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Doctoral thesis submitted in fulfilment of the requirements for the degree 'Doctor of Philosophy' in Philosophy

# **Powers for Dispositionalism**

## A Metaphysical Ground for New Actualism

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**Giacomo Giannini**

**Powers for Dispositionalism: A Metaphysical Ground for New Actualism**

**Abstract**

In this dissertation, I develop a metaphysics of powers to ground Dispositionalism, the theory of the source of modality according to which all alethic modal truths are grounded in dispositional properties instantiated in the actual world. I consider a number of key theses that powers metaphysics display, and investigate which can be incorporated in the metaphysical base of Dispositionalism, and how.

In the first part I examine the interaction of two core principles of powers ontologies: Directedness, the thesis that powers ‘point at’ their manifestations, and Independence, the thesis that powers can fail to manifest. These two principles are in tension: there is an argument, known as Too Much Possibility, to the effect that they are inconsistent. I examine various strategies to resist the argument. These involve Physical Intentionality, numerical identity between power and manifestation, process ontologies, and platonic universals. I conclude that they are all unsatisfactory.

In the second part, I develop a ‘minimal metaphysics of powers’ that is immune from the threat of Too Much Possibility. This involves considering unmanifested manifestations to be akin to (a suitably re-vamped version of) Mere Logical Existents. I argue that the best way to avoid the tension at the heart of powers ontologies is to conceive of unmanifested manifestations as non-essentially non-spatiotemporally located entities. I then consider some consequences of minimal metaphysics: I examine which ontological category the manifestations of power can belong to, and what are the prospects of grounding metaphysical, as opposed to natural, modality.

Finally, in the third part, I investigate whether further key theses of powers ontologies can be incorporated into the minimal metaphysics. This leads to discuss the relationship of the minimal metaphysics with grounding and dependency relations, the metaphysics of time, the truthmaking principle, and tendential theories of powers.

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*Potere e Potenza!*

Evronian Motto

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I do believe that we can get a grip on the truth-value of particular modal sentences only if we have a worked out theory of the source of modality. After working for some years on the topic, I cannot say that I am even close to that. Fortunately I do not need anything like a complete theory to know that it is not possible to have more loving, supportive, and caring parents than Inge & Dede: there is nothing I could ever write to acknowledge what I owe them.

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## 0. Introduction

The world could have been different than it is: Napoleon could have won at Waterloo, Flaubert could have never written the *Sentimental Education*, and I could have picked different examples of modal sentences. Some other things, on the other hand, must be the way they are: two plus two necessarily equals four, and everything must be identical to itself and nothing else. Some cases are less clear cut: it is unclear whether massive objects must be attracted to each other by gravitational force or they could have been repelling each other, or whether Socrates might have failed to have Phaenarete and Sophroniscus as parents. These are not specially selected facts. Modality is pervasive.<sup>1</sup> All truths (and falsities) have a determinate modal force: they are all either possible, impossible, necessary, or contingent.<sup>2</sup>

This raises two closely related questions. The first is to ask, for any particular fact, whether it is possible or not, necessary or not, *and how do we know this is the case*. This is a formidable challenge. But there is also a more general question, which is possibly even harder to answer to: *in virtue of what* something is possible as opposed to impossible, or necessary rather than contingent? Following Dummett (1959), we can re-state this question as follows: ‘What is the source of modality?’.

### 0.1 Powers and modality

In this thesis, I take a closer look to an apparently very intuitive answer to this latter question: that modal truths have their source in certain special properties present in the actual world: tendencies, capacities, potentialities, abilities, dispositions, and so on. Since for my purposes we need not worry about the fine-grained distinctions between these, I will use the umbrella-term ‘powers’ for them, and refer to the theory of modality that individuates the source of modality in actual powers as ‘Modal Dispositionalism’ (from now on, just ‘Dispositionalism’). The core idea of Dispositionalism, in its simplest terms, is that some

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<sup>1</sup> John Divers (1999) aptly refers to this as the principle of Modal Ubiquity.

<sup>2</sup> Of course, not all these are mutually exclusive: something can be both necessary and possible, for example.

irreducible properties concern and ground what individuals bearing them *can* do: the way something *is* tells us something about the ways that thing *could be* and what it *can do*. That is to say, powers are connected to their manifestations by a necessary connection of some kind; if powers and their manifestations can be said to be wholly distinct entities, then the view qualifies as anti-Humean, insofar as it contravenes the principle that ‘there is no object, which implies the existence of any other if we consider these objects in themselves’ (*T* 2.3. §IV).<sup>3</sup> According to the view, the potentialities of actual objects fix the modal facts and determine the topology and extension of modal space.

We can sketch Dispositionalism in its simplest form as the conjunction of the following two theses:

**DPoss:** ‘possibly *p*’ is true iff and because<sup>4</sup> there is some power whose manifestation, if manifested, would make ‘*p*’ true.<sup>5</sup>

**DNec:** ‘necessarily *p*’ is true iff and because there is no power whose manifestation, if manifested, would make ‘not-*p*’ true.

It is important to note that Dispositionalism does not aim to give us a reductive account of modality: we are not grounding modal truths in non-modal facts: powers are *modal properties*, and thus the view is in a sense a form of modal primitivism. How does this help answering

<sup>3</sup> This is commonly referred as ‘Hume’s *Dictum*’. However it is not obvious that powers metaphysics are anti-Humean because they violate the *dictum*, mostly because giving a precise characterisation of it is surprisingly tricky—see (Wilson 2010) for some elucidations. Depending on the chosen reading of Hume’s *Dictum*, a view according to which powers are all connected to one another by relations of metaphysical dependence might not count as ‘wholly separate’ entities.

<sup>4</sup> The clause ‘because’, although often omitted, is fundamental, for it distinguishes theories *of X* from mere theories *about X* (Wasserman 2016). Dispositionalism aims to be a theory *of* modality—that is, it aims to explain and ground global modal truths such as ‘possibly, *p*’ by appealing to powers, and not just to note that they line up nicely, extensionally: ‘iff’ is symmetric, and carries no explanatory value. The principle “possibly *p*” is true iff there is some power whose manifestation, if manifested, would make “*p*” true’ is available also to somebody who does not buy into Dispositionalism as a theory of modality, but simply recognises its extensional adequacy.

<sup>5</sup> Although I have formulated Dispositionalism in terms of sentences (and throughout the thesis will use sentences as truth-bearers), nothing hangs on this: everything I say in what follows would stand if we preferred the more common position and adopted propositions as truth-bearers.

the question about the source of modality, then? To see where the explanatory value of the theory lies, we have to first appreciate the great variety of modal truths that we normally deal with: general statements of possibility or necessity of the form ‘possibly,  $p$ ’ or ‘necessarily,  $p$ ’, counterfactual conditionals such as ‘were it the case that  $p$ , then it would be the case that  $q$ ’, modal auxiliaries such as ‘she might  $\varphi$ ’, and so on. Since the revival of interest in modality in analytic circles and the development of modal logic, and in particular ‘the discovery that the semantics of “possibly” and “necessarily” can be treated as a special case of the logic of the existential and universal quantifier, as long as we allow the quantifiers to range over an infinity of “possible worlds”’ (Vetter 2015: 1), philosophers have been taking the ‘global’ sentential operators ‘possibly’ and ‘necessarily’ as the fundamental and paradigmatic expressions of modality, and tried to reduce the other expressions to these.

Dispositionalism, on the other hand, holds that we should take *localised* modality as the bedrock, the ultimate source of all expressions of modality. Let’s try to unpack this statement. I understand the expression ‘ $x$  is the ultimate source of  $y$ ’ as involving some minimal *explanatory* constraints:<sup>6</sup>

**Why:** An explanation is an answer to a ‘why question’. In our case, ‘Why are some propositions necessary rather than contingent, and some possible rather than impossible?’

**Acylicity:** That  $x$  is explainable by  $y$  requires that  $y$  need not be in turn explained by  $x$ .

---

<sup>6</sup> Vetter (2015: 10) says that ‘metaphysical modality is... to be accounted for in terms of dispositional properties’. Given the fact that she includes grounding in her background assumptions (Vetter 2015: 26-8), we can safely understand her as maintaining that modal facts are *grounded* upon facts about dispositional properties. Given the controversies about every aspect of grounding, and in particular about the existence of a ‘big-G grounding’ (Wilson 2014; Berker 2018), I prefer to elucidate the notion of ‘ultimate source’ invoking more neutrally only the notion of explanation. Given that grounding, however understood, is commonly thought (but see Maurin 2019) to be closely connected to explanations, in that either it is itself an explanatory relation (Fine 2012, Dasgupta 2017), or metaphysical explanations track it (Audi 2012), I take my elucidation to be perfectly consistent with the spirit of Dispositionalism.

**Objective:** An explanation of this kind does not constitutively depend on our epistemic powers: it might be that  $x$  is explainable by  $y$  even if no one knows about that.<sup>7</sup>

**Ultimate:** If  $x$  is a K, there is nothing that is not a K which explains  $y$ .

Although these minimal constraints are probably not enough to offer a full-blown elucidation of ‘ultimate source’, hopefully they are enough for our purposes.

It is also not easy to offer a precise and satisfactory criterion for what counts as being localised. For the purposes of this Introduction, we can be satisfied by Vetter’s characterisation of the notion:

A potentiality is localised in the sense that that it is a property of a particular object... possibility, on the contrary, is not localised this way. Its being possible that such-and-such is not primarily a fact about any one particular object; it is a fact about how things in general might have turned out to be (Vetter 2015: 2).

This approach to the source of modality mirrors a recent and influential development with respect to another Aristotelian notion, that of essence. In a series of seminal papers in the ‘90s, Kit Fine has argued that we cannot reduce or ground the essence of particular objects to mere (global) necessities; rather, it is *localised essence*<sup>8</sup> that is prior to necessity and grounds it. Indeed, Dispositionalism and Essentialism are very similar theories about the source of modality: they both assert the priority of localised modalities over their global counterparts,

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<sup>7</sup> Why, Acicity, and **Objective** are a subset of the constraints on explanation offered by Romero (2019).

<sup>8</sup> Fine tries to capture locality in a more precise manner than the loose way I have adopted above, imposing an objectual constraint to the closure conditions which appeals to the notion of *objectual content of propositions*. See Fine (1994; 1995) for the details. It is far from clear that anything like a precisification of locality in terms of objectual content is available to powers ontologies. Although it would be very interesting to try to develop a suitably rigorous notion of locality for powers, for the purposes of this thesis the mere intuitive, rough characterisation will be sufficient.

and both strive to be ‘Hardcore Actualist’ (Contessa 2008) theories of modality; that is, they reject the idea that possible worlds (however conceived) should play a role in making modal statements true. In short, they both reject the idea that the Leibnizian biconditionals<sup>9</sup> are metaphysically informative, as it were. The main difference between Dispositionalism and Essentialism is that the former is a ‘possibility-first’ and the latter a ‘necessity first’ theory of localised modality.<sup>10</sup> In this thesis I will not explicitly thematise the relationship between these two theories, but their uneasy co-existence will emerge time and time again throughout.

It is important to bear in mind that philosophers have typically distinguished among various kinds of modality: natural (or nomological), logical, metaphysical, and so on, and debated which one is to be considered the most fundamental. What sort of modality is Dispositionalism aiming to ground? We can distinguish two brands of the project here, one ambitious and one more modest. The latter is characterised by the aim of grounding only *natural or nomological modality*, while the former aims at grounding metaphysical modality (understood as being the widest kind of modality: adopting the terminology of Hale (2013), the one involved in talk of *absolute<sup>11</sup> possibility and necessity*). Ordinarily, the difference between the two kinds of modality is thought to be this: natural necessity does not entail

<sup>9</sup> By Leibnizian biconditionals I mean the following: ‘possibly *p*’ is true iff ‘*p*’ is true at some possible world, and ‘necessarily, *p*’ is true iff ‘*p*’ is true at all possible worlds.

<sup>10</sup> The terms ‘possibility-first’ and ‘necessity-first’ are usually used to refer to different approaches to the epistemology of modality. Here I employ them in a metaphysical sense: for the potentiality theorist, the fundamental phenomenon makes possibility statements true, and necessity is to be obtained from there indirectly. It is tempting, but not necessary, to think that the epistemology would be isomorphic. Note that when I talk about ‘Essentialism’ here I have in mind *essentialist theories of modality* of the kind proposed by Lowe (2016), Hale (2013), Fine (1994; 1995; 1995b; 2015, Oderberg 2007, and Shalkowski 2008, that is, theories that have the explicit goal of locating the source of metaphysical modality in actual essences. I do not mean to include ‘Dispositional Essentialist’ theories of properties, such as Ellis’ (2000; 2001). Dispositional Essentialism is an interesting case when considered as a theory of modality (which is not!), because it seems to introduce both a primitive essence and a primitive potentiality operator that both have modal consequences, and are not reducible to one another: Saying that the essences of F is to have the power to  $\varphi$ , seems to entail  $\Box\Diamond\varphi$ , where box and diamond are generated by different, irreducible elements in the theory. Wildman (forthcoming) uses this as a counterexample against reductive essence-first accounts of modality.

<sup>11</sup> Although it is common to equate the notion of metaphysical modality with that of absolute or widest or most inclusive modality (*inter alios* Kripke 1980, Lewis 1986, Sider 2011, Hale 2013, Williamson 2016), it is not obvious that such equation is unproblematic: see Clarke-Doane (forthcoming) for a critique.

metaphysical necessity, whereas metaphysical necessity entails natural necessity: natural necessity is a sort of contingent necessity, as it were. Conversely, metaphysical possibility does not entail natural possibility, whereas natural possibility entails metaphysical possibility. That is to say: natural modality is strictly weaker than metaphysical modality. This is fairly easy to model in possible-world theoretic terms: natural modality concerns a subset of all the possible worlds, and natural necessity is to be understood in terms of a restricted universal quantifier. This familiar characterisation does not fit powers metaphysics and Dispositionalism, however, as both theories entail that laws of nature are metaphysically necessary (Bird 2007): in possible worlds talk, natural necessities would hold across *all* possible worlds. Nevertheless, I think that the distinction between the two kinds of modality should be retained.

In a one-world theory, such as Dispositionalism, the difference is not to be cashed out in terms of whether one modality holds only for a subset of possible worlds of the domain of the other, but rather in terms of what kind of entities in each world the modality is about: I take metaphysical or absolute modality to be about any entity whatsoever within each world, while natural necessity only holds for a subset of entities in each world (minimally, those located in spacetime). This preserves the idea that natural modality is weaker and more restricted than metaphysical or absolute modality: instead of restricting the domain of possible worlds upon which the quantifiers (equivalent to the modal operators) range, we restrict the domain of entities *within* a single world upon which the quantifiers (not equated with the modal operators) range. So, the difference between ambitious and modest Dispositionalism will revolve around whether powers can be truthmakers for sentences about non-natural entities: presumably, these might include sets, numbers, and other *abstracta*, together perhaps with logical operators (as in Hale 2013), if there really are any such things. We can spell out the two positions as follows:

**Ambitious Dispositionalism:** All modal truths concerning everything whatsoever are fixed by actual powers.

**Modest Dispositionalism:** A subset of all modal truths, those concerning natural entities, are fixed by actual powers.

The main goal of the dissertation is not to establish which version of Dispositionalism is preferable. However, the views developed in what follows will bear on the question, so the point will be addressed indirectly: I will suggest that Modest Dispositionalism is to be preferred.

## 0.2 The Big Picture

I am interested in examining a theory of the source of modality according to which modal truths are grounded in some special kind of properties: powers. This leaves us with two different, but closely related, lines of investigation: we have to spell out how, exactly, powers can ground *all* modal talk. That is to say, we have to provide a credible logic and semantics of powers-talk and show how we can reduce all global modal truths to the localised ones, as well as accounting for problematic cases. Call this the ‘semantic task’ for Dispositionalism. On the other hand, we have to make sure that we know what we are talking about when we talk about powers: what are, exactly, these properties that are supposed to do all the heavy-lifting in a dispositional theory of modality? Call this the ‘metaphysical task’.

This latter point is surprisingly obscure, despite (or perhaps because of) the recent explosion of interest in powers ontologies. Taking a closer look at the literature on powers, it turns out that many powers theorists have very different notions of what powers are supposed to be and how they should be characterised (Bird 2016, Groff ms.). What is worse, often they do not realise that this is the case, and end up talking past each other. So, we need to establish what powers are, if we are to ground modality on them. This task is

particularly urgent because it is not obvious that every account of powers is equally well-suited for the Dispositionalist project, be that modest or ambitious: not all conceptions of powers do an equally good job at grounding modal talk. Therefore, the confusion concerning the proper understanding of powers ontology threatens to undermine the Dispositionalist project as a whole, or at least to introduce very dangerous ambiguities at its foundations.

The main aim of this thesis is to remedy this confusion and formulate the best metaphysics of powers for Dispositionalism: that is, to take up the metaphysical task. By this I mean that I intend to provide an independently plausible and attractive theory of what powers are which can give Dispositionalism (either modest or ambitious) its best shot at being a satisfactory account of the source of modality. In order to do so, we need to meet two key *desiderata*. The first one is, naturally, that the metaphysics must not pose insurmountable difficulties for the semantic task—again, it must give Dispositionalism a good shot at being a satisfactory theory of (at least natural) modality. Call this the ‘modality *desideratum*’.

The second *desideratum* is that the metaphysics must still be recognisable as a metaphysics of *powers*, and be independently appealing for those friends of powers who are not primarily interested in the foundation of modality: it must share the core principles and elements of powers ontologies, so that dispositionalists can meaningfully interact with other powers theorists. That is to say, the differences with other metaphysics of powers must not be so great as to make them *radically* different, and thus avoid the risk of being accused of having changed the topic of conversation. The properties used by the dispositionalist must still be recognisable as powers. We must formulate a unitary framework, so that it makes sense to think that the same power ontology—and not simply a family of radically different but homonymous ones—can be put to use in the various projects that friends of powers are interested in, such as the foundations of modality, laws of nature, causation, theory of action, free will, etc. Call this the ‘integration *desideratum*’.

The goal of this dissertation is to strike the right balance between these two *desiderata*: I want to ground Dispositionalism in a metaphysics of powers that shares the core principles of, and thus can meaningfully interact with, other theories of powers which were developed with goals in mind other than grounding modality, and, at the same time, make sure that it gives Dispositionalism a chance.

Let's start by considering some theses that are ordinarily adopted by various powers theorists, to get a preliminary sense of the state of the playing field. Keep in mind that *not all power theorists accept all of the following, and not all of them are equally promising for Dispositionalism*. My goal will be to develop a **minimal metaphysics of powers for Dispositionalism**: to see which of the following theses the dispositionalist *must* accept, which ones she may, but need not, accept, and which ones she must reject, and show how the resulting blend is the best theory of powers *simpliciter*. The relevant theses are the following:

**Modal.** Powers are *modal* properties. The fact that powers are directed to their manifestations tells us what something could be or do.

**Irreducibility.** Powers are modal *properties*. Genuine dispositional predicates refer to ontic properties—entities in one's domain.<sup>12</sup> They cannot be reduced to simple conditionals or counterfactuals that hold in virtue of something that is not, itself, a power.<sup>13</sup>

**Directedness.** Powers are directed properties: their identity is determined<sup>14</sup> by what they are for. Powers have their modal profile essentially.

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<sup>12</sup> Bird (2016; 2018) equates being an ‘ontic property’ with being a fundamental or perfectly natural property. But characterising them as ‘ontic properties’ is perfectly orthogonal to questions concerning their degree of naturalness, basicness, of fundamentality—it is a further metaontological assumption that only fundamental or natural properties are *really there* (Fine 2001, Cameron 2010b) and thus are the only properly ontic properties.

<sup>13</sup> There is a long literature of attempts to such reduction or analysis, and an equally long literature of arguments for their failures. Since the topic has been so thoroughly discussed, I will not add to the pile. For some relatively recent discussion, see Choi (2009), Wasserman & Manley (2011), Vetter (2015).

<sup>14</sup> In what follows, I freely use ‘determine’ and ‘fix’ interchangeably: if  $x$  determines that  $Fy$ , then  $x$  fixes the  $F$  of  $y$ .

**Independence.** At least some powers, despite being instantiated, fail to bring about their manifestation.<sup>15</sup>

**Causality.** Powers are closely related to causality. This comes in at least two varieties: weak and strong. Weak: if there is causation, then powers are being exercised. Strong: If powers are being exercised, then there is causation—that is to say, *all powers are causal powers* (Shoemaker 1980, Bird 2007, Mumford & Anjum 2011).

**Productivity.** Powers are productive: they bring about their manifestation by *producing it* (Mumford & Anjum 2011, Groff 2013).<sup>16</sup>

**Dynamism.** Powers are *dynamic* and active.<sup>17</sup> A world of powers is not a passive mechanism that receives its activity from an external source, but is itself the source of change (Mumford & Anjum 2011; 2018, Groff 2013).

**Tendency.** Powers confer a tendential, *sui generis* kind of modality, stronger than mere metaphysical or natural possibility but always short of natural and metaphysical necessity (Mumford & Anjum 2011; 2018).

What are the ingredients for the minimal metaphysics of powers? In what follows, I will take **Modal** and **Irreducibility** as given: I will take it for granted both that powers are irreducible to global modalities such as counterfactuals, and that they are genuine properties. I will also assume that powers can be truthmakers for at least some modal claim:

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<sup>15</sup> ‘Power is one thing; its exertion is another thing. It is true, there can be no exertion without power; but there may be power that is not exerted’. (Reid 1983: 302).

<sup>16</sup> This thesis can be seen a particular variation of Strong Causality: causation is productive, and since all powers are causal powers, powers are productive, too; at least, this is how I take Mumford & Anjum (2011) to understand it. However, I think that the two theses can be separated, and that Productivity only aims to capture the idea that manifestations are borne out of powers, in some sense—whether causally or not might not be as vital.

<sup>17</sup> It is not easy to offer a precise specification of the distinct meaning that these two terms have within the picture offered by radical powers theorists: they are usually used together and belong to the same family (Groff 2013: 215). I take it that ‘active’ concerns the location of the causal oomph, as it were (within the entities in the world, rather than in the laws) and ‘dynamical’ is more concerned with the peculiar way in which powers are exercised. I will focus especially on this feature, when discussing **Dynamism**.

the challenge will be whether we can get *every* modal truth out of them. The conjunction of **Modal** and **Irreducibility** is the core idea of Hardcore Actualism: that modality is not to be ‘outsourced’ (Vetter 2011:743) to possible worlds. Possible worlds (however conceived) should not play a role in making modal statements true, and Leibnizian biconditionals are not metaphysically informative. In particular it is very important to stress that I will take as a starting point the version of **Modal** proposed by Barbara Vetter in her book *Potentiality* (2015), namely that powers are first and foremost truthmakers for simple ‘can-sentences’ such as ‘Finola can escape from Blenheim Park’ and ‘Ana can sing *Heart of Glass*’, in turn directly connected with ‘global’ sentences of possibility such as ‘it is possible to escape from Blenheim Park’, as opposed to the (perhaps more common) idea that powers and dispositions are most closely associated with counterfactual conditionals (Bird 2007, Jacobs 2010, McKittrick 2018). Vetter has a number of interesting and, to my view, convincing arguments for this,<sup>18</sup> which I will not rehearse here. This is due to the fact that this dissertation has a somewhat modest scope, insofar as it is primarily concerned with the *metaphysical* task, and not the *semantic* task. I believe that most of what I say in this dissertation would be, with relatively small adjustments, compatible with the idea that powers are primarily truthmakers for counterfactual conditionals, but I will not attempt to show how this can be done in what follows. I will adopt Vetter’s brand of Dispositionalism as far as the semantic task is involved unless explicitly stating otherwise throughout the thesis: it is by far and large the best and most fleshed-out version of the theory on the market.

On the other hand, I will discuss at length **Directedness** and **Independence**. I take both to be at the core of the minimal powers metaphysics. However, they are surprisingly difficult to square with each other: there is, *prima facie*, a strong tension between them (to the point that we can formulate an argument, known as ‘Too Much Possibility’, to the effect that the two theses are inconsistent) which we will have to dispel. Disarming Too

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<sup>18</sup> Aimar (2019) has an interesting argument to the effect that dispositions ascriptions are semantically equivalent to possibility claims, supporting Vetter’s theory. See also Kratzer (2012).

Much Possibility will involve exploring and mapping an intricate web of relations that obtains between powers and their manifestations. I will pay special attention to the interaction of two relations of dependence: on the one hand, I will defend the idea that powers depend for their identities upon their manifestations (call this ‘metaphysical dependence’ of powers upon their manifestations): a power has the identity that it has in virtue of the fact that it is a power *for* something.

On the other hand, powers are responsible for bringing their manifestations about —so, in another sense, it is the manifestations (and their occurrence) that depend upon powers (call this ‘productive dependence’ of manifestations upon powers). This results in a picture where powers and their manifestations are linked by complex, criss-crossing dependence relations. The picture has some surprising consequences: first of all, if we think that dependence tracks relative fundamentality, it entails a form of anti-foundationalism: in a powers ontology there cannot be a collection of absolutely fundamental, ungrounded entities. Secondly, it pushes the ontology of powers towards Necessitism, the view that necessarily, everything exists necessarily. Exploring and accounting for the interaction of **Independence** and **Directedness**, mapping the consequences of their relations, and finding the best way to resist Too Much Possibility will keep us busy for a considerable portion of this thesis, and will be the springboard for the central element of the theory of powers I develop.

The picture I will present, painted in very broad strokes, is this. Powers are genuine, ontic properties directed to their manifestations; manifestations fix the identities of the powers. When powers are exercised successfully, they bring about their manifestations. Saying that powers are directed to their manifestation means that there is a relation, call it ‘Directedness’, obtaining between powers and what they are for. Powers depend for their identity upon the identity of their manifestation, in virtue of the fact that they are related to it by Directedness. Such a relation commits us to the existence of both *relata*: both powers and their manifestations exist, or are something, *simpliciter*. Powers are directed toward their

manifestations even if they might not bring those manifestations about. I will argue that we have to take this at face value and accept the existence of unmanifested manifestations (that is, manifestations that have not been, and never will be, brought about). What is the ontological status of unmanifested manifestations? I will argue that the best way to characterise them is somewhat akin to Williamson's (1998; 2002; 2013) mere logical existents. However, we have to modify Williamson's characterisation of them if we accept Dispositionalism: instead of being treated as *contingently* non-located entities, they should be thought of as *non-essentially* non-located entities.

This will allow us to spell out what it means for a manifestation to become manifested: it means for it to acquire a spatio-temporal location. This view leaves us considerable freedom when it comes to the ontological category of manifestations of powers: powers can be directed towards tropes or states of affairs—I will argue that these are better candidates than universals as manifestations—and even towards particulars. This flexibility, I believe, represents a considerable advantage for the semantic task of Dispositionalism, because it will allow to give an account about *de re* sentences about merely possible individuals, as well as (suitably re-interpreted) claims about contingent existence, which may otherwise be hard to accommodate (Leech 2017; Kimpton-Nye 2018; forthcoming). Thus, the picture of the world that will emerge is going to be one network of particular entities (be they tropes or states of affairs), some of which are concrete and spatiotemporally located, and some of which are mere logical existents, all interconnected by criss-crossing dependence relations that fix the identities of the nodes—in a sense, the picture is akin to one of Leibnizian monads, insofar as each node of the network is a particular that is not reduced to the totality of relations, and yet is essentially related and contains all information about all<sup>19</sup> other particulars.

This is a *minimal* metaphysics of powers: it only encompasses the core and necessary elements that *any* theory who wants to qualify as a powers ontology must have. However, it

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<sup>19</sup> Assuming that there are no ghost-systems of powers, that do not interact with one another (Williams 2010; 2019).

can be enriched by adding some of the other theses mentioned above, such as (weak or strong) **Causality**, **Productivity**, and **Dynamicity**. Call ‘radical powers metaphysics’ any theory that accepts one or more of the other theses, alongside the minimal metaphysics. The possibility of radicalising the minimal ontology of Dispositionalism allows dispositionalists to share their ontology with other power theorists involved in other debates, thus ensuring that there could be meaningful communication between them, and they could form a common anti-Humean front, as it were.

In very broad strokes, here are a couple of examples to show that the minimal framework can be radicalised. Although I will largely ignore the relation between powers and causation, I suggest that the minimal metaphysics offers in principle no obstacle to the adoption of **Causality**. This is because it is a consequence of the minimal theory that powers can only have as manifestations entities that can exist in spacetime (and, indeed, for a manifestation to be manifested just is to acquire a spatiotemporal location). This means that the minimal framework excludes that powers could be directed towards those entities that *cannot* enter causal relations, namely *abstracta*. This does not, by itself, suffice to establish that all powers are causal powers (**Strong Causality**) or not even that powers are involved in every causal process (**Weak Causality**)—it leaves open the possibility that certain powers bring about their manifestations non-causally. More work needs to be done to exclude such possibility. However, the minimal metaphysics limits the domain of manifestations of powers to the right extent. This fits rather uneasily with Ambitious Dispositionalism: metaphysical modality, we have said, concerns every entity whatsoever, including *abstracta*. However, it is compatible with Modest Dispositionalism. **Causality** is not going to be central in what follows, and its acceptance is not necessary for the purposes of the project of grounding natural modality; however, it is a positive consequence that a suitable ontology could be available to the philosopher who is interested in accounting for *both* causation and natural modality.

**Productivity** and **Dynamism** are more interesting for the dispositionalist project, and will be discussed in more detail. As far as the former is concerned, in presenting the minimal metaphysics I will highlight that manifestations (and, in particular, the obtaining of the manifestation) depends upon the power that brings it about: minimally, this means that manifestations depend for their spatio-temporal location upon the fact that their powers are themselves located. I will call this notion of ontological dependence ‘productive dependence’. While I think that this notion is enough to capture the intuition that powers are responsible for the obtaining of their manifestations, it is probably too weak and lightweight to capture what certain proponents of **Productivity**, such as Mumford and Anjum, have in mind. However, just like the case of **Causality**, there are in principle no obstacles in adding the extra elements needed to implement a more heavy-weight version of **Productivity**, if one so wishes. I will suggest that a suitably stronger version of **Productivity** can be obtained by adding irreducible processes to the mix, which is a perfectly consistent development to the minimal theory. The presence of irreducible processes is also the core of **Dynamism**. The fact that the introduction of irreducible processes is consistent with the minimal metaphysics does more than just showing that dispositionalists can be in the same conversation as radical powers theorists and do not risk to past talk each other, however: I will argue that accepting **Dynamism** allows us to acquire a much firmer grip on the debate over the temporal direction of powers, re-framing it in terms of a debate over the direction of time’s arrow. This, in turn, could contribute significantly to the semantic task of Dispositionalism, because it allows us to offer a semantics of dated possibility claims (such as ‘It is possible for Sarah to eat *raclette* Monday at 7’) without having to introduce a multitude of merely possible dated states of affairs, such as [Sarah eats *raclette* Monday at 7], [Sarah eats *raclette* Tuesday at 8], etc. Thus, I will argue that even if she does not need to, the dispositionalist should welcome a radicalisation of the minimal metaphysics, as to include at least a light-weight version of **Productivity** and **Dynamism**: the best metaphysics for Dispositionalism shares more elements with radical powers ontologies that one might first think.

Some of the theses above presented are obviously incompatible with a powers ontology that aims to ground Dispositionalism: in particular, **Tendency** cannot, evidently, be squared with the project of grounding necessities upon powers; therefore, it cannot be part and parcel of the minimal metaphysics of powers for Dispositionalism. However, it is not enough to rule out the thesis on the ground that it would represent an insurmountable hurdle for the project I am interested in: in order to fully meet the second *desideratum*, we also need to show that **Tendency** is not a legitimate extension of the minimal metaphysics. Otherwise, we would introduce the possibility of an unbridgeable gap in the middle of powers ontologies. It will turn out that this is not as easy as one might think: I will suggest that we should exclude **Tendency** from the metaphysics of powers on the basis of considerations from theoretical virtues only.

The two *desiderata* (modality and integration) sometimes pull us in different directions, but are both equally important. Metaphysics is a systematic and holistic discipline —reality is a unitary and interconnected system. Even when we zoom in on a particular problem, we must offer a solution that could be employed elsewhere. If powers metaphysics and in general Anti-Humeans are to become a serious competing research tradition and hope to replace the dominant, Neo-Humean paradigm, they must show that they can do a better job in grounding modality without hampering one's ability to deal with other problems in metaphysics, as well as other fields of philosophy. If powers metaphysics turned out to offer a better theory of modality but prevented us to deal with<sup>20</sup> problems about persistence, mereology, objective chance, emergence, time, free will and so on, its chances to replace Humeanism would look rather grim, since that framework has proved to be immensely fruitful and influential in all those fields. The minimal theory that I develop in what follows aims to take a step in this direction, and offer a common metaphysical ground for a number of philosophical projects involving powers.

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<sup>20</sup> By this I mean either offer a novel and more convincing account of these phenomena, or more modestly just adopt the existing theories.

### **0.3 Structure of the Dissertations and Chapter Outline**

The thesis is structured as follows. I start by setting out the a problem at the heart of powers metaphysics in chapter 1 — the tension between Directedness and Independence, and the argument which can be derived from this tension, called Too Much Possibility. Too Much Possibility targets the ontological status of the manifestations of those powers that are not exercised: these manifestations seem to both exist (because powers point at them) and not exist (because they are not manifested). Much of the thesis will revolve around the solution of this problem. In the chapters 2 and 3, I consider two attempts to dissolve Too Much Possibility by showing that it is a pseudo-problem, based on a misunderstanding of powers metaphysics.

In chapter 2, I examine the first such attempt, proposed by Anna Marmodoro. It involves adopting the view according to which powers are numerically identical to their manifestations, and hence the non-existence of unmanifested manifestations is not an issue.

The second attempt, examined in chapter 3, involves adopting a process ontology, claiming that Independence is ambiguous, and therefore that it should be substituted with a clearer principle, Interrupt, according to which every process can be interrupted before reaching its natural endpoint, but maintains its identity even if interrupted — thus avoiding the tension between Directedness and Independence by simply abandoning Independence. I argue that both attempts at dissolving Too Much Possibility fail, and that the solution to the problem will have to involve abandoning one of the intuitively compelling background premisses to the argument.

In chapter 4, I first consider whether we can solve Too Much Possibility by denying that Directedness is a genuine relation which ontologically commits powers theories to the existence of (unmanifested) manifestations — a strategy that I call the ‘Physical Intentionality Route’. I argue that this strategy is doomed to fail, because powers metaphysics finds itself committed to manifestations even if Directedness is not a relation. I conclude the chapter by recognising that the only viable way to avoid the contradiction

threatened by Too Much Possibility is to recognise that unmanifested manifestations do exist, but have a peculiar ontological status — a strategy that I call the Actualisation Route. The question that comes to the fore, then, becomes what is this peculiar ontological status: what is the difference between manifested and unmanifested manifestations.

In chapter 5, I examine the existing views that follow the Actualisation Route: taking unmanifested manifestations to be existing but non-actual entities, and taking them to be uninstantiated universals, either Platonic or Aristotelian. I argue that neither of these options is fully satisfactory. In particular, I argue that adopting universals as manifestations of universals make it hard to see how Dispositionalism could account for *de re* truths about merely possible individuals, and that they make it hard to account for Independence while preserving the link between a universal and its instances.

Chapter 6 is the heart of the thesis. Here I offer my solution to Too Much Possibility — a solution that requires us to rethink some key aspects of the metaphysics of powers. I argue that the key factors that shape the ontology of powers and carve it at its joints are a primitive essence operator and the property of being spatiotemporally located: unmanifested manifestations, in particular, are to be understood as those entities that are not essentially located in spacetime. With these resources, I present my theory, which I call the ‘minimal metaphysics’ of powers. Most of the rest of the dissertation is dedicated to exploring the consequences of the adoption of this theory and its categorical structure.

In chapter 7 I return briefly to what ontological categories are compatible with a powers ontology, and I conclude that either states or affairs, tropes, or particulars are well-suited to be the manifestations of powers.

In chapter 8, I turn to the question of whether the minimal metaphysics that I have presented in chapter 6 can (and should) be “radicalised”, by adding to it some further, more controversial theses that are defended by some powers theorists, such as Productivity or Dynamism. I argue that both theories can be easily added to the minimal theory, and indeed they are a natural and welcome fit. This discussion leads to exploring the relation between

my framework for powers and questions about fundamentality and the metaphysics of time. I argue that powers sit rather uncomfortably with foundationalism about fundamentality, and that the theory I develop is most naturally associated with Eternalism.

In chapter 9, I turn to some problems that confront the minimal metaphysics with regard to truthmaking. Admitting mere logical existents in my ontology, I risk to have to admit that some contradictions are made true, and that everything that is possible is also true, in virtue of the fact that it has a truthmaker. To solve these problems, I adopt a form of truthmaking pluralism, to the effect that there are different kinds of truthmaking relations — and I distinguish between sentences about concreta, which are made true by spatiotemporally located entities, and sentences about abstracta, which are more naturally understood as being made true by the essences of abstract entities instead.

In the last chapter, I return to Independence, and examine its scope, its relation with tendential modality, and whether it presents problems for a dispositionalist foundation of necessity. I contrast two views concerning the source of Independence: one which maintains that Independence is constitutive of what it is to be a power, and therefore holds unrestrictedly, and another which maintains that Independence is grounded on more basic facts about powers, and which offers the possibility of restricting its scope. Investigating the source of Independence offers some important insights in the form that Dispositionalism will take, especially where the grounding of necessities is concerned. I present a model according to which Independence is grounded upon the degrees of powers, and show how this view fits with the grounding of necessities. I conclude that the account is preferable to the constitutive view of Independence on grounds of theoretical virtues.

I conclude the thesis highlighting the interplay between powers and essences that the minimal metaphysics has brought to centre-stage, and suggest that this is the critical point that new actualist theories of modality need to investigate.



## Chapter 1. The problem of Unmanifested Manifestations

The overall aim of this dissertation is to work out the details of a metaphysics of powers that is well-suited to act as foundation for Dispositionalism. In order to do so, we must make sure that a minimal version of powers metaphysics is in good order, or Dispositionalism will never even get off the ground. By this I mean that, regardless of its success in acting as the right basis for the semantic task of Dispositionalism, the minimal metaphysics of powers must be consistent and independently attractive as a theory of reality. It will turn out that this is far from easy or obvious: there is a deep-rooted tension at the core of any theory of powers that we will have to dispel before we can proceed. In this chapter, I will start by introducing and clarifying two core principles that characterise every metaphysics of powers (§1.1) and spell out the tension that arises between them. This tension is rather serious: an argument can be formulated to the effect that the two theses are inconsistent. Following Armstrong (1997) and Bird (2006; 2007), call such argument ‘Too Much Possibility’ (§1.2). In §1.3, I consider two ways to understand Too Much Possibility.

### 1.1 Two Principles of Power Ontologies

The first part of this thesis will be devoted to examining the interaction of two key principles of powers ontologies. Call these **Directedness** and **Independence**. These can be summed up as follows:

**Directedness:** Powers are directed towards their manifestation;

**Independence:** There are powers which exist without their manifestations ever being manifested.<sup>21</sup>

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<sup>21</sup> I adopt this reading of the principle for the sake of ease of exposition. The principle is often presented in modal term, along the lines of ‘(some) powers can fail to bring about their manifestations’. I will return to the difference in formulations in §10.

Let me say something more about each of these before moving forward.

**Directedness** is the guiding principle of any powers ontology: ‘Powers, or dispositions, are properties *for* some behaviour, usually of their bearers. These properties have an object towards which they are oriented or directed’ (Molnar 2003: 60). This is the usually taken to be what constitutes the anti-Humeanism of powers metaphysics: distinct entities (powers and their manifestations, be them other properties, events, facts, or what have you) are nevertheless essentially linked: a vase’s fragility is essentially connected to something else that is *beyond itself*, as it were: its breaking. What it is to be fragile is to be directed to breaking. In other words, ‘Having a direction to a particular manifestation is constitutive of the power property’ (Molnar 2003: 60). I will refer to this link between distinct<sup>22</sup> existents as the directedness relation.<sup>23</sup>

The directedness relation is constitutive of powers because it contributes, although indirectly, to the identity of the power. In particular, it is in virtue of the fact that a power is connected by directedness to its manifestations that the manifestations fix the identity of the power—a power P has the identity that it has because it is a power *for* a certain manifestation; and it is linked to that manifestation because it is directed towards it. It is important to note that there might be more to the identity of a power than its manifestations. In particular, I think that the degree of a power plays a key role and is constitutive of the identity of token-powers just as much as their directedness is.<sup>24</sup> By ‘degree of power’ I mean what captures the *intensity* of a certain power: a ‘strong’ power to

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<sup>22</sup> It is controversial that directedness links numerically distinct entities: for instance, Marmodoro (2017) denies it. I will discuss her position in chapter 2.

<sup>23</sup> Note that it is controversial that directedness is to be understood as a relation. For instance, Williams (2019), Contessa (forthcoming), Marmodoro (2017), Ingthorsson (2013), Martin (2008), Heil (2003), and Molnar (2003) all reject the idea. I will discuss this point with due detail in chapter 4.

<sup>24</sup> Those who think that powers are most closely connected to counterfactuals or manifestation ascriptions, instead of simple ‘can’ sentences (paradigmatically, Bird 2007), will also stress the fact that the stimuli conditions (or mutual manifestation partners, or ‘constellations’ (Williams 2019)) play a role in fixing the identity of the power. Similarly, those who think that token powers are modes (Molnar 2003) will maintain that the token-identity of the power is partially determined by its bearer (*Socrates*’ mortality differs from *Plato*’s mortality).

break is a different property than a ‘weak’ power to break. However, the role of the degrees of powers will largely be irrelevant until chapter 10. Therefore, in what follows I will ignore the degree of powers, and freely speak only of manifestations determining the identity of a power: bear in mind that this is just for readability reasons, and I always implicitly mean that a manifestation *partially fixes* the identity of a power, and that there might be additional factors at play.

For the time being, I will focus on the fact that ‘a power’s type-identity is given by its definitive manifestation’ (Molnar 2003: 60). Note that I am here talking about

individuation in the metaphysical sense, rather than the cognitive sense. Cognitive individuation is a mind-dependent act that involves singling out an entity in thought. Although it is true that we cognitively individuate dispositions by thinking about the manifestations that they are dispositions for, this is not the kind of individuation that is at issue above. Even if minded creatures were not to exist, it would still be the case that the nature of a disposition is determined by the type of manifestation that it is a disposition for. Thus, in speaking of the individuation of dispositions, we are speaking of a mind-independent *metaphysical* determination relation that distinguishes a given dispositional property from all other possible dispositional properties (Giannini & Tugby 2020).

I will say more on this sense of metaphysical determination in this chapter 4, as well as in chapter 8. The other key principle for the minimal powers ontology is this:

**Independence** There are powers which exist without their manifestations ever being manifested. That is to say, some powers can either exist without ever being exercised, or fail to bring about their manifestations even if they are exercised.

The principle is best expressed by Molnar:

The occurrence of the manifestation of a power depends on the existence of the power, but not vice versa. Powers can exist in the absence or in the presence of their manifestations and so are ontologically independent of the occurrence of the manifestations. (Molnar 2003: 82)

We can distinguish various readings of this principle, of increasing strength:

- **Time-Independence**: An individual power (token) might exist unmanifested for some time, but it has to manifest at some other (later?) time.
- **Token-Independence**: A token power  $P$  of kind  $O$  might exist and be forever unmanifested, but some other power of kind  $O$  has to be manifested at some time.
- **Type-Independence**: There could be a kind of powers that never manifest. ‘There is type-independence iff a disposition trope of kind  $O$  can exist without a manifestation of any trope of kind  $P$  existing’. (Molnar 2003: 82)

Most power theorists, I take it, favour **Token-Independence**: **Time-Independence** is way too weak; on the other hand **Type-Independence** seems to be too strong and bears unwelcome consequences.<sup>25</sup> However, I will argue that **Token-Independence** is untenable, and collapses into **Type-Independence**, and so we should adopt the strongest version of the principle.

**Token-Independence** is an exception-making thesis: it states that powers of a certain type generally manifest—meaning that at least some of them *must* do so, but some specific individual might be an exception and remain unmanifested. As any exception-making theory, it needs to justify i) why there could be exceptions and ii) why couldn’t the exception be the norm, that is, how it can exclude that **Type-Independence** is the case. It is this latter task that **Token-Independence** struggles to meet. Assume, for the time being,

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<sup>25</sup> For instance, they would be epistemically untraceable. If one is attracted to the Eleatic Principle for epistemic reasons (see Colyvan 1998 for discussion), then type-independent powers pass the test but betray its spirit.

that **Independence** is an intrinsic feature of powers *qua* powers.<sup>26</sup> Now consider the following dilemma for **Token-Independence**: either A) there is something special about the unmanifesting tokens, or B) there is not. If B) there is not, then we have to admit that *any* power token could fail to bring about its manifestation: there is no principled reason to say that P could fail to bring about M and P\* could not fail to bring about M\* if there is nothing special distinguishing the two. This means that we could pick an *arbitrary* power-token and say that *it* could fail to bring about its token manifestation. But, given that the token-independent power was arbitrarily picked, if we are operating in a non-free logic that accepts universal generalisation ( $A \rightarrow \forall x A$ ) we have to conclude that every token power is token-independent. If F is true of an arbitrary  $x$  of the domain, then  $\forall x Fx$ . In slogan terms: if it holds for any whatsoever, then it holds for everything whatsoever. If this is the case, then we have to conclude that *every* token power is token-independent, and so it is possible that each token power fails to bring about its manifestation. But this possibility just is an instance of **Type-Independence**: a type is not manifested unless it has any token that is.<sup>27</sup> That is to say: a generalised **Token-Independence** just is **Type-Independence**.

What if we choose the other horn of the dilemma, A) that there is something special about the token-independent powers? Call this distinguishing feature K, and maintain that only a subset of the power tokens of a certain type happen to have it. The subset can easily be construed as requiring to be a power and having K. But then it would seem that **Token-Independence** is not a feature of *powers* per se, but rather of Ks: K is the difference-maker and hence the truthmaker of **Independence**. But our initial assumption was that **Independence** was a principle of powers *qua* powers. Of course, that assumption

<sup>26</sup> This is not a hefty and not uncontroversial assumption. I will return to this point, and discuss it in detail, in chapter 10.

<sup>27</sup> If we have Aristotelian sympathies when it comes to the type/token distinction, we might perhaps even be tempted to maintain that a type does not *exist* unless at least a token is manifested. As it will become clear in what follows, I do not share such sympathies; furthermore, considerations such as these are irrelevant for establishing whether **Independence** should be read in its Type or Token version.

might be rejected.<sup>28</sup> But, as long as the assumption is granted, we have to accept the stronger reading with unrestricted scope: every power-token, and every kind of powers, can fail to manifest. This will have consequences when we examine whether Aristotelian Universals could be the manifestations of powers (§5.2).

## 1.2. The Problem

From **Independence** and **Directedness** we can derive a contradiction. The argument, also known as Too Much Possibility, was first offered by David Armstrong:

Consider, then, the critical case where the disposition is not manifested. *The object still has within itself, essentially, a reference to the manifestation that did not occur.* It points to a thing that does not exist... how can a state of affairs of a particular's having a property enfold within itself a relation (of any sort) to a further first-order state of affairs, the manifestation, which very often does not exist? We have here a Meinongian metaphysics, in which actual things are in some way related to non-existent things (Armstrong 1997:79).

There are two ways to unpack the argument. The first is by considering powers metaphysics in a broadly Quinean metaontology, according to which we are ontologically committed only to the entities that are bound by the existential quantifiers of the formalisations in classical logic<sup>29</sup> of our best overall scientific-cum-metaphysical (see Sider 2011 for the addition of the metaphysical part) theory. Adopting a powers metaphysics involves,

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<sup>28</sup> For instance, one might think that K is the *degree* of a power (Vetter 2015). Note that even if we accept that Independence is not a feature of powers qua powers but rather of some K, this alone would not be enough to prove that **Token-Independence** does not collapse into Type Independence: we would need also to show that, for every type of powers T, some but not all token Ts are K —for instance, that for every type of powers, some have maximal degree and some do not. This would be a very substantial thesis to prove, *even if we admit that certain powers have maximal degrees and some do not*, to the point that one might think that the burden of the proof lies in the camp of those who deny the collapse. I will discuss the assumption that **Independence** is a feature of powers qua powers in much more detail in chapter 10.

<sup>29</sup> I use ‘formalisation in classical logic’ over ‘first order logic’ because what is at stake here is the existence of certain properties, and offering a nominalistic translation of the claim would be exceedingly laborious. I take it that the amended Quinean theory captures reasonably well Armstrong’s own metaontology, given that he was a staunch realist about universals.

minimally, a commitment to the idea that our best overall theory includes sentences referring to powers or quantifying over powers: if one adopts a powers metaphysics, then she will maintain that powers are at least sometimes involved in our best overall theory of the world.<sup>30</sup> Now, if **Directedness** holds of powers, and this is taken to mean that, constitutively, powers are related to their manifestation (where the manifestation of a power is a certain entity, and not just some sentence made true by the power), it will follow from classical logic that also the manifestations of powers are part and parcel of our best overall theory: we are ontologically committed to them, too, by virtue of the fact that we are committed to the existence of powers and the relation that links powers and manifestations — and we are free to apply Existential Generalisation on the second *relatum*. Here is where the tension with **Independence** emerges. **Independence** states that certain powers can fail to bring about their manifestations. If we take this to mean that, when a power fails to bring about its manifestations, these simply do not exist, we get into serious trouble. Our best theory of the world makes reference, via **Directedness**, to manifestations, and so by Quine's lights we are ontologically committed to them. But, by **Independence**, we are also committed to the idea that sometimes they do not exist, since certain times powers can fail to be successfully exercised. But this leads to serious problems: we are both ontologically committed to unmanifested manifestations and we are not ontologically committed to them.

Armstrong's argument, as presented in the quotation above, is slightly different: he skips the contradiction in our ontological commitment, and focuses on a different bad result. This is because, I think, he directly considers an answer to the original problem, (and he takes it to be the only answers), which he thinks, at the end of the day, to be equally unsatisfying.

A most natural solution to the tension between Directedness and Independence is to introduce two kinds of existential quantifiers: one “inner, serious”, for which Existential

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<sup>30</sup> Often powers theorists will be more ambitious: they will maintain that powers appear at the fundamental level (Mumford 2006, Bird 2007).

Generalisation *does not hold*, and one “outer, lightweight” for which the rule does hold. In this way, we can modify the Quinean criterion for ontological commitment and say that only the variables bound by the *inner* existential quantifier are part of our ontology. If we adopt a powers metaphysics, we will admit that certain powers are quantified over by such inner, serious existential quantifier, but that the theory in itself does not quantify in a similar manner over manifestations (or, at least, not over unmanifested manifestation). Then, we admit that, given **Directedness** and the relation between powers and manifestations, by existential generalisation we can also quantify over manifestations. But, as we know, Existential Generalisation holds only of the “outer, lightweight” quantifier. Thus, we need not derive any ontological commitment about manifestations. If we interpret **Independence** to be formulated in the inner quantifier, we can avoid the contradiction: powers exist “seriously”, but manifestations only exists in a “lightweight” sense, and ontological commitment is only determined by the serious quantifier. If we read the serious quantifier as ‘exist’ and the lightweight one as ‘there are some’, we escape the contradiction by saying that ‘there are things that do not exist’. This is a paradigmatic statement of Meinongianism. Thus, Armstrong concludes, powers ontologies are committed to a kind of Meinongian ontology — which he takes to be a unacceptable result.

The first argument (the one concluding to the fact that powers theorists are both committed to the existence and non-existence of powers) relies on the following five background assumptions:

- I. Directedness is a relation.
- II. Existential Generalisation is admitted.
- III. Being manifested = coming into existence/becoming something.
- IV. Existence is captured by unrestricted existential quantified translations of our best theories.
- V. The formalisation of some of our best theories involves quantification over powers.

The second argument (the one concluding to the fact that powers theorists are offering a Meinongian ontology), on the other hand, relies only on the following background assumptions:

- A. Directedness is a relation
- B. There are two existential quantifiers (an inner and an outer), and only for the latter does Existential Generalisation holds
- C. Being manifested = coming into existence
- D. Existence is captured by the inner existential quantified translations of our best theories
- E. The formalisation of some of our best theories involves inner quantification over powers

Both arguments, if sound, would be bad for any kind of powers metaphysics— many friends of powers, being hardcore actualists, would not appreciate belonging to the same disreputable club that admits Meinongians. It would seem, therefore, that friends of powers need to reject (or suitably modify) one among **Independence**, **Directedness**, or the relevant background assumptions to avoid both versions of the arguent. This sets the initial agenda of the dissertation: I will examine various strategies that can be adopted to resist Armstrong's problem. Since I take it that both **Independence** and **Directedness** are non-negotiable linchpins for any theory of powers, avoiding the contradiction will typically rely on the rejection of one of the background premisses.

### 1.3 Which Formulation?

Before moving on to consider the various strategies available to resist Too Much Possibility, we should ask ourselves: which version of the argument should we focus on? The background assumptions I will be interested in are I. and III. (A and C) which are at the centre stage in either formulation, so it does not seem that much hangs on the choice of how Armstrong's argument is cashed out. Indeed, I want to stress that both formulations

can manage to bring into focus the contrast between **Directedness** and **Independence** which represents the core worry of the first part of this dissertation, and so they would both serve their purpose. This being said, it is more convenient if we settled on one formulation — if anything, for reasons of clarity.

I am inclined to adopt the first formulation. There are two main reasons for this choice, and they are somewhat symmetrical. Both are purely dialectical, and so carry only relative weight, but I think we should take them into account nonetheless. The first is that some philosophers who subscribe to the Quinean orthodoxy will find the introduction of an outer quantifier outright unacceptable. Although, in the end, I will maintain that the culprit of all the troubles connected with Too Much Possibility is assumption III/C, and my solution will not require the adoption of free logic, many philosophers sympathetic to Armstrong's position (and to hardcore actualism) will find even the momentary assumption of B. to be unacceptable. The second worry is specular: those philosophers who, on the other hand, are happy to allow for an outer quantifier and the adoption of free logic, will not see anything wrong in the conclusion that Too Much Possibility arrives at. So, they will not see the urgency of solving the problem — the argument does not conclude to an inconsistent position. Note here that Armstrong equates the adoption of free logic with Meinongianism, but that is perhaps a bit too strong: the adoption of free logic is a necessary but not sufficient condition for most Meinongian ontologies, and is typically associated with *possibilism* or *contingentism* (Williamson 2013), which is a weaker position than full blown Meinongianism.<sup>31</sup>

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<sup>31</sup> Some additional theses that are needed to go from possibilism or contingentism to full blown Meinongianism might be the following: The Characterisation Principle: for each collection of properties, there is an object that instantiates them. 'If  $A(x)$  is any property, or conjunction of properties, we can characterise an object  $c_A$  and be guaranteed that  $A(c_A)$ ' (Priest 2005: 83). The thesis according to which 'some proper names refer to things which do not exist, and can be used to state truths about such things' (Sainsbury 2010: 45).'

With this I do not intend to endorse a Meinongian ontology.<sup>32</sup> My point is just that Too Much Possibility will not move those who do: they will just happily bite the bullet — and on the other hand, those who are opposed to a Meinongian ontology, will protest that the second formulation involves a background assumption that they cannot endorse, even if in the end it will be rejected.

So, I suggest that it would be preferable, if possible, to focus on the first reconstruction, which has a clearly unacceptable conclusion. Again: I do consider the conclusion to possibilism and free logic to be a bad result, and so I am persuaded of the urgency of disarming the second version of the argument, too. If it turns out that the first formulation is inadequate, I am happy to adopt the second, Meinongian formulation: the main arguments presented in this thesis, including my preferred solution to the problem, are untouched.

Adopting the first formulation is not without its issues. Robin Hendry suggested that there is a good reason to abandon the first formulation, because assumptions II and III seem enough to generate a contradiction, without any need for the other background assumptions, nor **Directedness** — thus threatening to take the tension between **Directedness** and **Independence** out of the spotlight. If, indeed, **Directedness** was not necessary to generate the bad result, this would clearly run counter the spirit of the

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<sup>32</sup> On the contrary, throughout the thesis I would like to assume a fairly orthodox metaontology, what can be captured by the following theses:

**One Existence:** Existence is univocal—to exist is *not* said in many ways.

**One Quantifier:** Existence is captured by the unrestricted existential quantifier (of our most natural language)

**One Commitment:** We are ontologically committed to the entities bound by the existential quantifier appearing in our best overall theory

Note that this last thesis is consistent with adopting a layered, hierarchical conception of reality—an ‘Aristotelian’ ontology, to adopt Schaffer’s (2009) terminology. I am perfectly happy to concede that there might be more or less fundamental, or more or less natural, entities. And this is also consistent with thinking that ontologists and metaphysicians ought to be mainly interested in the fundamental level—what *really exists*, to adopt Fine’s (2001) expression, and everything that is not fundamental is a sort of ‘free lunch’ supervening or grounded in the fundamental. What this is not consistent with is the idea that everything that is not fundamental does not exist *simpliciter* and that only what really exists, exists *simpliciter*, alongside the lines of Cameron (2010b) and van Soldkoff (2019). I am hesitant to include Fine (2001) among these—his position seems to me to be closer to Schaffer (2009), but I admit that he could be interpreted as to be in the eliminativist camp.

argument and miss the intended target that I aim to investigate, namely the relation between **Directedness** and Independence, and so it would be a good reason to prefer the Meinongian version of Armstrong's argument. Hendry's argument runs as follows:

It is a tautology that for every  $x$ ,  $x=x$ . We can substitute  $x$  for every constant and obtain another tautology. In particular, we can substitute for  $M$ , where ' $M$ ' is the name of a particular manifestation of any given power under consideration, thus obtaining the tautology  $M=M$ . From this, applying Existential Generalisation, we obtain that  $\exists x (x=M)$ , which is enough to generate a contradiction with **Independence**, if III is adopted and thus **Independence** is understood as the conjunction of  $\exists x (x=P) \ \& \ \neg\exists(x=M)$ . So, **Directedness** does not play any role in generating the contradiction. This misses the point of Too Much Possibility: the argument was supposed to bring out a tension between **Directedness** and **Independence**.

The argument is elegant and touches upon a genuine worry. However, I think that it can be resisted— we can show, I think, that **Directedness** plays a key role even in Hendry's argument and, therefore, also in the first version of Too Much Possibility: it is not just **Independence** plus classical logic that does all the heavy lifting.

The crucial move to focus on in order to resist the argument is the substitution of  $M$ , in order to obtain  $M=M$  from  $x=x$ . This substitution, I think, is warranted only if ' $M$ ' does refer. Assuming a Millian/Kripkean theory of the meaning of proper names,<sup>33</sup> according to which the meaning of a proper name just is its referent, and a compositional semantics for sentences, if ' $M$ ' fails to refer — if it is an empty name — then the sentence ' $M=M$ ' is simply meaningless, and as such cannot be true. Reference is a precondition for truth of sentences involving proper names; 'Iuhfoyu2gf is red' is not truth-apt, because it does not express any proposition, because 'Iuhfoyu2gf' fails to refer. Indeed, the minimal

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<sup>33</sup> If names were definite descriptions in disguise, it would be even less problematic, I think. ' $M=M$ ' would amount to  $p = p$ , where  $p$  is a sentence of the form 'there exists some  $x$  such that...' — but from there we cannot generate anything that gives a contradiction with the second conjunct of Independence: 'the actual king of France = the actual king of France' does not yield a contradiction with 'there is no actual king of France' if 'the actual king of France' just means 'there is some  $x$ , such that  $x$  is the actual king of France' and the sentence can be false.

characterisation of Meinongianism offered by Sainsbury (2010: 45) included the thesis that ‘some proper names refer to things which do not exist’.

Alternatively, we can concede that  $M=M$  is true, but deny that from it we can infer that there is an  $M$ , if ‘ $M$ ’ fails to refer. The idea would be that, since ‘ $M$ ’ does not refer to anything in particular, it is just a notational variation of  $\forall x=x$ : it does not convey anything different than the *schema* expressed with variables.  $M=M$  just is a formulation of the schema of self-identity. But from the schema of self-identity we cannot infer that something is  $M$ .

The possibility of reference failure, and the consequent failure of meaningfulness of the name and truth-aptness of the sentence they are embedded in, is the reason why we cannot create entities out of thin air, by uttering self-identities involving arbitrary names, after all—and that we cannot so easily attribute necessary existence to everything.<sup>34</sup>

Even easy ontologists who want to allow for relatively unproblematic creation of fictional entities usually associate the proper name of the fictional character to some application conditions (Thomasson 2007; 2015), which demand that something else exists in the world (e.g. that some authors have performed some special speech acts or are in some mental state at some time):<sup>35</sup> the application conditions will then ‘associate’ ‘Sherlock Holmes’ with a particular existent entity (e.g. a description produced within an act of storytelling)—and that is what ‘Sherlock Holmes’ will refer to, at least initially.

Assuming that powers theorists, when engaged in ontology, are not involved in the kind of speech act productive of fictional characters and do not plan to offer application conditions for ‘manifestation of  $M$ ’ that involve the semi-reference used to create fictional characters, this leaves open the possibility that ‘ $M$ ’ fails to refer, unless one assumes **Directedness**. That is, I think that a power theorist could resist Hendry’s argument by

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<sup>34</sup> From the fact that necessarily, everything is self-identical we cannot infer that everything exists necessarily. And yet, surely it is true at every possible world that  $GG=GG$ . See Fine (2005b) and Williamson (2002).

<sup>35</sup> This leaves it open which speech act is involved. Schnieder and von Solodkoff (2009) and Moltmann (2015) use the term ‘semi-reference’ in these contexts.

saying that she is not committed to the fact that ‘M’ refers, and so substituting it to  $\forall x x=x$  either does not yield a meaningful sentence, or just yields a notational variation of it, from which it is not legitimate to infer M’s existence, since  $\forall x x=x$  could also be vacuously true.

If this is the case, then it would be perfectly acceptable to maintain that the manifestation of powers (note: here I am using the term as a generic description, not as a proper name of the entity the power is for) does not exist — and thus that **Independence** (interpreted along the lines of III.) is not inconsistent with classical logic on its own.

However, once we bring **Directedness** to the fore, and with it assumption I., the above strategy to resist Hendry’s argument is no longer available: if it is constitutive of the identity of a power that it is related to some entity it is directed towards, then we can introduce the name ‘M’ as that which refers to whatever P is related to — thus ensuring that ‘M’ refers. At this point, Hendry’s argument does go through — but so does the original argument, which applied Existential Generalisation on the directedness relation, without taking the detour of M’s self-identity.

My point is that powers theorists, without **Directedness**, are only committed to the idea that *some powers* exist (and thus, that some names for powers refer) — nothing suggests that powers theorists are committed to manifestations (and, *a fortiori*, to the idea that names for individual manifestations do refer).<sup>36</sup> However, once we bring in **Directedness**, understood as a relation (in virtue of adopting I.), this neutrality must be lost — and from here, we generate the conflict at the heart of Too Much Possibility.

It can be replied that here it is **Directedness** that is doing the work, and not assumption I. — why then are we adding it to the background assumptions? Wouldn’t **Directedness** alone do? We do not need anything quite as strong as assumption I. to grant that ‘M’ refers, after all: so, a number of weaker formulations of **Directedness** will

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<sup>36</sup> Indeed, this seems the position of some primitivists about powers, such as Ingthorsson (2012; 2015) and Azzano (2019): they only think that powers are truthmakers for modal sentences, and there is no need of talking about powers being directed at anything.

yield the problem, and this alone is a good reason to adopt the Meinongian version of the argument.<sup>37</sup>

I have two observations to offer in response of this point. The first one is that, as a matter of fact, assumption I. establishes what it means for **Directedness** to hold. So, as long as I. is assumed, to say that **Directedness** holds just is to say that there is a relation between a power and its manifestation. Assumption I. helps fixing, in a more precise way, what it is for powers to be directed — just as much as assumption III contributes to fixing what it is for a power to fail to bring about its manifestation. As long as I. and III. are assumed, they *just are* **Directedness** and **Independence**. Thus, as long as **Directedness** plays a role in the argument above, so does assumption I.

The second observation is that, only because Armstrong's (and Hendy's) argument can get off the ground with a weaker understanding of **Directedness** (e.g. one that establishes that every power *refer* to its manifestation,<sup>38</sup> and not that it is *related* to it) this does not mean that the argument is in any way deficient. At best, it can be protested that assuming that **Directedness** is a relation is an overkill. But that will be a problem which becomes relevant only for those who aim to solve the problem by rejecting assumption I., and who will face the task of finding a characterisation of **Directedness** which is suitably weak and does not allow Hendy's argument to get off the ground. Indeed, in chapter 4 I will argue that such characterisation is nowhere to be found, and will suggest that it is assumption III. that we need to get rid of. But this alone does not tell against the first formulation of Too Much Possibility.

In light of these considerations, I think it is fair to conclude that the first formulation of Too Much Possibility is build around (and captures) the tension between **Directedness** and **Independence**. On the basis of the dialectical considerations above, I think that this version of Too Much Possibility is preferable, as its urgency and weight will

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<sup>37</sup> A second objection might be this: why assume that 'M' is a proper name? Can't it be a predicate? This idea is quite similar to the proposal of solving Too Much Possibility by invoking universals, I think. I address that point in chapter 5.

<sup>38</sup> Note that this reflects the original formulation by Armstrong: '*The object still has within itself, essentially, a reference to the manifestation that did not occur.*' (Armstrong 1997: 79).

be more likely to be felt by a wider number of metaphysicians. I think this is enough to suggest that we adopt it, when discussing Too Much Possibility.

However, it is important to reiterate that my main worry in what follows *is the same* that the Meinongian version targets — namely, that there is a problem in thinking that **Independence** understood as possibility of non-existence (assumption III/C) can be paired with **Directedness** understood as a relation between powers and manifestations (assumption I/A). So, even if the reader is not convinced by the defence of the first formulation, insofar as they agree that a Meinongian metaphysics is not a welcome result, they can share my preoccupation with solving Too Much Possibility by rejecting one background assumption.

Before considering which among the background assumptions we should reject, however, we need to consider the possibility that the whole of Armstrong's argument rests on a conceptual confusion and is nothing but a pseudo-problem which, in a somewhat Wittgensteinian spirit, should be *dissolved* rather than solved. This will be the focus of the next two chapters.

## Chapter 2. Dissolving the Problem: Identity

In this and the next chapter I examine two attempts at *dissolving* Too Much Possibility without rejecting any of the background premisses. The first is based on the idea, defended by Anna Marmodoro (2016), that powers and their manifestations are numerically identical. If that were the case, then it would trivially follow that the ontological status of manifestations is no more mysterious than that of powers, and that it cannot be the case that a power being unexercised entails that its manifestation does not exist, since powers and manifestations are one and the same.

The second strategy I consider relies on identifying the manifestation of powers with processes, and maintains that Too Much Possibility is based on an ambiguity of **Independence**, which can be understood as concerning either the process itself that powers give rise to, or their endpoint. In a certain sense, this latter strategy involves abandoning **Independence**, at least as formulated in the reconstruction of Armstrong's argument above, and replacing it with a weaker principle, that I will call **Interrupt**. However, the strategy aims at accounting for the same intuition from which **Independence** stems, and exploits the unique resources available to process ontologies to maintain that no central tenet of powers metaphysics has been violated.

Ultimately, I will argue that Too Much Possibility is a genuine problem whose solution requires abandoning substantive metaphysical background assumptions, and both attempts to dissolve it are ultimately unsatisfactory.

### 2.1 Marmodoro's Aristotelian Identity Theory

The idea of powers as directed properties is rooted in Aristotelian philosophy and in particular in his notions of *dunamis* (often translated as ‘potentiality’) and *energeia/entelecheia* (often translated as ‘actuality’ or ‘actualisation’). If we take a closer look at Aristotle’s texts, however, it becomes quickly apparent that his usage of both *dunamis* and *energeia/entelecheia* do not map on the contemporary use of powers and manifestations. *Dunamis* and *energeia*

are both predicated of the instantiated property—of the actual power (in our sense of ‘actual’), not of the manifestation.<sup>39</sup> This becomes even more clear when we attend more closely to the meaning of the two terms that he uses to describe ‘being in act’: *energeia* and *entelecheia*. ‘*Energeia*’ is best translated not as ‘actuality’, but as ‘activity’ (Kosman 2013). Something in act, for Aristotle, is something that is doing its job, something that is actively exercising its ability to fulfil its (proper) function:

Aristotle asserts that *energeia* means activity, because it is connected with action and motion – the word ‘*ergon*’ indicating ‘work’ or ‘job’ but essentially ‘active functioning’ (whether the function is in fact a product of action, like shoes, or the action itself, like shoemaking). The term *energeia* thus literally means something like ‘being in action’ i.e. ‘doing work’ or ‘exercise’ (Johnson 2005: 87).

It is therefore a state or mode of being in which an actual power can find itself in; but a property not in act is not thereby not actual in our sense. Act and potency are both, according to Aristotle, features of the actual power. The fact is, Aristotle does not seem to care one bit about the status of the manifestation: he only seems to be concerned with the power.

Anna Marmodoro (2016) has argued that the contemporary insistence on powers and manifestations as distinct entities is misguided, and that we should adopt a theory of powers that matches more closely the Aristotelian picture sketched above, where manifestations are to be understood as the *energeiai* of powers without being distinct entities.<sup>40</sup>

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<sup>39</sup> This becomes even more evident if we consider the debate between Aristotle and the Megarians: There are some who say, as the Megarian school does, that a thing can act only when it is acting, and when it is not acting it cannot act, e.g. he who is not building cannot build, but only he who is building, when he is building (*Metaph.* IX 3, 1046b28-32). It is clear that what the Megarians are denying is that there could be un-exercised powers—that is, they just deny **Independence**.

<sup>40</sup> What follows is but the snapshot of the stage in an ongoing discussion with Marmodoro; although I hope to have represented her view accurately and I think that my objections are sound, I would be surprised if this were to be the last word in the discussion.

Marmodoro's key move is that she 'takes the manifestation of a power to be the activated state of the very same power, and not the occurrence of a new power' (Marmodoro 2016: 57). In short, she claims that:

the activation of a power is an *internal* "transition" from one state to another of the very same power: its manifestation is not the occurrence of a new power; rather it is simply a different state of the original power: an activated state [...] The powerfulness of a power is its capacity to actively engage in an activity (*ibid.*).

She concludes that powers are not *relational* in nature: for the manifestation of a power is not *something* else, but just itself *in a different state*, its state of activation. The upshot is that the whole Too Much Possibility argument rests on a misunderstanding of powers metaphysics and is ultimately a pseudo-problem: powers and manifestations are numerically the same entities, so the existence and ontological status of manifestations is no more problematic than the existence of powers themselves. We cannot and should not solve Too Much Possibility, because it ultimately is a pseudo-problem. Let's consider her position in more detail.

According to the view, powers only act in concert—they require mutual disposition partners. Say that there are two powers, P and Q, that are mutual disposition partners and end up interacting. The result of their interaction (their mutual manifestation) is *not* some *other* power G, or some event *e* and so on. The result, rather, is that they both change their state. They both become activated. Within the interaction, we can distinguish two roles that the powers might have: the Agent and the Patient. The activated state of the Agent consist in some activity which influences the Patient. On the other hand, the activated state of the Patient is (or brings about—this ambiguity is crucial, I will argue) some change in the power or its bearer: 'when a power is activated, it engages in the activity it is for, or it suffers the activity of its power-partner'.

Here *energeia* is understood as being the activity, the playing out of something's proper function. A power to see in potency, when activated, results in *seeing*. The manifestation of the power to see *just is* the power to see, activated: the activity of seeing. So, claims Marmodoro, there is no elusive manifestation whose metaphysical status is mysterious. There is just the same power, in another state. Her Aristotelian solution consists in a change of framework, resulting in the dissolution of the problem.

I think that her account suffers from a number of difficulties, and this in turn is enough to undermine the idea that Too Much Possibility is a pseudo-problem. I will focus on two issues. The first concerns the ontological status of the power's states: what are they, exactly? Doesn't Too Much Possibility risk to re-surface at the level of the active states, instead of at the level of manifestations? The second concerns how Marmodoro's theory can account for change and our explanations thereof: how can we use her powers to make sense of the fact that the two massy objects were attracted to each other, as opposed to being repulsed, or that I walked left instead of right?

Let's start from the first issue. What are the states that powers can be in? What is an activated state, before the power enters in it? The identity of a power, since it cannot rely on the manifestation (for the manifestation is numerically identical with the power), must be connected to the qualitative state that occurs when the power is activated, when it encounters its dispositional partners. Surely, the identity of a power must encode what kind of states the power can enter. And, surely, **Independence** demands that certain activated states never obtain: a power can exist without ever entering its activated state.

If we are allowed to reify such states, then it seems that we can offer a version of Too Much Possibility that targets states instead of manifestations. Roughly, the argument runs as follows:

- i) Powers are directed at their activated states
- ii) Therefore, there are activated states
- iii) Powers can exist without their activated state existing

iv) Therefore, there are non-existing activated states

Why should talk of a power's various qualitative states, some of which can fail to occur, be any different and less problematic than talk of a numerically distinct manifestation? I find it quite natural to consider activated and non-activated states to be just states of affairs which share some of their components, namely the power involved in them.

I suspect that the options available to Marmodoro to avoid this version of Too Much Possibility targeted at states will closely resemble those employed by the defenders of the 'Physical Intentionality' strategy against Armstrong's original argument which I will discuss, and ultimately find inadequate, in chapter 4, and for this reason, I will not focus on this objection excessively here.

## 2.2 Changes and Activities

Even if we momentarily discard the issue of the ontological status and nature of "qualitative states", there is another problem that afflicts Marmodoro's theory and which ultimately makes it an unsatisfactory metaphysics of powers. The problem is how Marmodoro's theory can account for ordinary changes, and in particular for contrastive explanations of these changes.

The world is a constantly evolving place: things acquire and lose properties, move around in space, and so on, and the activity of powers is (at least sometimes) what makes things change and evolve. But if all that powers do is just pass from their potential state to their active state, how can we account for such change? How can we justify that nothing remains the same? Note that this is not the old, standard accusation that powers are always packing, never travelling or that all there is to change is a 'passing powers around'. There is no problem with passing powers around, as long as different entities (*e.g.* different properties) are involved. The water first had the power to dissolve salt, and now, having effectively dissolved the salt, it has the power of making humans who drink it dehydrate.

No problem here (Mumford 2009). What I do not understand is how there can be change when the powers that are passed around turn out to be *the same power*.

Take, for instance change in spatial location. At  $t_0$ ,  $a$  is at some location  $L$ . At  $t_1$ , it is at  $L^*$ . Why? The obvious answer is that something made it move: there is a nearby massive object,  $b$ , that has pushed  $a$  from  $L$  to  $L^*$ . Our run-of-the-mill power theorist will say:  $b$  had some power  $P$  whose manifestation was the truthmaker for ‘ $a$  is at  $L^*$ ’ (be it some event, state of affairs, what have you). But, according to Marmodoro, the only power that  $a$  and  $b$  can have is that of entering in their activated state. So, in this case,  $a$  would have the patient power of being pushed, and  $b$  the agent power of being pushing. But how does this, alone, explain the fact that  $a$  has actually moved to  $L^*$ ? And how can it account for the fact that it has moved to  $L^*$  instead of  $L^{**}$ ? How is it that being in the activated state of being moved results in an actual change that is not just the change  $\langle a \text{ is in state } P, a \text{ is in state } A \rangle$ ?

Perhaps the difficulty can be made clearer if we adopt the following schematic reconstruction of the interaction. ‘AP’ and ‘PP’ stand for ‘Agent Power’ and ‘Patient Power’, respectively. The subscripts ‘<sub>a</sub>’ and ‘<sub>p</sub>’ stand for activated state and potentiality state. The following are the stages of an interaction between two powers, according to Marmodoro’s theory:

- I) AP<sub>p</sub> and PP<sub>p</sub> are not interacting (hence their both being in a potentiality state)
- II) AP and PP are in a position to interact and they both activate: AP<sub>p</sub> becomes AP<sub>a</sub> and PP<sub>p</sub> becomes PP<sub>a</sub>
- III) AP<sub>a</sub> is engaged in the activity it is for, and PP<sub>a</sub> ‘suffers the activity of its power-partner’
- IV) Change C occurs: e.g. PP and its bearer are now located in a different place L\*.

The problematic passage is the one from III to IV. How is it that being in an activated state generates certain events or brings certain states of affairs about, such as being located at L\*? Why doesn’t the interaction only result in both powers being in a different state? That is to say, why doesn’t the model stop at step III)?

Marmodoro suggests that ‘an important feature that can ground classifying a power as active is if the power is bringing about *change* in another power (or its bearer)... If the power’s activity brings about change, then the effect of the power’s activity is a new power that is generated in the process’ (Marmodoro 2016: 74). How does this work? How can a new power be generated, if the only thing that happens in an interaction is a transition from one state to the other?

The most natural explanation I can think of is that *a* being in an active state is a power whose manifestation is the generation of a new power, or some other appropriate numerically distinct manifestation: events, states of affairs, etc. But that is exactly what Marmodoro’s theory purports to deny. So there must be a different story.<sup>41</sup>

According to her theory, the activation of the patient power *brings about a change*: ‘The power fulfilling the active causal role is activated, *while the power fulfilling the passive causal role is activated, and, often, changes as well*’ (Marmodoro 2016: 70, my emphasis). But this change is not the *manifestation* of the power, but only a by-product, as it were, of the power being in its activated state. How can there be by-products without powers being involved? These by-products are caused or brought about by something (the patient power being activated), but they are not the *manifestations* of that activity, and hence are not its effects.

Consider the case of mass. Marmodoro will presumably maintain that its activated state is the existence of a gravitational field. So far, so good: the gravitational field *is* the power being activated. But then, the gravitational field *makes objects move*: the forces of the field result in a change in the location of massy objects. This seems to be the manifestation of mass, or of the action of the gravitational field, which is the same power. It is *these events*, namely the changes in location of the massy objects, that we have been concerned with so far. Marmodoro can deny that they are *manifestations* of mass, strictly speaking: the gravitational field *is* (similarly, Cartwright & Pemberton 2013) distinguish between

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<sup>41</sup> Marmodoro pointed out in personal correspondence that in her account not all effects are manifestations of powers. But, if their possibility is not grounded upon powers, then her theory is not suitable to ground Dispositionalism, even in its modest form, so her proposal would automatically be disqualified. Given that this is the project I am interested in, I have to assume that there is some way in which her theory can ground all property instantiations in time and space upon powers.

manifestations and effects). But then she still has to tell us a story that links the gravitational field and these further changes.<sup>42</sup>

I suspect that this difficulty is rooted in too narrow a focus on a certain kind of Aristotelian *changes*, namely those that he calls ‘activities’ (*energeiai*). In *Metaphysics* IX 6., Aristotle distinguishes between two kinds of *dunameis*: one, commonsensical, that brings about *movements* (*kinesis*) and another, more elusive kind which is the real target of his discussion, resulting in *activities* (*energeiai*). The difference between a *kinesis* and an *energeia* is this. Movements have their end (*telos*) outside themselves. For instance, walking to the marketplace has its end in being at the market, which is something *distinct* from walking there. (Cooke 2007). Similarly, building a house is a movement, because its end is an artefact, *e.g.* the built house.<sup>43</sup> Note that, since the realisation of movements lies *outside* the movements themselves, they cannot be co-present: there cannot be at the same time the movement (my walking to the market, my building the house) and its completion or goal (me being at the market, the finished house).

However, there is another kind of capacities, whose realisation or end lies precisely in their very activation (Witt 2003, Kosman 2013). These are called ‘activities’. The goal of strolling is just *being strolling*—so, the power to stroll being exercised coincides with its end goal. There is no ‘pointing towards’ any further or external goal here: strolling is just the activation of the capacity to stroll, and does not require any reference to anything further in order to be understood. Metaphysically speaking, the identity of strolling does not depend on any further entity.<sup>44</sup> The relation between a first and a second entelechy is of this kind:

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<sup>42</sup> The point resembles the proposal of adopting processes as manifestation for powers that I will discuss in the next chapter.

<sup>43</sup> To be fair, this is controversial: one can also think that the telos of the *dunamis* to build is the *process* of building. See Ross (1949) for a classic argument to the effect that the telos of building is the artifact.

<sup>44</sup> Aristotle does not distinguish between these two directly in this way: he offers a linguistic test for distinguishing these two, the so-called ‘tense test’. The test, in short, is this: activities, but not movements, allow us to infer the perfect tense of the verb from the present tense. This is harder to understand in English, since the perfect tense is expressed with the past tense, but an example would be: if I am strolling, it is true at each moment that I have completed the strolling. In the case of movements, on the other hand, the inference does not go through: if I am building it does not follow that I have completed the building.

the end of the capacity to speak French is actually *speaking* French, and of being able to see is actually the activity of seeing.<sup>45</sup>

I suspect that Marmodoro, in saying that the manifestation of every power is its being in a state of activation, has extended the peculiarities of activities to every power: she treats every power as if it were the *dunamis* for an *energeia*. But, despite playing a key role in Aristotle's philosophy, capacities for activities do not exhaust the field of properties or powers. Indeed, most powers that are commonly discussed would be among those that produce movements. And such powers make reference to something besides themselves: namely, an external *telos*. The power to build makes reference to the house that will be eventually produced, the power to walk to the marketplace makes reference to the state of affairs<sup>46</sup> of being in the marketplace (Coope 2007). And it is precisely that status of the house, or the state of affairs of being in the market, that concerned us under the header of 'manifestation'. Therefore, Marmodoro's account is, at best, incomplete: it stops short of the problem that was puzzling us. To see why this is the case, consider the role of contrastive explanations in our understanding of changes.

### 2.3 Activities and Contrastive Explanations

It seems to me relatively unproblematic to say that the sort of activities described by Aristotle and Marmodoro do produce and result in specific changes: my strolling in the park brings it about that I am near the fountain at  $t_1$  and near the bench at  $t_2$ . These changes are causally brought about by the activity of strolling, even if strolling was not *directed at* being near the bench. So, the problem with Marmodoro's account is not that it is mysterious how the agent and patient power's being in an activated state can result in some change C. My activity of strolling produced the change of me going from my room to the bench in the park. The problem is that, ordinarily, we do also want to know something about why an activity produced a given by-product, as opposed to another: why did I end

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<sup>45</sup> See Arist. EN X 4, 1174a14-b6, and especially *de An* 2.5, 417a21-30.

<sup>46</sup> For a convincing argument to the effect that Aristotle adopted an ontology of states of affairs, see Crivelli (2004).

up at the bench, rather than near the supermarket, as a result of my activity? That is, we need to offer an explanation of the particular changes resulting from activities.

We can formulate a dilemma: since these changes are distinct from the activity of strolling, either i) they are produced by it and powers are involved, in which case there is not always numerical identity between a power and its manifestation, or ii) they are not produced by it, in which case Marmodoro can maintain that there is always numerical identity between a power and its manifestations, but her theory of powers cannot account for a considerable portion of the changes and goings-on in the world. Compare this case with the previous example of mass, gravitational fields, and actual displacement of massive objects. A theory of gravitation that could explain gravitational fields but not, in turn, the movements of massive objects would not be a good physical theory: it would be no use in predicting whether the rocket will reach Mars or not.

To this point Marmodoro will object something along these lines:

The lack of a directedness relation does not mean that there is not causation or production of changes of any kind. The activity of strolling results, as an *incidental by-product*, in my change of location: I was strolling in the woods and ended up in Shincliffe. Strolling is not *directed* at being in Shincliffe, but it is obvious that it is my strolling that brought it about that I'm there. The difference between i) strolling and ending up in Shincliffe and ii) walking to Shincliffe is that the former activity can be understood without mentioning the village, whereas the motion depends on it for its identity: walking to Shincliffe is not the same as walking to Neville's Cross. Activities such as strolling, then, *can* bring about changes, even if these are not essential to their identity.

So, Marmodoro could say that her account only describes a subset of powers —*activities*— but can perfectly explain how these in turn *produce* other changes. She can then re-state her claim: a significant class of powers work that way, and it is misguided to look for a distinct manifestation *for those*.

This account cannot be complete. Firstly, I take it that Marmodoro is committed to the thesis that powers being exercised have some important connection with causal goings-

on. This, superficially, seems to be the case on her account: it is, after all, the activation of my power to stroll that caused my being in Shincliffe. However, the state of affairs [GG is in Shincliffe at  $t_1$ ] is an accidental by-product of the activity of the power: the manifestation of the power of strolling is just strolling—the whole point of the identity account is that no reference to anything but the power is required. So far, so good. The problem is that this theory does not allow us to formulate any *contrastive explanation* for the fact that I am in Shincliffe: it cannot account why I am in Shincliffe rather than in Gilesgate at  $t_1$ . After all, both states of affairs could be accidental by-products of the activation of the power to stroll. Or, indeed, I could have been strolling in circles in my own room the whole time. But an account of causation that does not ground contrastive explanations cannot be satisfactory: it is contrastive explanations that we care about, most of the time, when we talk about causation and changes. When I ask why the window is broken, I am interested in knowing why it is broken *rather than intact*. It is hard not to be suspicious of a theory of powers that cannot ground such contrastive explanations. The account seem to have nothing to say about the link between the activated power and what happens in the world, even if we concede that activated powers do bring about changes.

Secondly, I have spoken so far of the activated state of a power (its activity) as a process. But, obviously, it cannot be a process, if Marmodoro's position is really an identity theory: powers are properties, and processes, well, are processes. In short, the initial question that I have laid aside re-surfaces:: what is an activated state? Either i) it is a process, or ii) it is not.

If the activated state is *not* a process, but the activation of powers does incidentally generate processes or events such as changes, it is not easy to understand what link there is between activated state and the by-product state of affairs or process. The activated state would be a middleman between a dormant power and a state of affairs or process. But then it is unclear what is its role: what does the activated state bring to the table, given that it is not directed towards the process? If we accept that identity is transitive, and powers are distinct from processes, then identity theory has to break down somewhere: either the

activation of a power is not identical with the power, or it is not identical with the resulting process or state of affairs.

Assume that the activated state is a process, then. If we want to retain the specificity of Marmodoro's identity theory, then she has to maintain that there is no categorical distinction between processes and properties. The activated state just is a process, but is also identical with the power, because power and process are one and the same thing. I find this idea quite hard to understand. Let me just note this puzzling consequence: the identity between powers and processes would entail that there are 'inactive processes', corresponding to inactive powers. But what is an inactive process? What is the difference with an active one?

Perhaps none of the arguments above are knock-down; but I find the resulting picture to be rather perplexing. Marmodoro's rejection of Too Much Possibility as a pseudo-problem was based on the adoption of her identity theory of powers; but her theory seems to raise harder questions and more problems. So, I suggest that we abandon Marmodoro's proposal for dissolving Too Much Possibility.

## Chapter 3. Dissolving the Problem II: Processes

Discussing Marmodoro's theory, we have seen that it seems to involve three elements: powers, their activated states, and processes. I have argued that, in this picture, it is unclear what role activated states were supposed to play, and that postulating an identity between activated states and either powers or processes did lead to a number of somewhat baffling results. However, the idea that the exercising of powers results in the unfolding of a process has some plausibility and appeal (Mumford and Anjum 2011). Maintaining that processes are the manifestations of powers offers unexpected resources for thinking that Too Much Possibility can be dissolved: the fact that they are homoeomerous (like-parted); this means that, if a process is occurring during an interval, then the very same<sup>47</sup> process is also occurring during any of its sub-intervals. This unique feature allows us to say that there is numerical identity between a process that develops fully and reaches its natural endpoint and one that is interrupted before reaching its endpoint. After presenting the two main theories of processes in §§3.2-3, in §3.4 I suggest that, if we think that processes are the manifestations of powers, we can perhaps abandon **Independence** in favour of a weaker thesis, **Interrupt**, according to which every power must produce the process that it is for, but it need not complete it, and thus disarm Too Much Possibility. In §3.5 I will argue, however, that adopting processes as manifestations of powers is not the way forward.

### 3.1 Processes

A metaphysics of processes offers some unexpected resources, I believe, to deal with Too Much Possibility. Processes *prima facie* allow us to resist and dissolve the argument, by distinguishing between two ambiguous readings of Independence. This would be an interesting result, because the appeal to irreducible processes is linked with **Dynamism** and as such is considered to be part and parcel of radical powers metaphysics. Recall:

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<sup>47</sup> Standardly, being homoeomerous is taken to require only *type*-identity between whole and parts. However, as it will become apparent in the following sections, some (namely Stout) invoke a stronger notion, which requires *token* identity between a whole process and its parts.

**Dynamism** Powers are *dynamic* and active. A world of powers is not a passive mechanism that receives its activity from an external source, but is itself the source of change.

The most convincing way to cash out **Dynamism** involves the idea that exercised powers give rise to an irreducible process<sup>48</sup> terminating, eventually, in what we have so far referred to as the manifestation of the power. This suggests that there is a certain ambiguity in the notion of a manifestation of a power: it could refer either to the process or to its endpoint or *telos*. It is precisely this ambiguity that might be exploited to reconcile **Directedness** and **Independence**; or so the idea goes. This would mean that stronger and more contentious versions of powers metaphysics are better placed to avoid the fatal contradiction threatened by Armstrong's argument.<sup>49</sup>

Unfortunately, powers theorists who cash out **Dynamism** in terms of processes tend not to offer much attention to the metaphysical characterisation of process ontologies: both Handfield (2008) and Mumford & Anjum (2011), for instance, focus mainly on the formal models that could be employed to *represent* certain causal processes (Feynman diagrams and vector spaces, respectively). As a result, there is some underdetermination as far as the precise theory of processes that is involved in radical powers metaphysics. I will quickly examine two theories of irreducible processes, namely Mass Process Theories, proposed *inter alios* by Alexander Mourelatos, Jennifer Hornsby, and Thomas Crowther, and Individual Process Theories (also known as ‘Occurrent Continuants’), defended among others by Rowland Stout, Helen Steward, and Antony Galton, and see whether they can help us dissolving Too Much Possibility.

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<sup>48</sup> For this reason, I will not engage in Neil Williams' assessment and critique of processes as manifestations, as he considers them to be nothing over and above ‘protracted, structured events’ (Williams 2019: 131). See also Giannini (ms.).

<sup>49</sup> Proponents of **Dynamism** include Stephen Mumford & Rani Anjum (2011, 2018) Ruth Groff (2013, ms.), and arguably Toby Handfield (2008) and Nancy Cartwright and John Pemberton (2013).

### 3.2 Mass Process Theories

The first requirement for a theory of primitive processes is to clearly distinguish them from events. In particular, it is paramount that processes are not reduced to a series of events: ‘processes have no motionless parts. Indeed, in no real sense does a process have parts at all... The process is, in reality, an indivisible unity’ (Mumford and Anjum 2018b: 71). However, moving past the negative characterisation is not easy. Let’s start with a linguistic detour.

Alexander Mourelatos (1978) argued that the distinction between events, states, and processes is not to be traced to families of lexical verb types, as Vendler (1957) and Kenny (1963) thought. Rather, the difference emerges at the predicative level. He noted that there is a feature of Indo-European languages that marks such difference: verbal aspect. In particular, events are expressed via perfective predication, whereas imperfective predication express processes: this can be clearly observed in sentences such as ‘John was reading [activity, imperfective] when I entered [achievement, perfective]’ (Mourelatos 1978: 418).

Importantly, this is no mere grammatical feature; rather, our language<sup>50</sup> tracks a fundamental metaphysical distinction. This is made evident when we operate a nominalisation transcription on the sentence in question, which involves ‘rewriting a basic predication in such a way that the predication becomes an explicit quantification and the main verb is transformed into a kind of noun; the nominalization therefore can be thought of as revealing the hidden quantification that many philosophers and linguists have discerned lurking beneath the structure of many sentences which do not look, on the face of it, to be quantificational in form’ (Steward 2012: 759)—a strategy not unlike the one adopted by Davidson (1967) to show how ordinary predication presuppose an ontology of events.

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<sup>50</sup> By this I mean Indo-European languages—unfortunately I have to admit that I do not know how widespread this feature is in other languages. Thanks to Jiwon Kim for pointing this out.

When we operate such a nominalisation, a striking difference emerges between perfective and imperfective sentences. Consider the two following sentences and their two nominalisations:

- i) Jones pushed the cart to the top of the hill (Perfective)
- ii) Jones pushed the cart for hours (Imperfective)
- iii) Jones was painting the Nativity (Progressive)
- iv) There was *a* pushing of the cart to the top of the hill by Jones (Nominalisation of perfective)
- v) There was pushing of the cart for hours by Jones (Nominalisation of imperfective)
- vi) There was painting of the Nativity by Jones (Nominalisation of progressive)

The quantifiers in the nominalisations of the perfective sentences range over countable individuals—things like books, teapots, or persons, which we refer to using sortal terms. This is not so in the case of imperfective sentences: they seem to quantify over *stuff*, the sort of thing we refer to with mass-nouns, like water or gold. As Mourelatos notes:

The pushing and the painting in these contexts do not have the terminus or closure that would allow us to speak of *a* pushing or *a* painting—we are not told that the cart was pushed some place, or that the Nativity did get painted. The parallel with simple nouns for these transcriptions is not in sentences of the form ‘There is at least one K’; it is rather in sentences of the same form as ‘There is snow on the roof,’ or ‘There is gold in this mountain’ (Mourelatos 1978: 427).

From this observation Mourelatos, Hornsby (1980; 2012), and Crowther (2011; ms.) draw the analogy that Things : Stuff = Events : Processes. They argue that we should attribute to processes similar features to those we attribute to stuff; in particular, the fact that they are not *countable individuals*. There are not token processes, but only types. There cannot be two

waters; just more or less water. Similarly, there cannot be two pushings; just more or less pushing. We can then formulate the first feature of mass theories of processes:

**Process Type:** Processes come only in types. There are no token processes, no individual processes.

The things/events and stuff/processes analogies lead Mourelatos to single out another key feature of processes, which will be extraordinarily important in what follows. He notes that:

a substance is not homogeneous—or, to use the more precise term used by the ancients, homoeomerous, “like-parted”. A clock is not made of clocks. Correspondingly, an event E is not made up of E-events: the capsizing of a boat is not made up of boat-capsizing. Stuffs are homoeomerous: if X is gold, then all parts of X are gold. Processes are homoeomerous.  
(Mourelatos 1978: 430)

More precisely, we can express this property with the following principle:

**Homoeomerous.** If it is true that O was  $\varphi$ -ing between  $t_1$  and  $t_2$  then O was  $\varphi$ -ing during any subinterval between  $t_1$  and  $t_2$ .

From this principle, we can conclude that processes' identity, unlike that of events, is not determined at all by their temporal boundaries—the very same  $\varphi$ -ing goes on between distinct stretches of time. And indeed, if there are only *types* of processes, it is hard to think how their spatiotemporal coordinates could play an essential role in fixing their identity.

Note that this does not mean that processes have to be such that every interval has to be indistinguishable from any other, and not composed of qualitatively different subprocesses. That is a further property, which Crowther (2011) calls **Homogeneity**. We don't have to think that all processes need to be homogeneous, as the uniform acceleration of a

body described in Newtonian laws of motion would be, for instance. Processes can be varied and have different stages—different things happen when I am digesting, say: mastication is quite different from the action of hydrochloric acid and pepsin in the stomach. However, there is a sense in which the *same process* is occurring in both occasions: digesting. At each moment is true that I am digesting, even if digestion is made of qualitatively different sub-processes. That is to say: we can maintain that processes are homoeomeric and recognise that complex processes can consist of different, non-homogeneous phases.<sup>51</sup>

Secondly, we have to recognise that the analogy with many ordinary mass nouns is not perfect and might break down. Consider the case of the referents of mass terms such as water or gold. As a rule of thumb, the inference from ‘O is made of water’ to ‘a proper part of O is made of water’ works. But obviously at a certain point it breaks down, and therefore we cannot consider it a valid inference: if O is a single molecule of water, then its proper part won’t be water itself, but rather an atom of oxygen or hydrogen. Similarly, with simple chemical elements: if we divide a piece of gold enough times, we will end up not with gold, but with just a couple of fundamental particles—say, a couple of electrons. This is not the case for stuff-like processes: if I am walking from  $t_1$  to  $t_2$ , then it must be the case that I am walking at any sub-interval, even an extremely short one, even if it would not be possible to complete an act of walking in that interval. In short, the analogy only works if we consider those mass nouns that refer to entities that *really* are *stuff*, all the way down, and not just stuff that can be reduced to countable entities.<sup>52</sup>

Finally, one might be tempted to assimilate Mourelatos’ processes to Aristotle’s activities (*energeiai*), which, as we saw in the previous chapter, he contrasts with movements. The assimilation is tempting because Aristotle offers a test, known as the ‘tense test’, to individuate activities that seems to rely on **Homoeomericous**:

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<sup>51</sup> This is particularly important for the powers theorist who wants to understand causal processes along the lines of Mumford and Anjum’s ‘sweet solution’ (2011:121).

<sup>52</sup> For instance, the metaphysics of Anaxagoras could be a good example (Marmodoro 2017b). In Aristotelian science, that would work with the elements, e.g. earth or water.

at the same time we are seeing and have seen, are understanding and have understood, are thinking and have thought: but it is not true that at the same time we are learning and have learnt, or are being cured and have been cured. At the same time we are living well and have lived well, and are happy and have been happy. If not, the process would have had sometime to cease, as the process of making thin ceases: but, as it is, it does not cease; we are living and have lived. Of these processes, then, we must call the one set movements (*kineseis*), and the other actualities (*energeias*) (*Metaph.* IX 6 1048b).

I think that such an assimilation would be a mistake. Aristotle's distinction between movement and activity, as we have seen in the section on Marmodoro's proposal, is based on their different *telic structure*, that is, the different relations that these acts have with their endpoint, and the tense test is just a way to make such a structure explicit: movements are the sort of acts that have their goal *beyond themselves* (indeed, reaching the goal brings the movement to an end), whereas activities have an immanent goal, as it were—the goal is within the activity itself.<sup>53</sup> It *is* the activity itself. Compare the case of building a house with just playing at building a house.<sup>54</sup> The former is a movement, because its *telos* is something different from itself (namely, the completed house), while the latter is an activity, because its goal is within the action itself: the point of playing is playing, not anything that might be produced as a result of the activity. This is made evident if we attend the success conditions of the two activities: if a builder stops halfway through and just forgets to build a roof on the house we would think that she's a bad builder and that she has not done her job: we would not be happy to pay for the house. On the other hand, if a child was building a house as part of a game (or making-believe that she was a builder) and stopped before installing the roof, we would not think that she has failed in her activity. She has not failed to successfully play.

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<sup>53</sup> Aristotle's distinction is closer to the one offered by Vendler and Kenny, based on different families of verb types.

<sup>54</sup> 'For example, in the building of a house, the product is not the act of building or of being built, but the building, that is, the house itself, which results from this act.' (Kosman 1969: 41).

Mourelatos' account of processes is, instead, perfectly neutral on the telic structure of said processes (Mourelatos 1993). It is based on their quantificational behaviour, not on their relation to an end or goal. Indeed, no indication is provided on the role or importance of the terminus or telos of the process, if there is one at all; his account is more general. This can easily be seen from the fact that actions such as walking do correspond to processes in Mourelatos' theory, whereas they are paradigmatic cases of movements for Aristotle: 'For every movement is incomplete—making thin, learning, walking, building; these are movements, and incomplete movements' (Arist. *Metaph.* XI 6 1048b29).

### 3.3 Individual Process Theories

Not all theories of irreducible processes take the analogy with stuff and mass-nouns as their starting point, however. In particular, Rowland Stout (1997; 2016) Antony Galton (Galton 2003; 2006; Galton and Mizoguchi 2009) and Helen Steward (2013; 2015) all admit *individual* processes—that is, they maintain that there are token processes, as well as types. This is possible because the distinction between processes and events is *not* based on the different quantificational structure of perfective/imperfective sentences. Processes are not distinguished from events because they behave like stuff.<sup>55</sup>

Rather, according to Stout, the difference between processes and events lies in the different way they exist in time. Events, he argues, are temporally extended thanks to the fact that they *spread out* across time, much like the objects persist according to perdurantism. Processes, on the other hand, extend in time in quite a different way than how they extend in space: they persist by enduring, much like three-dimensional objects. This means, according to Stout, that processes bear properties *at a time*, whereas events bear properties *atemporally*.<sup>56</sup>

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<sup>55</sup> To be fair, this is not precisely true of Steward (2013), who adopts the Mourelatos conception and attempts to then extend it to individual processes. I will focus on Stout's theory in what follows.

<sup>56</sup> It is not fully clear to me how to flesh out this idea in detail: I suspect that what Stout has in mind is close to an adverbialist position about persistence (*e.g.* Lowe 1988, Haslanger 1989), so that for an entity to have properties at a time just means that instantiation is time-indexed (the apple is green t-ly and is red t'-ly). That is to say, for something to have a property at a time just is for it to have a time-indexed relation of instantiation.

Since processes are to be distinguished from events on the basis of the way they occupy time, rather than their stuff-like behaviour, we have no particular reason to believe that they are not countable, and that there are no token processes. To support his point, he maintains that there could be non-trivial questions of re-identification of processes, such as the following, which couldn't arise if processes were only type-like entities, like Mourelatos, Hornsby, and Crowther think:

Suppose I see a bush fire spreading through one bit of countryside and then some time later see a bush fire spreading through another bit. There is one sense in which it is fairly obvious that what is happening in each case is the same thing—namely a bush fire spreading through the countryside. But there is a further question which we may be interested in, and which is naturally expressed by asking whether it is the very same process of fire spreading which is observed on both occasions (Stout 1997: 21).

If such questions are intelligible and not trivially answerable, then we have to recognise that there are individual processes, thus accepting:

**Process Token:** The type/token distinction applies to processes, and there are token processes.

Stout thinks that the fact processes are continuants also allows us to derive a stronger version of **Homoeomerous** involving sameness of numerical identity between a process and one of its sub-intervals. The identity of a process, much like that of a three-dimensional substance, has little to do with its temporal location: Napoleon at 45 was identical to Napoleon at 25. Similarly, a process at the later stages of its development is strictly identical to that process at its earlier stages. This is the case also with transworld identity:<sup>57</sup> Napoleon in  $\alpha$  is identical to the Napoleon in  $\omega$  who died before becoming

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<sup>57</sup> Naturally, the argument presupposes that there is genuine numerical identity between individuals in different possible worlds.

emperor. Similarly, for processes: if a particular apple  $a$  undergoes a token process of decaying at  $\text{@}$ , then if same apple at some other world  $w$  undergoes decaying will undergo the numerically same token process. This is the case even if at  $w$  the process is prematurely interrupted:

We want to say at one stage of the apple's decay that the very same process was going on as was going on at an earlier stage. But suppose that something interfered with the process so that the later stage never happened—perhaps the half-rotten apple was put into deep-freeze. This would not affect the identity of the process at the earlier stage before the interference. What was happening before the interference is not affected by whether or not the interference occurred (Stout 1997: 21).

The argument can be reconstructed as follows:

1.  $x$  at  $\text{@} = x$  at  $w$ .
2.  $x$ 's  $\varphi$ -ing at  $\text{@} = x$ 's  $\varphi$ -ing at  $w$ .
3. Complete ( $x$ 's  $\varphi$ -ing at  $\text{@}$ ).
4. Interrupted ( $x$ 's  $\varphi$ -ing at  $w$ ).
5. Interrupted ( $x$ 's  $\varphi$ -ing at  $w$ ) = Proper Part of  $x$ 's  $\varphi$ -ing at  $\text{@}$ .
6. Therefore,  $x$ 's  $\varphi$ -ing at  $\text{@} = \text{Proper Part of } x$ 's  $\varphi$ -ing at  $\text{@}$  (From Indiscernibility of Identicals, 2., 5.).

The conclusion amounts to saying that the stronger, token version of **Homoeomerous** holds: if it is true that  $o$  was  $\varphi$ -ing between  $t_1$  and  $t_2$ , then  $o$  was  $\varphi$ -ing during any subinterval between  $t_1$  and  $t_2$ .<sup>58</sup>

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<sup>58</sup> Note that Aristotle would concede that this principle holds only for *activities*, which we have seen constitute a more restricted class than processes (they are processes with a particular telic structure).

### 3.4 Dissolving Too Much Possibility

How are processes, thus understood, supposed to help with Armstrong's argument? *Prima facie*, processes do not seem to be in a better position than events, states of affairs and the like when it comes to dealing with Too Much Possibility; if we take **Independence** to mean that processes might not take place, then it does not seem that we can make sense of the directedness of powers without appealing to *merely possible processes* and their ilk—therefore having to distinguish between *actual* and *non-actual* processes. We have already seen that this is not very helpful. What is interesting about processes, however, is that they allow us to distinguish between two formulations of **Independence** and to think that the principle is ambiguous.

The distinction that I have in mind is between the process itself and its *terminus* or *telos*, that is to say, its completion point, its goal. This distinction obviously applies only to those processes that Aristotle would have categorised as *movements*—processes whose *telos* is not immanent to the process itself—which is why it was important to distinguish processes from Aristotelian activities. With regard to these processes, we can interpret **Independence** in two distinct ways, one stronger and one weaker.

**IND-Process:** The manifestation M of a power P is a certain process,  $\varphi$ -ing. The power can exist without there ever be any  $\varphi$ -ing.

**IND-Telos:** The manifestation M of a power P is a certain process,  $\varphi$ -ing, which has a certain *telos* T. The power can exist and produce the process of  $\varphi$ -ing, which however might not be completed, and thus without T occurring.

IND-Process is stronger than IND-Telos in the sense that IND-Process entails IND-Telos, but not vice versa: if a power directed at some process  $\varphi$ -ing can exist without the  $\varphi$ -ing occurring, *a fortiori* it can exist without the endpoint or telos of that process occurring. On the other hand, if a power directed at some  $\varphi$ -ing can exist without the telos T of  $\varphi$ -ing occurring, this does not mean that it can exist without *any*  $\varphi$ -ing occurring.

It is at least somewhat ambiguous whether the manifestation of a power is the process, or the process' *telos* is:<sup>59</sup>

Powers are not just for the end point of the causal transaction, such as the property of being dissolved that is the end point of solubility. The power is for the whole process that takes a sugar cube from being in liquid to being dissolved (Mumford & Anjum 2018b: 66).

This ambiguity can offer us, perhaps, enough elbow room to escape Too Much Possibility. If we disambiguate IND as IND-Process the account will face the usual difficulties: we need to distinguish between an actual and a merely possible process. But it is not immediately clear that the problem emerges if we take IND-Telos instead. The reason for this has to do with **Homoeomerous**. If we adopt IND-Telos, the process theorist can say that the manifestation *qua* process is always and necessarily occurring—it is as actual as the power. Every time that there is a power, there is the process that the power manifests. Only, certain processes reach their telos and complete, and others do not, so that their *telos* might not be actualised. Processes can be interrupted before they reach, and bring about, their natural endpoint. Because of **Homoeomerous**, an interrupted process is identical (numerically and in kind) to a non-interrupted process: we can just consider the interrupted process to be a sub-interval of the interrupted one, which by **Homoeomerous** is identical to the whole. In short, the proposal is to turn **Independence** into a milder principle:

**Interrupt:** The manifestation of powers can be interrupted, interfered with before it reaches its *telos*.

How is this supposed to help with Armstrong's argument? The idea is simple: just replace **Independence** with **Interrupt**, while preserving the intuition that supported the thesis, as

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<sup>59</sup> Perhaps Marmodoro's attempt to dissolve Too Much Possibility relies on exploiting a similar ambiguity, and her strategy is not too different from the one available to process theorists. In that case, we can consider the arguments against the latter to also carry some weight against the former.

well as all the work that **Independence** was supposed to do. If we do so, then it is always the case that powers do manifest, for the manifestation of powers is the process, and powers always bring about the process, even if the process is later interrupted, because an interrupted process is numerically identical to a non-interrupted one. Thus, we do not need to worry about the status of unmanifested manifestations, because, strictly speaking, there are no such things. We can capture everything that **Independence** was supposed to convey by using **Interrupt**—maintaining that every manifestation-process can be interrupted. But an interrupted process is the same entity as a non-interrupted one, so nothing metaphysically weird goes on in those cases.

Consider a case of interruption discussed by Neil Williams:

Two brothers, Angus and Malcolm, are hiking in Australia when Angus has the misfortune of being bitten by a highly venomous Tiger Snake. His foot swells at the location of the bite, and Angus starts to sweat as his breathing becomes laboured. Lucky for him, Malcolm is no stranger to snake bites, so quickly splints and binds the area, thereby limiting the flow of venom. Nevertheless, a small amount of the potent neurotoxin in the venom begins to work its way through Angus's system, and he starts finding it harder and harder to move. Malcolm resorts to carrying Angus, and in due time arrives at a local emergency ward, where an anti-venom is administered. Angus recovers, and has little to show for his encounter beyond a minor wound and an exciting tale (Williams 2019: 132).

Williams thinks that processes are not fit to account for such cases, and hence even if the adopting of a process ontology allows us to weaken **Independence** into cases of interruption, it would still not do the trick. His argument is, in short, that processes come as complete packages:

What was initially attractive about treating this case as a process was that as a structured entity its cleavages allowed us to distinguish partially completed processes from those that run to completion or never start. But now this is denied us once more. Manifestations as processes looks to be an all-or-nothing affair: they either come about or they do not. It is their structure that makes them

appealing, but this proposal undermines that feature. If we are to exploit the cleavages, we need a means of accessing them (Williams 2019: 133).

But Williams does not consider **Homoeomerous**. A corollary of the principle is that the identity of the process is not affected by the process' reaching its *telos* or not: a complete  $\varphi$ -ing is numerically identical to an incomplete one—it is the very same process, albeit it is clearly ‘at an earlier stage’. Assume that  $\varphi$ -ing reached its goal at  $@$  after extending for the interval  $t_1-t_3$ , and that the same  $\varphi$ -ing was interrupted at  $t_2$  before reaching its goal at  $w$ . Given **Homoeomerous**, we can say that  $\varphi$ -ing at  $@$  is numerically identical to  $\varphi$ -ing at  $w$ , but the latter ex hypothesis did not reach its endpoint. So, in a sense, it's not true that processes are an ‘all-or-nothing affair’ that lack the suitable ‘cleavages’.

On the contrary, it seems that the process *can* be interrupted, after all, and that we can make sense of near-fatal poisonings without having to invoke *possibilia*. So, if we can safely replace **Independence** with **Interrupt**, we can avoid Armstrong's argument altogether. Or so the radical powers theorist argues. Is this (dis)solution of the problem satisfactory?

I take it that one of the reasons friends of powers are so deeply committed to **Independence** is that the principle seems to be involved in every case of finks, masks, antidotes, and all the other cases used as counterexamples to the reductive analyses of powers in terms of conditionals or counterfactuals. Note that I am not saying that most powers theorists think that the reductive analysis cannot work *because* there are such counterexamples: plausibly, the impossibility of the reduction has a deeper and more general explanation—my two cents is that the root of the irreducibility is due to different sensitivity to contextual shifts, which is (somehow) connected to the fact that powers are local, while counterfactuals are global matters.

However, these counterexamples still play an important role in justifying a metaphysics of powers (presentations of powers metaphysics as recent as McKittrick 2018 still devote considerable attention to them) and they all seem to involve the fact that

powers, for one reason or the other, fail to manifest. Can we reasonably abandon **Independence** and save the intuition by invoking **Interrupt**? **Interrupt** works well with cases in which powers are not manifested because an antidote is involved, that is, an ‘interference with the temporal succession of causal events starting with the disposition’s stimulus  $s$  and (possibly) ending with manifestation  $r'$  (Schrenk 2010; see Bird 1998). These are cases like the near-fatal poisoning discussed by Williams. So, in the case of antidotes, we can abandon **Independence** in favour of **Interrupt** without much trouble. Indeed, it arguably provides a *better* model (Mumford and Anjum 2011; 2018b).

Finks also do not offer any reason to accept the one over the other, because finkish cases are not *really* about **Independence** (Martin 1994). Rather, they are concerned with the fact that powers can be gained and lost by their bearers; that is, counterexamples based on finks work to undermine counterfactual reductions because they highlight the fact that powers are *properties*. If powers can be lost or gained at a time, they allow for the possibility of unlucky worlds where powers are lost every time that the appropriate stimulus ‘hits’ their previous bearer, and are re-gained right afterwards, invalidating the counterfactual ‘if  $x$  were to undergo  $S$ , then  $M$  would occur’. This is perfectly compatible with both principles.

The cases that seem to offer better evidence for **Independence** over **Interrupt** are the prevention ones—masking and so on (Johnston 1992, Lewis 1997, Ellis 2001, Handfield and Bird 2008). Cases of prevention are harder to square with **Interrupt** because it seems that here the mishap occurred *before* any process could even start: if the hammer was prevented by a layer of styrofoam to hit the glass and shatter it, it would seem that the process of shattering (the manifestation of the glass’ fragility) did not even begin to take place, not that it was interrupted. In short, cases of prevention seem best interpreted as cases of IND-Process: cases where the process does not occur. But IND-Process does not solve Armstrong’s problem: they re-introduce ‘non-actual’ entities, in this case non-actual processes. **Interrupt** would not be enough to explain *every* case in which we think that **Independence** is involved, and hence would not offer a satisfactory solution to Too Much Possibility.

Process theorists still have a card up their sleeve, though. She could argue that there are no such thing as cases of prevention, and that they can all be understood as cases of antidotes: what we treat as prevented processes are nothing but interrupted, *larger* processes. Case in point: we can re-describe the example of the styrofoam preventing the hammer to trigger the glass' fragility as a case in which the larger process of hitting the glass with a hammer and shattering it has been interrupted by an antidote, namely the styrofoam. Suppose that the strategy generalises; there is no such thing as genuine prevention, but only cases of antidotes, which are explained *better* by **Interrupt**.

This is a Pyrrhic victory for friends of processes, however, for it highlights one of the cruxes of process ontologies, namely how to individuate them. I will argue that the only way to individuate processes with the minimal fineness of grain required involves specifying the relation that processes have with their *telos*; however, this relation makes Too Much Possibility re-surface, thus making the appeal to processes as manifestations as a way to dissolve Armstrong's argument useless. Before moving forward with the objection, let me introduce one *desideratum* for the manifestation of powers.

### 3.5. Precision and the Identity of Processes

I suggest that the following requirement is a *desideratum* for every minimal metaphysics of powers, and even more so if said metaphysics is aimed at grounding our modal discourse.

**Precision:** ‘The identity of dispositional tropes is as determinate, but no more so, than the identity of the manifestation events towards which the dispositions are directed’ (Molnar 2003: 60). Manifestations must be fine-grained enough to differentiate between distinct powers.

Assume, for the time being, that distinctness of manifestations is the only relevant element in determining the identity of a power. Thus, two powers P and P\* differ only in virtue of having M and M\* as manifestations, respectively, and not for their degrees, bearers, stimuli,

and so on. In this scenario, the ontological category of manifestations must make it possible to differentiate between the manifestations that two distinct powers tend towards. If processes make it hard to meet **Precision**, then we have good reasons to doubt that processes are the manifestations of powers.

If we adopt a (somewhat) sparse conception of properties (as I have done, implicitly, so far) and think that it is not the case that every predicate corresponds to a genuine property, it becomes quite difficult to establish *a priori* how fine-grained the manifestations (and therefore the powers) need to be: there is no telling from the armchair how many genuine properties there are out there, and how many and how diverse different predicates refer to one and the same worldly entity. Therefore, one might be suspicious that **Precision** can carry any weight at all when it comes to measuring the theoretical virtues of one account: how do we know that any sort of fineness of grain and distinction between predicates is not merely a feature of our language, and all there is out there is just a handful of ontic properties? This is a hard question indeed, which I cannot hope to address properly without being led too far astray.

In what follows I will assume that, even if we adopt a sparse conception of properties, we can retain at least some intuitions from the manifest and scientific images to the effect that there is more than one property, and that predicates differing wildly in their extension or intension can generally be thought of as referring to different properties (this inference can be defeated and falsified, naturally). I will suggest that process ontologies lack precise identity criteria and are therefore threatened to systematically undermine this assumption.

Before considering this point in more depth, I need to address a possible objection to my use of **Precision**, which runs as follows: ‘powers never act alone, and are usually multi-track; **Precision** is misleading, since it requires to only consider a power at a time, in isolation. Wouldn’t the collective nature of the action of powers drastically change the requirements of **Precision**?<sup>60</sup>’ The objection raises two points:

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<sup>60</sup> Thanks to Alexander Carruth for raising this objection.

- i) Powers do not act alone; they have dispositional partners.<sup>61</sup>
- ii) Powers are multitrack; there is more than one manifestation<sup>62</sup> associated with each of them.

The points are obviously interrelated, but I will try to address them separately—hopefully this will not distort the discussion.

Some observations about the first point: I do not need to claim that manifestations are the *only* determining factor for a power's identity. Perhaps its manifestation partners do play a role: perhaps the full description of a power includes all the 'constellations' (Williams 2019) it can find itself in. But this does not influence the demand for precision *as far as manifestations are concerned*: what the criterion demands is that manifestations, *insofar* as they determine the identity of a power, be fine-grained enough to do their job. Secondly, perhaps we can maintain that disposition partners do not play any role in fixing the identity of a power: perhaps we can offer a reductionistic explanation of the interaction of powers simply based on sameness of manifestations—in short, we could think that A is a disposition partner of P if and only if and because both P and A are directed towards the same manifestation, M, so that only the precision of manifestations determines the precision of the power. I shall not explore this point further, but I hope that it shows that acknowledging that powers do not act alone does little to undermine the need for precision as far as manifestations are concerned.

Consider now the second point, concerning multi-track powers. By 'multi-track powers' I just mean a power that is directed to more than one manifestation (token). This is how Neil Williams presents the idea:

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<sup>61</sup> Or stimuli conditions, if we were to adopt a Bird-style counterfactual view of powers.

<sup>62</sup> Or pairs of stimulus and manifestation, if we were to adopt a Bird-style counterfactual view of powers.

Here is a straightforward example. Consider the three-dimensional shape of a lump of sugar—its *cubicness*—and assume, for argument’s sake, that this is a power. In virtue of the cube having the shape it does, it can fit through certain sorts of openings, but not others. It will also cast specific sorts of shadows, resist tumbling down inclined planes, stack neatly with other cubes, make certain impressions in soft clay, and so on. All of this it can do—and a great deal more to boot—in virtue of its cubicness. This is what it is for a power to be multi-track (Williams 2019: 81).

I don’t see how increasing the number of manifestations would affect how fine-grained the manifestation needs to be. We can consider a power multitrack if it has a disjunctive manifestation:<sup>63</sup> P is for M or  $M_1$  or ...  $M_n$ . If anything, this is *less* discriminating than a single track, for a disjunction is always less discriminating than one of its disjuncts. The difference that considerations about dispositional partners and multi-track dispositions might make concerns **Independence**, in case—not **Precision**.<sup>64</sup>

If we concede that Precision is a *desideratum* for powers ontologies, we can ask ourselves how fine-grained processes can be, and how we do individuate them. **Homoeomerous** is based on the hypothesis that the overarching process has already been identified, and allows us to establish the identity of one of its more limited components: it stated that if there was  $\varphi$ -ing between  $t_1$  and  $t_n$ , then there was  $\varphi$ -ing at an subinterval  $t_k - t_i$  of  $t_1 - t_n$ . However, it is unclear how we are to go about when in the opposite situation—that is, when we have the identity of a shorter process, and want to know whether a longer process is identical with it or not. The converse of **Homoeomerous** is clearly untenable:

**Shomoeomerous:** if it is true that  $\sigma$  was  $\varphi$ -ing between  $t_1$  and  $t_2$  then  $\sigma$  was  $\varphi$ -ing during any interval between  $t_1$  and  $t_3$  that has  $t_1$  and  $t_2$  as subinterval.

<sup>63</sup> Since I do not consider powers to ground counterfactuals, but simple possibility claims, this is not problematic. The trouble of thinking multi-track powers as disjunctions, as Bird correctly points out, affects those who think that a power makes true a counterfactual, because a disjunction of counterfactuals is not equivalent to a single counterfactual with disjunctive antecedent and consequent. (see Bird 2007: 21-24).

<sup>64</sup> Indeed, they can be used to *deny* Independence. See Williams (2019).

Holding **Shomoeomerous** would warrant the conclusion that every process is infinitely long, which not only seems counterintuitive, but greatly diminishes how fine-grained the manifestations can be. Invoking spatiotemporal continuity seem even worse: it would be both too strong and too weak a criterion. Too strong, because it would not allow us to admit intermittent processes (*e.g.* John's morning and afternoon sessions of painting the same portrait can reasonably be thought of as being part of the same process) and too weak, because it would identify and conflate different processes, such as John's sleeping, waking up and starting to paint the portrait—even John's living, dying and decaying.

Indeed, were we to accept a criterion based on spatiotemporal continuity, we could easily formulate a ‘slingshot’-like argument to the conclusion that the entire history of the universe is nothing but one single process, under the assumption that spacetime is continuous—a sort of faux slingshot for processes. But this is clearly untenable: we would be forced to admit only one global power which could not be interrupted, for what could be the antidote of a power that includes everything whatsoever?

The situation is particularly dire if we subscribe to a Mourelatos/Hornsby stuff-like view of processes: since processes are types only, we cannot appeal to the token identity of the ‘bearers’ of the process, for they cannot figure in the identity of the type. But individual process theories, such as those defended by Stout, do not fare much better. Although they accept something along the lines of

**Process Bearer Identity.** The identity of an individual process  $\varphi$ -ing depends on the identity of the substances involved in  $\varphi$ -ing.

it is not clear what they take to be the criteria to individuate substances, or bearers: obviously, they cannot invoke their properties (for these are powers, whose identity depend on the *process* they give rise to, generating a tight circle).

Unfortunately, it is not clear what they invoke, instead. Stout (1997) gestures towards a criterion of spatiotemporal continuity,<sup>65</sup> but we have seen that this won't do. Stout (2016) offers two sets of considerations regarding the identity of processes. First, he suggests that the only intelligible way to think about the identity of individual processes is epistemological, in terms of re-identification: ‘the identification and individuation of the things or activity referred to in answering the “What is happening?” question is grounded in the basic skill of keeping track of these things just as the identification and individuation of concrete objects is’ (Stout 2016: 58).

Even if we think that matters of identity ought to be reduced to problems of re-identification *à la* Strawson (1959), we are not given much detail about this capacity of ours to do so: and, indeed, our capacity for re-identification seems to be yet another power (or complex disposition), whose manifestation is supposedly a process that we need, in turn, to be able to re-identify in order for it to have a precise identity. A regress looms large.

Given the vague way in which I have spelled out the assumption about the fineness of grain for powers, it is not easy to gauge how serious this problem is. I take it that any theory of processes that allows for a slingshot argument to the effect that ultimately there is just one, all-encompassing process would evidently violate the commonsensical assumption; similarly, I take it that an ontology that would systematically blur most of our scientific distinctions (*e.g.* between mass, charge, spin, and so on)<sup>66</sup> would also clearly violate **Precision**. In the present context, where we are interested in developing a metaphysics of powers for Dispositionalism, we might want to require an even more stringent constraint of

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<sup>65</sup> ‘Associated with this distinction is the existence of identity conditions for token processes across time. It seems that these conditions might depend on spatio-temporal continuity’ (Stout 1997: 21).

<sup>66</sup> Note that the list need not include only terms employed by fundamental physics: I do not intend to commit to any form of microphysical reductionism; the predicates of special sciences such as chemistry and biology might well refer to sparse properties! In other words, I do not intend to maintain the equation between sparse properties and fundamental properties (especially because, in a metaphysics of powers, it is hard to individuate absolutely fundamental properties: I will return to this in chapter 8): I am happy to subscribe to a more liberal view of sparse properties that relies on the ‘scientific conception’ of sparse properties (Schaffer 2004) or an ‘explanatory’ view (Dorr and Hawthorne 2013, Vetter 2018b).

precision and fineness of grain, especially if we adopt truthmaker semantics (Fine 2014; 107; 2017b).

It seems to me that the only<sup>67</sup> reasonable way to identify processes with the required (albeit vague) degree of precision, provided that nothing like **Shomoeomerous** or anything involving spatio-temporal continuity might work, is a criterion involving the *telos*<sup>68</sup> of the process. Processes are individuated by what they are *for*. How do we distinguish between melting and freezing, if not by saying that one's natural endpoint is that water is in liquid state, and the other's natural endpoint is water in a solid state? This, however, threatens to bring us back to Armstrong's problem. For what is the relation between a process and its *telos*, if not the relation that holds between a power and its manifestation? Aren't we saying that a process has the identity it has because it is directed to a certain natural endpoint, and that at the same time that such process can fail to bring about its endpoint? If it is impossible to offer precise identity conditions for processes without invoking their *telos*, then invoking processes as manifestations of powers and substituting **Independence** with **Interrupt** will have just swiped the problem under the carpet—the bump will reappear down the line. An argument perfectly similar to Armstrong's Too Much Possibility (which should be familiar enough at this point, so I will not rehearse it) will be formulated invoking the following two principles:

**Process Identity:** the identity of a process depends upon its *telos*.

**Interrupt:** every process can be interrupted before it brings about its *telos*.

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<sup>67</sup> It is unclear to me whether DiFrisco is offering a distinct proposal when he writes that ‘processes lack the categorial features of numerical identity over time, persisting instead by having temporal parts, and they are individuated primarily by causal relations rather than by location’ (DiFrisco 2018: 79), because it is not wholly clear what theory of causality he has in mind and therefore whether by ‘causal relations’ occur just in case certain counterfactual conditionals hold, or whether he adopts a powerful theory of causation, in which case his proposal would be the same as mine, or whether he has some other, perhaps primitivist, theory of causation in mind.

<sup>68</sup> Steward (2013) speaks of ‘form’, which I take to be closely linked with the telos. If this is not so, I have to confess that I am not sure to understand what she might mean by that.

This poses a challenge for process theorists: they need to be able to offer suitably fine-grained criteria of identity for processes (so that they could differentiate all the powers) and avoid slingshot-like arguments for the existence of a single massive process, and do so in a way that does not invoke the sort of directedness relation that occurs between powers and manifestations, which would re-introduce Too Much Possibility, the problem that the adoption of process ontologies was supposed to dissolve. I do not have a knock-down argument to the effect that the challenge cannot be met; however, the burden of the proof lies on the side of process theorists; furthermore, given the fact that our current main preoccupation is how to solve Too Much Possibility, and that process theories loop back to it, it seems that adopting processes is nothing but an unnecessary detour. Therefore, we have to conclude that processes do not allow for a swift side-stepping of the problem at hand, and we have to go back to the task of finding a credible answer to Key Question and face Armstrong's challenge head-on. In order to do this, it is time to consider whether adopting universals as manifestations of powers offers us unique and special resources to do so.

## Chapter 4. Solving the Problem: Physical Intentionality

I have argued that attempts at dissolving Too Much Possibility, either by adopting an identity theory between powers and manifestations or adopting a process ontology for manifestations and substituting **Independence** with **Interrupt** are ultimately unsuccessful. We should recognise that Too Much Possibility is a genuine problem, whose solution requires adopting a substantial metaphysical position, by rejecting one of the background assumptions to the argument.

### 4.1 Recap of the Problem

Recall that we considered two versions of Too Much Possibility. The first was couched in terms of a broadly Quinean metaontology:

- i) Our best overall theory includes sentences quantifying over powers (powers metaphysics)
- ii) We are ontologically committed to the entities quantified over our best overall theory (Quinean metaontology)
- iii) Therefore, we are ontologically committed to powers (i, ii).
- iv) Powers are directed to their manifestations (**Directedness**)
- v) Being directed is a relation (assumption I)
- vi) Therefore, we are ontologically committed to their manifestations (ii, iii, Directedness)
- vii) Some powers can fail to bring about their manifestations (**Independence**)
- viii) Some powers exist and their manifestation does not exist (Independence + assumption III)
- ix) Therefore, we are not ontologically committed to the manifestations of powers that do not bring about their manifestations (viii) and we are ontologically committed to them (vi)

This argument relies on the following background assumptions:

- I. Directedness is a relation.
- II. Existential Generalisation is admitted.
- III. Being manifested = coming into existence/becoming something
- IV. Existence is captured by unrestricted existential quantified translations of our best theories.
- V. The formalisation of some of our best theories involves quantification over powers

The second formulation, on the other hand, involved introducing an inner and an outer quantifier:

- i) There exist (inner quantifier) powers (powers metaphysics)
- ii) Powers are directed to their manifestations (**Directedness**)
- iii) Directedness is a relation (assumption A)
- iv) Powers are related to their manifestations (ii, iii)
- v) There are (outer quantifier) manifestations (iv, Existential Generalisation)
- vi) Some powers can fail to bring about their manifestations (**Independence**)
- vii) Some powers exist and their manifestation does not exist (**Independence**, assumption C)
- viii) Therefore, there are (outer quantifier) some manifestations that do not exist (inner quantifier) (v, vii)
- ix) Therefore, there are things that do not exist

The argument requires the following background assumptions:

- A. Directedness is a relation

- B. There are two existential quantifiers (an inner and outer), and only for the latter does Existential Generalisation holds
- C. Being manifested = coming into existence
- D. Existence is captured by the inner existential quantified translations of our best theories
- E. The formalisation of some of our best theories involves inner quantification over powers

It is time to consider strategies to resist the argument. There are only two common background assumptions between the two arguments: I./A. (directedness is a relation) and III./C. (being manifested = coming into existence). Presumably, then, the culprit of our troubles must lie in one of them.

In this chapter I will examine, and ultimately reject, an influential strategy, which involves the rejection of I/A: it denies that directedness is a relation. I dub this strategy the ‘Physical Intentionality Route’. I will argue that the Physical Intentionality Route ultimately fails, and that the most promising solution to Too Much Possibility therefore involves rejecting III), being manifested = coming into existence/becoming something — what I will call the ‘Actualisation Route’.

## 4.2. The Physical Intentionality Route

A number of philosophers (*e.g.* Molnar 2003, Heil 2003, Martin 2008) have maintained that directedness is not a genuine relation. The reason is that they think that powers are *intentional* properties—they display ‘Physical Intentionality’, and thus a power is directed towards its manifestation in the same way that a belief or a desire is directed towards its object. And, the argument goes, (mental) intentional states can notoriously be directed towards non-existing (even impossible) objects, without having to commit to their existence (they are, after all, non-existents). Holding such a position entails either admitting that intentionality is a relation, but a *sui generis* one which resists existential generalisation, or is not a relation at all (therefore there is no second *relatum* that can be subject to existential

generalisation). The latter strategy seems more promising. So, if powers are intentional, we have to think that then directedness *is not* a relation at all. We block existential generalisation in Too Much Possibility because there is no second *relatum* to generalise from. Therefore, no commitment to manifestations stems from **Directedness**. This in turn means that there is no contradiction with **Independence** (if we adopt the Quinean version of the argument) or that we are not committed to saying that ‘there are things that do not exist’ (if we adopt the Meinongian version of the argument).

The Physical Intentionality strategy against the Quinean formulation of Too Much Possibility<sup>69</sup> runs as follows:

1. Intentional states and properties are not related to their objects.
2. If there is no relation, we cannot quantify upon the intentional object as a result of applying existential generalisation to the relation.
3. If we cannot quantify upon intentional objects that way, we cannot quantify on them at all.
4. We are only ontologically committed to what is within the scope of the ‘basic’ existential quantifier.
5. Powers are intentional.
6. Therefore, we are not committed to non-actualised manifestations.
7. Therefore, we can resist Too Much Possibility by rejecting its premisses 1. and 2.

Most attention has been devoted to premiss 5. of Physical Intentionality, concerning the question whether powers actually are intentional. It is indeed not easy to understand what are the ‘marks’ of intentionality (Crane 2001; 2008; 2009, Nes 2008) and whether powers actually display them (Martin & Pfeifer 1986, Place 1996, Molnar 2003, Heil 2003, Martin 2008, Bird 2007, Mumford 1999, Bauer 2016). It is far from clear that premiss 5. can be

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<sup>69</sup> I will stick to this formulation of the problem in what follows. Translating the arguments to target the Meinongian version is fairly straightforward — I will leave it to the reader who is sympathetic to that understanding of Too Much Possibility. Nothing of importance hangs on this choice.

established: for instance, when Molnar (2003) examines the standard ‘marks’ of intentionality in order to show that powers display very similar features, he includes the fact that they admit of non-existent intentional objects. But such ‘mark’ is obviously what is at stake here, and thus it would appear that those who embrace Physical Intentionality to escape Too Much Possibility commit a blatantly circular reasoning:

1. A power being directed towards its manifestation does not commit to the existence of the manifestation because powers are intentional.
2. Powers are intentional because, *inter alia*, they can be directed towards non-existent objects.

However, this only shows that Molnar’s reasons to accept premiss 5. are bad—not that the strategy is in itself hopeless. Perhaps there are independent reasons for thinking that directedness is not to be conceived as a relation and thus that there is nothing to operate the Existential Generalisation on. Perhaps we can forget every reference to intentionality and offer independent reasons to the effect that directedness is not a relation, and reformulate Physical Intentionality accordingly.

I want to offer a stronger reason to reject the strategy. This will involve rejecting premiss 3. of the argument above: I will argue that *even if directedness is not a relation* and we cannot operate Existential Generalisation upon the two *relata*, we can nevertheless quantify upon the manifestations and thus generate ontological commitment towards unmanifested manifestations in virtue of *other obtaining relations* between the two.

### 4.3 Let’s Not Get Physical (Intentionality)

Here’s my proposal to the effect that the Physical Intentionality route is not going to work. I will argue that even if directedness itself is not a relation, a metaphysics of powers that accepts **Directedness** (that is, the idea that the identity of powers is determined by their manifestations) presupposes that there are *other* relations between powers and their

manifestations, which make the commitment to the existence of manifestations inescapable. This in itself does not prove that there is a relation of *directedness* between powers and their manifestations, and therefore that assumption I. is legitimate. However, the main reason—at least in the present dialectical context—to doubt that there is such a relation was the desire to avoid ontological commitment to unmanifested manifestations. Once we are forced to conclude that such commitment is unavoidable, we might as well concede that there is such a thing as directedness.<sup>70</sup>

My argument is based on a reading of **Directedness** according to which the identity of powers is fixed, or determined, by their manifestation. That is to say, two powers are different because they tend towards different manifestations. I think that such a principle must be shared by the proponents of Physical Intentionality: if they give up on the idea that powers are the properties they are in virtue of what they are *for*, then I do not think that we are talking of the same thing anymore.

Manifestations, by determining the identity of powers, give rise to the *criteria of identity* and *principles of individuation* of powers. The difference between these two relies on two different notions of identity. ‘A criterion of identity for entities of a kind K’, according to Lowe (2010: 9), ‘is supposed to be a principle which specifies the identity (and thereby the distinctness) conditions of Ks in an informative or non-trivial way’. The principle can be stated thus:

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<sup>70</sup> It is tempting to be more ambitious, and identify the directedness relation with the metaphysical relation that I will argue links powers and manifestations and commits us to unmanifested manifestations. However, I think that such temptation is best resisted—not so much because it would muddle my dialectical situation with regard to the supporter of Physical Intentionality (although it would), but mainly because I want to say that there is a multiplicity of dependence relations link powers and manifestations (see especially §8). So, we cannot just identify directedness and metaphysical dependence—presumably, we should identify it with the conjunction or the plurality of all the relevant dependencies. But this is risky for the minimal metaphysics, because I want to maintain that Weak Productivity is optional for powers theorists. Saying that Productive Dependence constitutes directedness would mean that people who reject Weak Productivity and people who accept it are talking about radically different entities—which would be unfortunate, and violate the integration *desideratum*. So, I find it preferable to say that directedness is quite distinct from the various dependence relations (although it might ground them). Thanks to Anna Marmodoro for pressing me on this point.

**Criterion of Identity:** If  $x$  and  $y$  are entities of kind K, then  $x=y$  iff  $x$  and  $y$  stand to one another in the relation  $R_K$ , where  $R_K$  denotes some equivalence relation (other than identity itself) on entities of kind K.

According to Lowe, criteria of identity only ‘concern “identity” as a *relation*—the relation that logicians standardly represent by means of the equality sign, “=”’ (Lowe 2010: 9).

Principles of Individuation, on the other hand, are stronger than mere criteria of identity: they establish what an entity *is*. In short, Principles of Individuation are concerned with ‘*which* entity of its kind  $y$  is’ (Lowe 2010: 9) and thus:

the notion of “identity” at play here is not the one symbolized with the “equals” sign, *i.e.*, “=”. Rather, we mean “identity” in the sense of *what* a thing is, or *which* thing of a certain kind a thing is (Lowe & Tahko 2015).

In short, it is the sense of identity that is employed when we discuss something’s nature: it is meant to capture what it is to be that very thing. It is this latter sense of identity (we can refer to it as ‘thick identity’) that I am interested in here. So, by saying that the identity of powers are fixed or determined by the identity of their manifestations I mean that *which entity a power is*, in the thick sense, is fixed by which entities its manifestation(s) are, in the thick sense.

Following Lowe (1998; 2006), I maintain that if  $x$  fixes or determines the identity of  $y$ , then  $y$  depends *for its identity* upon  $x$ . Therefore, my starting point is that powers depend for their identity on the identity of their manifestations. We can express this idea thus:

**MD:** A power P depends for its identity upon the identity of its manifestation M: P is what it is in virtue of M’s being what it is.

I will formalise this notion of thick identity rather inelegantly by introducing a thick identity predicate, ID, so that ‘what  $x$  is’ will be represented by ‘ID $x$ ’. We can then re-formulate **MD** as follows:

**MD\***: ID(P) depends upon of ID(M).

We can call such kind of Identity Dependence also ‘Metaphysical Dependence’ (Lowe 1989; 2006; 2009, and Tahko & Lowe 2015);<sup>71</sup> in what follows I will use the two terms interchangeably.

Now, to the key move in my argument. Tahko and Lowe (2015) maintain that the following principle holds:

**Identity-Existence**: If  $x$  depends for its identity upon  $y$ , then, necessarily,  $x$  exists only if  $y$  exists.

That is, they claim that identity dependence entails rigid existential dependence, at least if we express it in modal/existential terms. If the principle holds, it would mean that it is not the case that some object  $x$  exists without the entities  $yy$  that determine its identity also existing. But, we have said, every friend of powers is committed to the idea that powers depend for their identity upon their manifestations, by **Directedness**. Since powers owe their identity to their manifestations even when they are not manifested, this means that powers theorists are committed to the existence of unmanifested manifestations if they accept **Identity-Existence**. The argument runs as follows:

1. Powers depend for their identity upon their manifestations.

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<sup>71</sup> Some might be surprised by the idea that it is the power which depends on the manifestation, and not vice versa: after all, powers are supposed to *bring about* the manifestations, and surely that involves some sort of dependence! I will discuss this at some length in §8.1 and §8.2

2. If  $x$  depends for its identity upon  $y$ , then  $x$  exists only if  $y$  exists.<sup>72</sup>
3. Powers do not change their identity when they bring about their manifestation.<sup>73</sup>
4. Therefore, unmanifested manifestations exist.

So, in order to show that powers are ontologically committed to their manifestations, we just need to show that 2. is true, *i.e.* that **Identity-Existence** holds.

The formulation of metaphysical dependence given above in **MD\*** leaves undetermined how, exactly, we are to understand the relation of dependence between  $ID(P)$  and  $ID(M)$ . There is a vast number of suggestions in the literature on how, precisely, we should understand metaphysical dependence. Instead of examining every one of them and showing that **Identity-Existence** follows from each, I will offer a more general argument, to the effect that *regardless of how we cash out MD\**, (modal/existential) rigid existential dependence follows from it.<sup>74</sup>

The plan is this: instead of focusing on *what, exactly, metaphysical dependence is*, I propose to focus on *how we express* dependence and the explanations involving them. There are two options available, as far as I can see: i) a *relational* approach, which employs a relational predicate linking the entities that are dependent with the entities upon which they depend, or ii) an *operational* approach, which introduces a sentential operator linking the sentences or propositions expressing or referring to what is determined with sentences or propositions expressing what does the determining. The situation mirrors that of

<sup>72</sup> Here I am only concerned with existence *simpliciter*, the one understood along the Quine-van Inwagen lines delineated in the metaontological assumptions I presented in fn. 32.

<sup>73</sup> I am here assuming this premiss: it seems innocuous enough and I did not want to add a further detour to the argument.

<sup>74</sup> It is fairly common to think that Metaphysical Dependence is to be captured with the help of a non-modal essence operator: see for instance Lowe (2006) and Tahko and Lowe (2015). For a powers-related example, Jaag writes that ‘If  $\mathcal{E}_P (Px \rightarrow NMx)$ , then  $Px$  is essentially dependent upon

$NMx'$  (Jaag 2014: 9). Note that Jaag uses the symbol  $\mathcal{E}_P$  to express primitive essence just in the same way that I will use the Finean operator  $\Box_P$ . They express the same notion. However, not everybody agree that Finean essences should be used to characterise metaphysical dependence (Koslinski 2012b) and some even take it to be a primitive notion (Barnes 2018). So, despite my sympathies for cashing out MD in terms of essence, I think it is better to offer a completely general argument here which does not rely on such reading.

grounding:<sup>75</sup> although it is probably best to keep metaphysical dependence and grounding separated (Schnieder 2017, Barnes 2018), it is quite natural to think that the options regarding how to *express* grounding in metaphysical explanations are the same as those to express metaphysical dependence.

If we pick a predicational approach, we can think of the *relata* as being facts concerning the thick identities of the particulars involved. Therefore, metaphysical dependence will have this form:

### Relational MD: $R([IDx], [IDy])$

Different theories of dependence will differ with regard to how, exactly, the relation R involved will be cashed out: it might even be a primitive relation (Barnes 2013). These details are not important here. What is important is that, *ex hypothesis*,  $[ID(P)]$  obtains: we are concerned about actually instantiated powers that have a definite identity, so the fact that P is what it is obtains. From any account of dependence it will follow that, if it is the case that  $R([IDx], [IDy])$  and  $[IDx]$  obtain, then  $[IDy]$  obtains, too. Now note that y is a constituent of the obtaining fact  $[IDy]$ . So, M is a constituent of  $[ID(M)]$ . We can then easily derive the ontological commitment to y by appealing to the uncontroversial principle that the constituents of an obtaining fact do exist—a fact could not obtain if one of its constituents did not exist. If [Caesar speaks in the senate] obtains, then Caesar exists, because [Caesar speaks in the senate] could not obtain if there were no Caesar, no speaking, or no senate. So, given the fact that M is a constituent of the obtaining fact  $[ID(M)]$ , we can conclude that M exists. Expressing ‘the fact  $[Fa]$  obtains’ as  $O[Fa]$ , we can formalise the argument as follows:

1.  $R([\text{ID}x], [\text{ID}y])$  Predicational reading of MD\*

<sup>75</sup> See for example Correia (2010), Correia & Schieder (2011), Fine (2012), Audi (2012), Rosen (2010), Dasgupta (2014), Sider (2012) Raven (2015).

2.  $O[IDx]$  Assumption
3.  $O[IDy]$  1,2
4.  $\forall x (O[Fx] \rightarrow \exists z (z=x))$  Constituents of obtaining states of affairs exist
5.  $\exists z (z=y)$  3, 4

The situation is not much different if we choose an operationalist approach, perhaps more surprisingly. If we adopt this view, the dependence would be expressed by a sentential operator flanked by two sentences (or propositions). Let's use sentences:

**Operational MD:** ‘ $IDx$ ’ because ‘ $IDy$ ’

Again, we assume that it is the case that the power has the identity it has, and therefore it will be true that ‘ $IDx$ ’. From this it follows that it must be true that ‘ $IDy$ ’. Now we can ask what is the truthmaker for ‘ $IDy$ ’. I can see only two options: either it is the fact  $[IDy]$ , in which case the same reasoning as above applies, or it can be  $y$  itself. Either way, if the power exist, so does the manifestation it is a power for: power metaphysics are committed to the existence of unmanifested manifestations.

Alex Skiles has suggested to me in personal conversation that Metaphysical Dependence could be also expressed via generalised identity—as a ‘just-is’ sentence, along these lines  $[IDx] \equiv [IDy]$  or ‘ $IDx$ ’  $\equiv$  ‘ $IDy$ ’. The benefit of adopting this strategy would be that, according to the generalised identity theorists (*e.g.* Rayo 2013, Correia & Skiles 2017), two sentences flanking the generalised identity sign do not differ in their ontological commitments: ‘What it takes for [For Susan to be a sibling just is for her to share a parent with someone else] to be true is for there to be no difference between Susan’s having a sibling and Susan’s sharing a parent with someone else’ (Rayo 2013: 4) and that the two sentences flanking the operator are ‘full and accurate descriptions of the same feature of reality’ (Rayo 2013: 5). Rayo intends to use just-is statements to offer various ontologically deflationary positions, in particular when applied to abstraction principles in mathematics:

he thinks he can reap all the benefits of Neo-Fregeanism without having to pay the cost (see Linnebo 2019 for a detailed discussion). Similarly, the proponents of the Physical Intentionality Route might use this feature to deny that ‘the identity of P depends on the identity of M’ commits us to the existence of M any more than ‘P is directed to M’ does; since they assume that the latter bears no ontological commitment to manifestations, they can conclude that neither does the latter. Therefore, my argument begs the question, and the discussion with Physical Intentionality theorist has reached a dialectical impasse.

Even conceding that the strategy is in general viable (see Linnebo 2014; 2019 for critiques), what I find problematic in Skiles’ suggestion is that metaphysical dependence seems to be very poorly captured by generalised identity: they seem to be wildly different phenomena. The problem is not merely that generalised identity is symmetrical and metaphysical dependence is not, because we could perhaps cash out metaphysical dependence in terms of the asymmetric ‘partial generalised identity’ developed in Correia & Skiles (2017). The problem, rather, is that the whole point of talk of generalised identity is to discuss ‘same feature of reality’—but this is not what the powers theorist want to do with **Directedness**: powers are, in some sense at least, *distinct* from their manifestations! Powers are not the same feature of reality than their manifestations, differently described or conceptualised—they are something distinct, although closely linked. Even those who, like Marmodoro (2017), think that powers are numerically identical with their manifestations, would resist the idea that powers and manifestations are *the same feature of reality*; for instance, Marmodoro still stresses that manifestations are different *states* of powers (whatever ‘states’ are). A way to make this point more vivid: Kovacs (forthcoming) notes that we can distinguish between dependence relations that *constitute* and dependence relations that *determine*. Metaphysical dependence, as it occurs between a power and its manifestation, seem to be of the determinative kind; (partial) generalised identity, on the other hand, seems to be relevant to the constitutive kind of dependence.

Early critics of powers, such as Armstrong (1997), often complained that if one were to adopt a metaphysics of powers, there would be no real change in the world, just

passing powers around. Defenders of powers have responded by noting that ‘passing powers around’ is a perfectly legitimate kind of change (Mumford 2009). A thing was fragile, and then it is no longer fragile: it is broken, instead. This is a real change, even if being broken is, in turn, a power. But if we accepted that powers *just are* (even just partially) their manifestations, this defence would no longer be available—it would seem that Armstrong had a point, after all. This does not show that the idea of understanding metaphysical dependence in terms of generalised identity is necessarily misguided. But it does show that it is not a view that a powers theorist should feel at all inclined to accept, because it would spell considerable problems for their metaphysics in general. Therefore, although the idea would deserve further discussion, I think that for our current purposes we can safely dismiss it: the metaphysical dependence between powers and manifestations is not generalised identity.

#### 4.4 Primitive Identities for Powers?

I want to conclude that we are ontologically committed to the existence of unmanifested manifestations, because powers metaphysically depend upon their manifestations, and metaphysical dependence commits us to the existence of the determined entities as well as the determining entities. Now, friends of Physical Intentionality will protest that it is unjustified to assume that powers depend for their identity upon their manifestations, and it was unwarranted on my part to attribute them that assumption: although everybody agrees that powers are *for* something, they will contend that there is no *metaphysical determination* involved. Such a position is exposed for example by Ingthorsson (2012), Jacobs (2011), and Contessa (forthcoming).<sup>76</sup> Since the consequences of the argument against physical intentionality are very important in what follows, it is worth examining the complaint in some detail.

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<sup>76</sup> I suspect that Williams (2019) is also sympathetic to it, but his case is less clear-cut than the others.

Valdi Ingthorsson (2012) argues that we should resist the idea that the identity of powers is determined by the identity of their manifestations: instead, according to him, powers have primitive identities. The idea that powers metaphysically depend upon their manifestation would derive from a confusion between a conceptual or epistemological characterisation of powers and their nature: we conflate what we can *perceive* of a property with what it really is: ‘Powers are believed to be essentially related to a manifestation because manifestations, as opposed to powers, have been thought to belong to the domain of the perceptible’ (Ingthorsson 2012: 73). He argues that friends of powers should invoke a form of Ramseyian humility (Lewis 2009) when it comes to the nature of properties. Once we abandon the idea that the whole nature of a property has to be within the realm of the perceptible, we do not have any particular reason to think that the identity of a power is determined by the identity of its manifestation:

I will suppose that the property represented by the phenomenal quality has a determinate nature independently of the character of the phenomenal quality [...] and I suggest that we can calmly assume that a property that gives rise to a manifold of ‘outcomes’ can nevertheless have a determinate nature independently of the character of those ‘outcomes’ because the property is not identical to these outcomes (Ingthorsson 2012: 73).

I think there is a problem for the view that powers have a primitive identity, and hence that Ingthorsson’s proposal should be abandoned. The problem is this: Powers have their modal/nomic profile fixed. This is the minimal characterisation of what it is to be a power: they could not exist in another world and give rise to different possibility claims or counterfactuals.<sup>77</sup> Obviously, the modal/nomic profile of a power includes its manifestations.

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<sup>77</sup> I have so far operated under a much stronger conception of power, one according to which the modal profile is essential to it. However, to avoid begging the question against Ingthorsson, in this context I will operate with this weaker characterisation.

The question is: how are we to link the power to its necessary modal/nomic profile? A natural answer is this: a power P has its modal/nomic profile N necessarily because *it is essential to* P that it has profile N, where ‘essential to’ is to be understood in non-modalist terms (Fine 1994). Finean essences cannot be analysed in modal terms, but have modal consequences: following Fine’s formalisation,  $\Box_x p \rightarrow \Box p$ . Hence it is necessary that P has profile N. This is the as good a candidate for a bedrock explanation as we are going to get (Glazier 2017). But if N is part of the essence of P, then P will depend for its identity upon N. Even if we do not wish to equate metaphysical dependence to essential dependence (as Lowe 2006), it is hard to deny that essential dependence is at least a species of metaphysical dependence. According to the Finean picture, entities are ontologically dependent upon what is mentioned in their essence: that’s why {Socrates} depends upon Socrates and not *vice versa*. The modal/nomic profile of P—call it ‘NP’, includes the manifestations of P, M. So P depends metaphysically upon M, *contra* Ingthorsson’s hypothesis. Since this essentialist explanation is not available to those who think that powers have primitive identities, they need to offer an alternative explanations of the necessary link between a power and its profile.

It is unclear what strategy for filling the gap between a power and its necessary nomic profile is available to the primitivist, however. Obviously she could not appeal to laws of nature or such, for that would defeat the whole point of powers metaphysics: it is powers and their nomic profile that ground and explain laws of nature (if there are any), not *vice versa*: this would bring us back to a DTA conception of laws. Similarly, invoking brute necessary links would seem to be unjustified and costly: it becomes just mysterious why powers are necessarily linked with their nomic profile and not others.<sup>78</sup> Maybe the primitivist can offer a convincing story, or maybe essentialist explanations are not better than primitivist ones, *contra* Glazier. But I think that Glazier offers us good reasons to prefer an essentialist explanation to a primitivist one, and thus reject Ingthorsson’s suggestion that

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<sup>78</sup> A somewhat similar argument can be found in Neil Williams’ discussion of ‘B-type property dualism’ (Williams 2019: 102-12).

powers have their identities primitively. So, I think we should maintain that it is preferable to think that powers depend for their identity upon their manifestations.

If this is the case, then the argument against physical intentionality does still apply, and hence that we are committed to unmanifested manifestations. Thus, the tension remains: we need to find another way to dispel it. The only way that I can see to do so is to think that there is some *other* property which manifested manifestations have, and unmanifested manifestations lack. In other words, we need to reject assumption III. More perspicuously:

$$1) \exists F \forall x ((\text{Manifested}(x) \square F(x)) \wedge (\neg \text{Manifested}(x) \square \neg F(x)))$$

$$2) F \neq \lambda x. \exists z (z = x)$$

Rejecting assumption III) and the idea that the difference between being manifested and being unmanifested is existing or not, however, does not tell us anything about how that difference is to be understood in more positive terms. This means that the question we need to answer in order to avoid the contradiction is the following:

**Key Question:** What is the feature which differentiates being manifested and being unmanifested?

In the next chapter, I will consider and reject some popular proposals as how the Key Question can be answered, before developing my account in chapter 6.

## **Chapter 5. The Actualisation Route**

Once we recognise that Physical Intentionality is not viable and that we have to go down the Actualisation route, it becomes pressing to answer Key Question: what is the property that distinguishes manifested and unmanifested manifestations?

It is very tempting to take cue from the name of the strategy itself, and suggest that the relevant property is that of being actual. I will briefly argue that this strategy is not promising before turning to a more serious contender: the idea that the manifestations of powers are universals, and therefore the difference-maker between being manifested and being non-manifested in being instantiated or not.

### **5.1. Actualism**

Can we simply think that the answer to Key Question is that manifested manifestations are actual, in the contemporary sense of the term, and non-manifested ones are non-actual? The idea might seem tempting at first, but should be resisted, for two reasons. The first is that the proposal would not advance much our understanding Key Question: despite the fact that talk of actuality is pervasive in contemporary metaphysics, it is surprisingly hard to find an illuminating elucidation of its meaning—especially once we abandon the framework of possible worlds talk. The second reason is that such understanding would undermine one of the key elements and points of appeal of Dispositionalism: the fact that it is supposed to be a Hardcore Actualist (or ‘New Actualist’) theory of modality (Contessa 2009, Vetter 2013).

The first problem boils down to the fact that it is not clear what, exactly, we take ‘actual’ to mean. I suspect that some philosophers just take ‘actual’ to be the same as ‘being (something)’. This would collapse our solution into the contradiction offered by Too Much Possibility, for it would entail that everything whatsoever (including unmanifested manifestations) is actual.

Since the position is of no help to the problem at hand, we can dismiss it: ‘being actual had better be actually doing something harder than just being, otherwise the supposed dispute is just silly’ (Williamson 2013: 22-3). Similarly, we can dismiss those classical possibilist positions that distinguish between being, on one hand, and existence or actuality on the other (*e.g.* Russell 1903) for they qualify as Meinongian according to the characterisation of the position offered in §1.3.

There are other conceptions of actuality that do not equate it with being something *simpliciter*. One is the Lewisian one, which treats ‘actual’ as an indexical meaning roughly ‘having spatiotemporal relations with the utterer of the sentence’. Or we can take an ‘ersatzer’ meaning of the term, roughly indicating a set of sentences or states of affairs (in the representational sense used by Plantinga 1974) that do not perfectly match the world. These readings of ‘actual’ are intelligible and do ‘something harder than just being’, but they are unhelpful for powers ontologies. The Lewisian proposal only makes sense if one does have the whole plurality of concrete possible worlds—but that is something that the Dispositionalist clearly has to do without. As for the linguistic (or in general, primitivist representational) ersatzer: how are powers supposed to turn a representation or sentence into flesh, when they bring about (and thus actualise) their manifestation?

Philip Bricker is an interesting example of a reading of ‘actual’ that would be helpful for a powers ontology. He supports a Lewisian Genuine Realist ontology of concrete possible worlds, but refuses to adopt Lewis’ deflationary reading of ‘actual’—a position that he labels ‘Leibnizian Realism’ (Bricker 2006). Worlds are concrete particulars, but only one (ours) has the special, absolute property of being actual. However, when it comes to explaining what this vital property is, Bricker is forced to say that the property is primitive, and cannot characterise it any better than saying that

What I mean by “is actual” is, more or less, what the Meinongian means by “exists”. What I mean by “exists” is, more or less, what the Meinongian means by “is” or “has being”. I say: whatever is,

exists. The Meinongian says: there are some things—for example, merely possible objects—which do not exist (Bricker 2006: 44).

Now, this clarification is either wrong or unilluminating. I think it is fairly safe to say that existence entails being spatiotemporally located, for the Meinongian, so if we followed Bricker's translation, every world would be actual. On the other hand, if the term is not cashed out in these terms, then it becomes mysterious again. We seem to be confronted with a recurring problem: either being actual is a trivial property, in which case the proposal cannot do any work to solve Too Much Possibility, or being actual is a substantive property, but we seem to be unable to provide an elucidation of it.

The second problem of the proposal is that Dispositionalism is supposed to be a hardcore actualist theory of modality—that is, it is committed to the idea that everything whatsoever that exists is actual. Leibniz biconditionals are not metaphysically illuminating because they talk about other possible worlds (whatever their nature), when, according to the hardcore actualist, there are none. If everything that goes on at our world is actual, and *there is only our world*, then being actual is a trivial property and we cannot hope to solve Too Much Possibility by denying that some entities (unmanifested manifestations) are actual: they could be so only if they existed in some other possible world, but *ex hypothesis* there are none. It is clear that this is not a promising way to answer Key Question.

## 5.2 Aristotelian Universals

We have seen that ‘actuality’ is not a good candidate to answer Key Question and clarify what is involved in the Actualisation Route. However, there is another popular option on the market that I have not considered yet. The idea is to adopt universals as the manifestations of powers, and take the distinguishing feature that separates manifested

from unmanifested manifestations to be the property of being instantiated.<sup>79</sup> Manifestations are universals: manifested manifestations are instantiated universals, whereas unmanifested manifestations are uninstantiated universals.

The idea, to my knowledge, was first suggested (somewhat obliquely) by Stephen Mumford (2004) and is perhaps the most commonly adopted solution to Too Much Possibility (Tugby 2013, Vetter 2015, McKittrick 2018):

Can we say that the powers are directed towards the properties rather than the particular instantiations of those properties at particular times and places? In a significant sense, yes. For the power is indeterminate in respect of time and place of its manifestation. Each manifestation will be somewhere and somewhen but the somewhere and somewhen are not necessary for the having of the power. They are among the contingent details of its manifestation. What is necessary to its manifestation is the universal only. This universal exists, whether or not manifested by some particular power. So if the universal is what a power is *for*, then its existence is not *Meinongian* (Mumford 2004: 194).

The crucial point, I take it, is that universals can be multiply, wholly instantiated.<sup>80</sup> If a token power P is directed towards universal U, then we can concede that directedness is a genuine relation, entailing the existence of its *relata*, even if this particular token P fails to bring about the manifestation: U exists anyway, and *it is the very same universal that would have been instantiated yet another time*, had P manifested, or that is manifesting in virtue of the

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<sup>79</sup> Note that this presupposes that there is something such as the higher-order, extrinsic property of 'being instantiated'. The proposal might seem a non-starter for this reason, as it threatens an ugly Bradley-regress. However, for the sake of argument I will largely ignore this, as I will not insist too forcefully, in what follows, on the fact that it is highly unclear and mysterious what exactly instantiation is supposed to be. Perhaps we can make sense of the idea that instantiation is a 'non-relational tie' which gives raise to *sui generis* higher order extrinsic properties without generating a vicious regress. Although I will not press on this point much, these further problems should also be kept in the back of one's mind when considering universals as the solution to Key Question.

<sup>80</sup> I take universals to be minimally characterised by the following two theses: i) universals are the only kind of thing that can be instantiated: 'the difference between particulars and universals is that, simply in virtue of its being a particular, nothing whatever can instantiate a particular' (Lowe 2006); and ii) universals can wholly present in multiple places at the same time. Taking the possibility of simultaneous multiple instantiation as defining trait of universals might beg the question against the theories of Platonic haecceities that I will discuss in the next section: my argument against these will not crucially rely on this part of the definition.

success of P\*. No need for *possibilia*: only actual universals involved. A manifestation is manifested if the universal in question happens to be instantiated in a specific spatiotemporal location<sup>81</sup> as a result of the action of the token power,<sup>82</sup> and unmanifested if the very same universal is uninstantiated in that specific place and time (despite the action of the token power).

The view, naturally, amounts to the idea that powers only have Type-identities in virtue of their manifestation. This will become relevant for the purposes of developing a theory of powers that is apt to ground modal truths, for it will invite a dilemma when it comes to explain the truth of *de re* modal sentences: either we have to introduce very fine-grained universals, or we admit that powers do not have much to say about the modal properties of specific individuals and particulars. I will come back to this in the next section. For the time being, let's consider a bit more in depth what we are talking about when we talk about universals.

In this context, it is particularly important to be clear about the relation between the existence of universals and their particular instances. A significant distinction within theories of universals can be drawn between those that maintain that universals ontologically generically depend upon their being instantiated and those who regard them as being independent. Call the former ‘Aristotelian’ and the latter ‘Platonist’ theories of universals.

In short, friends of Aristotelian Universals accept the following ‘Principle of Instantiation’, according to which each property or universal ‘demand[s] that it is a property of some particular[, and for each relation universal [it must] be the case that there are

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<sup>81</sup> Or particular—the details of our theory of the instantiators do not matter greatly at this stage.

<sup>82</sup> In some sense of ‘as a result of’. The most natural reading would be to treat this as a causal explanation, but the power theorists who reject **Strong Causality** and concede that there are non-causal powers will probably resist such reading. Still, even who admits non-causal powers has to find a way to say that the pattern of instantiation of universals at a certain moment  $t_n$  must be in some way *due to* the action of some powers at some other time  $t_m$ , otherwise it would be unclear what work the powers are doing, and how such a picture would differ from a Humean mosaic. *That* is the reading of ‘because’ that is relevant here.

particulars between which the relation holds' (Armstrong 1989: 75, quoted in Vetter 2015), whereas Platonists reject it. Their position can be summarised as follows:

**Aristotelian Universals:** A universal  $F$  exists iff there is some particular  $x$  such that  $x$  instantiates  $F$ .<sup>83</sup>

**Platonic Universals:** A universal  $F$  is an abstract<sup>84</sup> entity which exists necessarily at all times, independently of being instantiated.

The majority of power theorists embrace Aristotelian Universals (Ellis 2001, Mumford 2004, Vetter 2015, and arguably—*pace* her professed neutrality—McKittrick 2018). I take it that one of the main reasons for adopting an Aristotelian view of universals is that it allows us to maintain Ontological Naturalism, which is ‘the doctrine that reality consists of nothing but a single all-embracing spatio-temporal system’ (Armstrong 1981: 149). That is to say, the view does not need to invoke in our scientific and metaphysical explanations the actions or relevance of entities that are not causally efficacious and within our epistemic grasp: all there is, is right in front of our eyes.

More importantly, adopting an Aristotelian theory is helpful to clarify *what universals are supposed to be* and how they are supposed to be instantiated. A common reason to adopt the idea that universals (generically)<sup>85</sup> ontologically depend upon their instances is that properties, when everything is said and done, are nothing over and above *ways things are*. David Armstrong, who more than anybody in the last decades has contributed to establish

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<sup>83</sup> Aristotelian theories of universals can be further differentiated once the temporal dimension is factored in. To avoid an excessively cumbersome discussion, I will only deal with the most liberal version: A universal  $F$  exists at some time  $t$  iff there is some particular  $x$  such that  $x$  instantiates  $F$  at some  $t'$ , where either  $t \geq t'$  or  $t' \geq t$ . This is the position adopted by Armstrong: ‘We certainly should not demand that every universal should be instantiated now..The principle of instantiation should be interpreted as ranging over all time’ (Armstrong 2008: 65)

<sup>84</sup> Note that by ‘abstract entity’ I do not mean the Aristotelian or (Neo)Fregean ‘entity produced by an operation (psychological or else) of abstraction from a non-abstract one’.

<sup>85</sup> By generic ontological dependence I mean non-rigid, pluralised modal/existential dependence:  $x$  depends generically for its existence upon the  $F$ s  $\equiv_{df}$  Necessarily,  $x$  exists only if some  $F$  exist. See Lowe (1998; 2006), Correia (2008) and Lowe & Tahko (2015).

*in rebus* universals as respectable entities, in the last years of his life (see in particular Armstrong 2004) defended an ontology of states of affairs according to which these are the fundamental building block of reality—they are not posterior or dependent in any way on their ‘components’. On the contrary, their components (bare particulars and immanent universals) are just ‘abstractions’ from the fundamental states of affairs.<sup>86</sup> Universals and thin particulars are *aspects* of states of affairs, or thick particulars (Heil 2015). He argued that

[universals] are mere constituents of states of affairs... If a particular  $\alpha$  has the property-universal  $F$ , then the state of affairs is  $\alpha$ 's *being F*. For convenience we may continue often to refer to the universal by the mere letter ' $F$ '. But it is best thought of as  $\_\text{'s being } F$ . Similarly, we have  $\_\text{'s having } R$  to  $\_$ . The universal is a gutted state of affairs; it is everything that is left in the state of affairs after the particular particulars involved in the state of affairs have been abstracted away in thought (Armstrong 1997: 28-9).

A comparison with the linguistic case is helpful here: assume that states of affairs are best referred to or described by atomic sentences such as ' $F\alpha$ '. In order to obtain the best description of the universal (that is, the predicate that ‘corresponds’ to it), we will just need to use an abstraction operator—say, the one provided by  $\lambda$ -calculus. The predicate ‘*being F*’ is thus abstracted from  $F\alpha$  by lambda, resulting in ' $\lambda x.Fx$ '. According to Armstrong, something similar goes on at the metaphysical level. Universals or properties are just aspects of things, they are ‘gutted states of affairs’: that is why they depend upon them. This helps to dispel the idea that universals are some mysterious kind of entity that somehow are related, by means of an equally mysterious relation of instantiation (or participation, etc) to ordinary things. That is to say, I take it that adopting an Aristotelian theory of universals partially succeeds in minimising the role of instantiation and therefore the potential troubles connected to it. We don’t have to *really* worry about instantiation if all properties

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<sup>86</sup> The components of states of affairs, such as universals, ‘only exist at the limit of abstraction’ (Armstrong 2009).

are just the way things are, abstracted from other irrelevant details. It would seem that Aristotelians have one less mystery to solve, and so *ceteris paribus* be preferable. The problem is that such view of universals does not help much when it comes to Too Much Possibility, when it is articulated employing **Type-Independence**, as I have argued in chapter 1. that it should.

Those who are committed to the idea that the manifestations of powers are Aristotelian Universals face a tension between the following three<sup>87</sup> theses:

- i) Manifestations of powers are Universals.
- ii) Universals exist only if (ever) instantiated: A universal (type) exists iff it has an instantiated token.
- iii) There are type-unmanifested powers.

A terminological note: this tension has often been associated to the problem of ‘alien properties’ for actualist possible-world metaphysics (Tugby 2013). I think we should be careful in associating the two debates here, because the term ‘alien properties’ is ambiguous: it might be read weakly, as ‘properties that are not (or ever will be) instantiated at the actual world’. But it might also be read more strongly, as ‘properties that *cannot* be instantiated at the actual world’. To avoid confusions, let me refer to the latter set of properties as ‘super-aliens’ (Vetter 2015: 269).

The problem presented above concerns aliens only: **Independence** only shows that there are kinds of powers that might never manifest—nothing is being said about *super-aliens*. For what has been said so far, the power theorist is not committed to the existence of

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<sup>87</sup> Matthew Tugby presented a very similar objection, but added a fourth point in order to bring out the inconsistency, which he called the ‘intrinsicness platitude’, which states that ‘many disposition instantiations are intrinsic to their possessors’ (Tugby 2013: 454). His main reason for doing so, as far as I can see it, is to prevent the Aristotelian from biting the bullet and simply deny that unmanifesting powers exist, and that there are laws that concern them. However, if we accept the strongest version of **Independence**, as I have argued we should, then such a denial is no longer viable, and we can establish the inconsistency without having to invoke the intrinsic/extrinsic distinction, which is somewhat muddled when it comes to powers. Aside from this detail, the argument is very similar to that offered by Tugby.

the latter, so she might simply deny their possibility and incur in no internal tension (Giannini & Tugby forthcoming). Given **Type-Independence**, powers ontologies are committed to aliens. But how can there be Aristotelian alien universals, if universals (generically) depend upon their instances for their existence? The point of adopting universals was that they could exist even if they failed to be instantiated in some particular occasion. But, according to the Aristotelian conception, they need to be instantiated *at some point* by something in order to exist. But aliens, by definition, are never instantiated. Yet, powers are directed at them, so they need to exist. How is this possible? Vetter recognises the problem and relaxes the principle of instantiation enunciated by **Aristotelian Universals** as follows:

**PPI.** Every universal must be at least potentially instantiated: there is a property universal of being F only if there is some particular thing which is F, is potentially F, or is potentially such that something is F (Vetter 2015: 272).

Vetter then explains how this modified principle of instantiation gets around the problem of unmanifested dispositions:

the claim that something has a potentiality to have (or produce or constitute something which has) the actually uninstantiated property of being F is not in jeopardy because there might be no property of being F. Rather, that claim, if true, guarantees that there is such a property, because this is precisely what it takes for there to be a property of being F (Vetter 2015: 272).

Her proposal obviously avoids Armstrong's objection: unmanifested manifestations do exist because for a universal to exist just is for it to be the manifestation of a power, to be what a power is directed at. I have two worries about Vetter's solution; although I do not think that they will amount to a refutation, I think they are enough to spur us to find an alternative solution.

The first is whether her proposal still qualifies as Ontologically Naturalistic. On Vetter's weakened Principle of Instantiation, the theory of universals is no longer naturalistic, because

it was not the fact that properties are dependent upon something that made them naturalistically *kosher*, but rather the fact that they were located in space-time: they were located where their instances were. But now consider the uninstantiated Aristotelian universals allowed by **PPI**: where in space-time are they? Surely they are not located where their instances are, because there are none. But they cannot be located where the potentialities directed to them are, either, because i) nothing grants that the manifestation is co-located with the potentiality, and ii) if they were located there, then by Aristotelian lights they would be *instantiated* by the bearers of the potentiality, which would catastrophically mean that every power is always already manifested (Tugby & Giannini forthcoming).

I suspect that many philosophers who are attracted to Ontological Naturalism consider it to be a somewhat weaker reformulation of the Eleatic Principle, the thesis that everything which exists *simpliciter* is involved in causation.<sup>88</sup> However, Ontological Naturalism is not a non-negotiable axiom of any good philosophy: it can be abandoned, if need be, so Vetter ought not be too worried by this consequence.<sup>89</sup>

The second objection to Vetter's brand of Aristotelianism is more significant: it is no longer Aristotelian, at least in a *useful* way. It remains Aristotelian in so far as it keeps hold of the generic ontological dependence between universal and its instantiations. But this dependence does not do much work anymore, in terms of both elucidating what universals are, and minimising the role of instantiation. If Aristotelian universals are, *ceteris*

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<sup>88</sup> It might be preferred to the Eleatic Principle because ‘being involved in causation’ is frustratingly vague, but it is hard to formulate the principle more precisely (Oddie 1982, Cowling 2015). Perhaps, Ontological Naturalism manages to capture the spirit of the Eleatic Principle without incurring in the same problems: after all, being spatiotemporally located is often taken to be a necessary condition for being causally active. I suspect that Ontological Naturalism does a poor job in capturing the Eleatic Principle, for it does not exclude the existence of idlers.

<sup>89</sup> And I think that here, need be: I suspect that any solution to Too Much Possibility will have to be non-naturalistic.

*paribus*, to be preferred because they successfully minimise the role of (the somewhat mysterious) instantiation and elucidate what it is to be a universal, then a theory of universals that does not qualify as Aristotelian loses some of its appeal, insofar as it is burdened with the additional task of offering an illuminating theory of instantiation.

I think that adopting PPI undermines the understanding that many friends of Aristotelian universals have of what it is to be a universal, and thus undermines the main motivation for the theory. Adopting Vetter's picture, we can no longer say that universals are *ways things are*, for they no longer need to be instantiated. They become *ways things can be*. But it is no longer clear what is the argument that the abstraction operation is acting upon, here: are there possible states of affairs upon which we operate the 'metaphysical abstraction'? Aren't we just smuggling in possible worlds back again? Would that still be hardcore actualism?<sup>90</sup> What distinguishes possible states of affairs from actual states of affairs? We cannot, obviously, just invoke the property of actuality, because we have already dismissed it as moot and unhelpful.

PPI, while obviously disarming Too Much Possibility by recognising the existence of unmanifested manifestation, does not say much about their status—that is, it does little to answer Key Question. Invoking universals was supposed to help because we knew what the difference between an instantiated and non-instantiated universal was supposed to be. The manifestation was the same old familiar universal—the aspect of something—and saying that it was not instantiated by a particular object or region of spacetime simply meant that such object or region did not have that aspect. But if we admit potential universals, it is no longer clear what the region or object does not display: it does not instantiate the aspect that no thing has. What does this mean? Once we give up on the orthodox understanding of Aristotelian universals *in rebus*, it seems that we need to invoke a primitive relation of instantiation, and use it to define the property of being instantiated which elucidates the difference between being manifested and unmanifested. That is to say,

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<sup>90</sup> Compare here with a Stalnakerian account of possible worlds as 'ways things might be'. See for instance Stalnaker (1976; 2003; 2012).

we need to do much of the work that those who adopt a Platonist theory of universals have to do. This suggests that Vetter's proposal is much closer to Platonism than Aristotelianism: they are only divided by a dependency claim that has lost much of its *raison d'être* (Giannini & Tugby forthcoming). Therefore, we should now consider Platonic Universals and examine if they are good candidates for being manifestations of powers.

### 5.3 Platonic Universals

Matthew Tugby (2013) has argued that invoking universals to solve Too Much Possibility is only available if we accept a Platonist conception of universals, according to which they are not ontologically dependent upon their instances. Otherwise, it is hard to make sense of dispositional properties that have never been (and never will) been exercised, but which are nevertheless perfectly real. How can there be an uninstantiated Aristotelian universal, if the existence of the universal generically depends upon its instances? We have seen that the only Aristotelian view that is able to deal with the issue (namely, Vetter's) is very close to Platonism in spirit, and so for all purposes it might be assimilated.

Those who think that the manifestations of powers are Platonic Universals should not be troubled by **Type-Independence**, as Platonic Universals exist necessarily and can exist uninstantiated:

On the Platonic picture proposed, manifestation universals exist even if they are never instantiated. Thus, the directedness (and so identity) of a disposition is secured regardless of the contingent circumstances that possessors of those dispositions find themselves in (Tugby 2013: 467).

There are two difficulties for those who think that invoking Platonic Universals as manifestations of powers is the best solution to Armstrong's argument and correctly answers Key Question, I think. The first is that, if powers were directed only towards Platonic universals, it would be very hard to develop a credible Dispositionalist theory of *de*

*re* modality. The second is that they have a hard time making sense of **Independence** at all. Let's start with the first.

Recall: according to Dispositionalism, ‘possibly *p*’ is true iff there is a power such that its manifestation is a truthmaker for *p*. But if the manifestation is a universal, how could dispositionalists account for sentences involving specific individuals? How are we to make sense of my power to make *Jamie* angry, if powers are directed at universals only? This is to say: how are we to make sense of ‘individualistic’ truths (in the sense of Dasgupta 2014) on a Platonic conception of properties? Another way to put the point is to note that universals are notoriously bad truthmakers for singular contingent claims, such as ‘*this* rose is red’ (Armstrong 1997; 2004). If powers can only point to universals, how are they going to provide the truthmakers for ‘it is possible for *Priscilla* (and not her duplicate) to be queen of the desert?’ and not just ‘it is possible that someone who is thus-and-so is queen of the desert?’ In short, I think that we can pose the following dilemma for Dispositionalist powers ontologies that invoke universals as manifestations: either i) they cannot account for a significant class of *de re* truths or ii) they have to commit to independently unappealing metaphysical positions, such as Platonic haecceities.

Of course, the Platonist can deny that there are individualistic facts and hence *de re* truths of that kind (this seems to be also the strategy of Jubien 1993; 1996). This might be acceptable for those who aim to ground nomological modality upon powers, when this is understood as being the sort of modality that only concerns laws of nature, or the phenomena that laws of nature are supposed to govern—regularities in property instantiation and so forth, for they all seem to involve only *de dicto* modal truths (Tugby forthcoming, Mumford 2004). But the outcome does not seem to be acceptable for those who intend to develop a metaphysics of powers to ground modality *tout court*—or even just the more modest project of grounding natural modality, when this is understood in the sense that I have sketched in the Introduction. If you recall, I characterised natural modality as a restricted form of modality that only concerns spatiotemporally located entities. And there is no reason to think that there are no *de re* truths about them: *Jamie* *is* located in

spacetime, and I am interested in whether I can make *him* angry. In short, this option does not seem to be available to the Dispositionalist, because *de re* truths were supposed to be Dispositionalism's bread and butter.<sup>91</sup>

Having dismissed the first horn of the dilemma and recognised that Dispositionalism needs to account for *de re* truths, the only other solution I can envisage<sup>92</sup> is invoke individual universals. This seems to be Vetter's strategy. She adopts a very lightweight, abundant conception of properties, according to which any predicate that can be obtained via lambda-calculus corresponds to a property, and hence has no problems admitting *individual properties*. Call 'impure individual properties' the ontic correspondents of impure predicates, such as 'sitting next to Max', 'being in love with Mary' and so on. Call 'pure individual properties' those that correspond to predicates such as 'being Quine', 'being Napoleon', etc. Given her generous ontology, Vetter has no problem admitting impure and pure individual properties, *as long as these concern actual individuals*—in the case of pure individual properties, she can just abstract them from the actual identity relations that every actual thing has with itself: from Quine's being self-identical, she can abstract the property of being identical to Quine.

However, she has a problem in accounting for individual (pure and impure) properties concerning merely possible individuals. How is she going to introduce a merely possible individual, such as Dory, my merely possible granddaughter? And my property of skating with her, or her potentiality to be a painter? Note that I am here interested in the

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<sup>91</sup> Jacobs (2010) is the exception: he recognises that powers-based theories of modality can only make sense of *de dicto* truths, and invokes a version of counterpart theory to account for *de re*. I think that counterpart theory has some fatal shortcoming, both expressive (Fara & Williamson 2005) and foundational, and so is not really a viable alternative. In short, the latter objection is that the counterpart relation can be legitimately thought to be relevant for the truth-conditions of a *de re* sentence only if we presuppose that counterparts represent each other; but this representation cannot be grounded in the usual ways and has to be thought to be primitive and just as 'magical' as ersatzists' theories criticised by Lewis (1986).

<sup>92</sup> I have already dismissed the possibility of adopting counterpart theory in the previous footnote. Similarly, invoking Dasgupta (2014)'s solution, according to which individual facts are collectively but not individually grounded by the qualitative facts, will not do here, because a Dispositionalist will need to spell out the truth-conditions of *de re* claims such as 'Giacomo has the capacity to make Jamie angry'. Pointing at the universe as a whole—the totality of the qualitative facts, all the platonic universals—seems a peculiarly bad answer.

possibility of Dory herself (fist banging on the table, name written in italics) being possibly a painter—not just the possibility that somebody thus-and-so (e.g. someone who is my granddaughter, named ‘Dory’) is a painter: in order to have the impure property, we need to abstract from Dory’s being self-identical, and not just the *de dicto* truth that everything (including something that is my granddaughter) is self-identical. But if there is no Dory, how are we to abstract the property of being Dory by lambda operator?

This point bears strong similarities to the arguments presented by Jessica Leech (2017) concerning Dispositionalism’s ability to account for statements of contingent existence. Leech focuses on whether we can maintain that Barbara Vetter’s parents had, prior to her birth, the non-maximal power to generate BV, which is supposedly the source of BV’s contingent existence. My point is, as a matter of fact, a generalisation of Leech’s point: I take contingent existence — and therefore, the possibility of non-existence— as just one case where Dispositionalist rely on *de re* predication concerning mere possibilia: saying that BV might not have existed in a Dispositionalist framework means attributing to her ancestors powers that involve *BV* herself, in a context where she has to be treated as a mere possible entity (and not just a future one). The upshot is that, if one is moved by Leech’s objection, then they ought to recognise that a solution to her problem will involve devising a way to increase the expressive powers of Dispositionalism in a way that allows for accounting for *de re* truths about mere possibilia in general, even if one is, like Stalnaker (2012), skeptical of other cases of talk involving them. The moral I want to draw is this: if we are to account for contingent existence, then we must be able to account for mere possibilia in general. And once we can do that, we might as well make full use of our expanded expressive powers. My and Leech’s objections, conversely, highlights the fact that there is a tension between the idea that Too Much Possibility can be solved by invoking some feature of universals, and that pure and impure properties are abstracted painlessly from individuals.

The last alternative I can think of is to renounce the lightweight, abstractionist view on pure and impure individual properties, and invoke full blown Platonic haecceities, of the

kind used by Plantinga (1974).<sup>93</sup> Such individual essences, as Plantinga calls them, have a (justly, I think) bad reputation. I will not rehearse here all the arguments that have been moved against them: I will only briefly report an argument by Menzies that I find particularly convincing in this footnote.<sup>94</sup>

There is a second, quite unrelated difficulty for the Platonist—one that cuts even deeper. The problem is how to make sense of **Independence**: if Platonic universals are necessary existents, and they are the manifestation of powers, then how could a power fail to bring them about? Indeed, it would seem that every power is always manifested—for the universal exists necessarily, with no interruption. Note that a Platonist about universals has to sharply distinguish between a universal and its instances: Platonic universals are abstract,

<sup>93</sup> More recently, Jubien (2009) pursues a similar project, trying to reduce individuals to properties. His account is partially vulnerable to the same objections that have been moved against Plantinga. He can deflect some because he avails himself of an independently structured and metric spacetime (and stuff occupying it)—a move that is hardly compatible with General Relativity. I doubt that the powers theorist could remedy to this by adopting a qualitativist approach along the lines of Dasgupta (2014), according to which the individualistic (or haecceitistic) facts or properties are collectively grounded by the qualitative properties. The reason is this: assume that collectively the fundamental qualitative properties determine the structure and metric of spacetime, in keeping with GR. Given a structured spacetime, we could then apply Jubien's strategy to produce 'individual properties': physical objects are just property instantiations. The problem is that, if such properties are real and legitimate, then they must have been mentioned among the manifestations of the original properties: which would be enough to individuate them, making them haecceitistic from the get-go.

<sup>94</sup> Define a property or relation to be *logically simple* (*simple*, for short) if it is not itself a negation, conjunction, disjunction, quantification, modalization, etc. of any other properties or relations...Next, say that a property **P** is *general* if it is possible both that (i) something **x** exemplify **P** and that (ii) possibly, something **y** distinct from **x** exemplify **P**. Intuitively, then, a property is general if it can be exemplified by more than one thing, albeit perhaps only at different times or in different possible worlds... Now, haecceities are either simple or they are not. Both options are problematic... If haecceities are logically complex, the central question is: In what does this logical complexity consist? An appealing and quite popular answer dating back to Russell is that logical complexity, at least in part, involves a certain type of metaphysical complexity: a logically complex property, proposition, or relation is literally *constituted* by less complex metaphysical parts...And, most relevantly, *singular* properties and relations like **being a student of Quine** that involve expressions for a relation and an individual are constituted by those very entities, in this case, in this case, the relation **being a student of** and *Quine himself*... If this account is correct, then Quine is a literal metaphysical component of the haecceity **being identical with Quine**. If so, however, then it seems that haecceities are ontologically dependent on their instances; no haecceity exists uninstantiated'. If individual essences are taken to be simple, on the other hand, 'haecceities are logically simple but non-general properties. But this seems a very odd combination. Intuitively, at first blush anyway, properties and relations are common, general, repeatable characteristics of, or connections between, things — redness, wisdom, humanity, marriage, adjacency, etc. Recognition of shareability among many particulars, awareness of a one over many, is what gave rise to the concept of a property in the first place. In fact, of course, not all properties are general. But, intuitively again, non-generality comes about by virtue of logical complexity, by virtue of the manner in which the components of a complex property are "woven together" logically... Hence, it follows from these intuitions that, necessarily, all logically simple properties are general' (Menzies 2014).

necessary objects, while their instances are (mostly) concrete and contingent. Universals and their instances are linked by means of a relation of instantiation.<sup>95</sup> But this seems absurd—surely these are not the powers we had in mind. Platonism was invoked especially to make sense of some pesky cases of **Independence**; it cannot turn out that every power is necessarily perpetually manifesting.

We can imagine<sup>96</sup> that the Platonist will reply: ‘that’s a straw-man! Obviously, powers do not bring about the *universal*; rather, they make it the case that the universal is instantiated; if they bring about anything, then this is the *instantiation* of said universal’. This reply, although initially convincing, does not stand to scrutiny once we attempt to state it more clearly and flesh it out. Consider these three ways of specifying it:

- a) The manifestation of a power is not the Platonic universal, but rather its instantiation.
- b) The power is directed towards the universal, but *brings about something else*.
- c) Directedness is not to be understood as ‘tends to’ or ‘brings about that’, but rather ‘tends to instantiate’.

The first option states that there is a unambiguous sense of ‘bringing about’ that is closely linked with the directedness relation of a power towards its manifestations, and that powers are directed to, not the Platonic universal, but its instantiation, and so it is the instantiation that they bring about when successfully exercised. This response would be disastrous for the Platonist, because instantiations of a (first order) universal are not, in turn, universals. Rather, they are events, or states of affairs, tropes, etc. Claiming that the manifestation of a power is the *instantiation* of a universal brings us back to the initial conflict highlighted by

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<sup>95</sup> I take it that Vetter’s universals cannot be concrete, either, since they may fail to be anywhere in space and time.

<sup>96</sup> I could not find any Platonist who explicitly addresses this point in print, so I must present the Platonist’s reply as a somewhat speculative reconstruction, mainly based on personal conversations and correspondence. In particular, what follows results from an on-going discussion with Matthew Tugby; although I hope to have offered a charitable and accurate reconstruction of his ideas (as presented at the time of our conversations), I do not wish to claim that he is definitively committed to any of the following specifications of the Platonist defence, so I will keep a fictionalised Platonist as my foe.

Too Much Possibility: we are committed to the existence of unmanifested manifestations by **Directedness**, and **Independence** has to be taken as asserting their possible non-existence. The contradiction still follows, and invoking universals was a useless *detour*. The question of what unmanifested *instantiations* are is not solved by saying that they are instantiations of necessarily existing Platonic Universals.

The second option suggests that we distinguish between what determines the identity of the power and what is brought about: the power is *directed* towards the universal, which fixes the power's identity, but what is *brought about* is some state of affairs produced by or relevantly connected to the successful exercising of the power. If I understand him correctly, this seems to be Tugby's preferred response to the argument. Thus understood, the Platonist would be maintaining that 'manifestation' is ambiguous—a strategy not unlike **Interrupt** adopted by the process theorist. **Directedness** only commits us to the universal, but **Independence** is concerned with the state of affairs. The problem with this approach is that universals and states of affairs better be suitably related, or we would end up rescinding the link between a power's identity and the property instantiated in the world as a result of powers' activity—thus facing a similar problem as the one that afflicts Marmodoro's account (§2).

The position of the Platonist might even be more uneasy than the one Marmodoro is in. For how are we to understand the relation between universal and its instantiation? We cannot simply say that there is an entity, the possible instance of  $U$ —call it  $u$ —which is appropriately related to the universal  $U$ , because that would commit us to the existence of all instances, all over again. Nor can we just say that there is a high-order relation between  $\text{Directed}(P, U)$  and the extrinsic higher order property of the universal of being instantiated,  $\text{Instantiated}(U)$ , because then the obtaining of the relation would simply entail the existence of  $[\text{Instantiated}(U)]$ , which presumably is incompatible with the universal failing to be instantiated, as per **Independence**.<sup>97</sup> But how else can the two be linked? There might be some other, credible ways to flesh out this idea, but I must confess that I cannot think of

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<sup>97</sup> It would amount to saying that universals are necessarily instantiated.

any. Hopefully, an ingenious Platonist will be up to the task. Until then, however, I will consider this answer to be unsatisfactory.

The final option is to suggest that we re-interpret ‘directed towards’ as ‘tending to instantiate’. Saying that  $P$  is directed towards  $U$  only means that  $P$  tends to instantiate  $U$ : the link with  $u$  and  $\text{Instantiated}(U)$  is built into the directedness relation itself, as it were; and tendencies can fail, so we could grant **Independence**. Or something along those lines. The proposal seems to me to be riddled with problems, possibly because I have a hard time formulating it clearly in the first place. First of all, one might worry that understanding ‘directed towards’ as ‘tends to instantiate’ will generate a regress, for what is ‘tendency’ if not what powers have with regard to their manifestations? This is a worry perhaps similar to the regress objection to pure powers presented by Psillos (2006). Assume for the sake of argument that the regress is not vicious, and hence a Psillos-style argument is not damning. Even so, the account is troubling, for it only postpones the problem: how is the tendency to instantiate linked to the states of affairs [ $\text{Instantiated}(U)$ ] or to its instance,  $u$ , and how does this link exist without entailing the existence of the *relata*? How can *this* tendency not generate the contradiction? It seems that the only way to do so is to embrace the Physical Intentionality Route and reject Existential Generalisation. But the appeal to (Platonic) universals was meant to be an alternative to Physical Intentionality! If this is correct, then it would turn out to be that this third way to flesh out the Platonic universals-based solution to Too Much Possibility appeals to Physical Intentionality; insofar as the latter is misguided, so will be also this last Platonist’s strategy.

## **Chapter 6. The Minimal Metaphysics of Powers**

There is a better way to cash out the difference-maker between manifested and unmanifested manifestations. The alternative solution that I intend to develop is that unmanifested manifestations are akin to Timothy Williamson's merely logical existents. The idea that manifestations 'in potency' can be linked to logical existents has been already suggested by Alexander Bird (2006; 2007), but was not sufficiently elaborated. In particular, Bird does not move past the analogy and does not develop a systematic account of what, exactly, a mere logical existent is supposed to be, within a metaphysics of powers. I will start by drawing an analogy between Dispositionalism and Necessitism (§6.1), and then consider Williamson's proposals to cash out the idea of mere logical existence in terms of individuals that only have modal properties (§6.2) and that are contingently not located in spacetime (§6.3). I will argue that both characterisations are problematic in the context of a powers metaphysics for Dispositionalism, and offer an alternative proposal, which relies on a primitive notion of essence (§6.4) and characterises unmanifested manifestations as non-essentially non-located entities. This will represent the core of the minimal metaphysics of powers that I develop in this thesis. I conclude the chapter by discussing some of the consequences of the view for the Dispositionalist project at large (§6.5-6), and in particular in connection with the compatibility of essences and mere logical existents (§6.7) and with some puzzles connected stemming from the idea that the unmanifested manifestations of powers are not located in spacetime (§6.8).

### **6.1. A Williamsonian Analogy**

The problem that powers theorists face with regard to unmanifested manifestations bears strong similarities with a situation confronted by necessitism: I will suggest that some of the strategies employed by the latter could be of help to powers metaphysics.

Necessitism is the thesis that necessarily, everything that exists exists necessarily. The thesis, defended by Timothy Williamson (2002; 2016), is highly controversial. A

reason<sup>98</sup> for this is that most of us have the intuition that sentences like the following are true: ‘I do not have a brother, but I could have had’, ‘My teapot could have not been created’, ‘People cease to exist when they die’, etc. The natural and commonsensical reading of these sentences is to take them at face value, as attributing contingent existence to people and teapots.

There are two responses available to the necessitist to such worries: One is to bite the bullet and simply claim that the intuitions are, after all, false or unreliable: the necessitist’s metaphysical thesis rests on more secure rational ground than mysterious pre-theoretical intuitions. In case of disagreement, all the worse for the intuitions.<sup>99</sup> Call this the ‘hard error theory’ strategy. The other option—call it ‘soft error theory’—is to maintain that these sentences are false, but that there are true sentences very similar to them, and it is *these other facts* that our intuitions are really about. We are mistaken in thinking that there is something that could be nothing, but there is a true proposition that serves the same purposes in everyday life, and our common-sense and pre-theoretical intuitions are about that one. I think that this is the route that the necessitist should take. Soft error theory would characterise the contrast between necessitism and, say, the truth of ‘my teapot Cocca could have not been’ *not* as

1.  $\Box \forall x \Box (\exists y y=x)$
2.  $\exists x (x=Cocca \wedge \Diamond \neg \exists x (x=Cocca))$

Which in English read:

1. Necessarily, everything is necessarily something
2. Cocca is something and possibly it is not something

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<sup>98</sup> Not necessarily a *good* reason, of course.

<sup>99</sup> Perhaps intuitions play no role at all. See Cappelen (2012).

But rather as

- A.  $\Box \forall x (\exists y y=x)$
- B.  $\exists x (x=\text{Cocca} \wedge F(\text{Cocca}) \wedge \Diamond \neg F(\text{Cocca}))$

In English:

- A. Necessarily, everything is necessarily something
- B. Cocca is something and is F and possibly Cocca is not F

where F is a property that existents can have or lack and that can be used to make sense of our common-sense intuitions of contingency. While 1. and 2. are inconsistent, A. and B. are not. The soft error theory solution bears striking similarities to the Actualisation Route. So, we should take a closer look at how the necessitist interprets the ‘F’ involved in B.

Williamson (2002) interprets the ‘F’ involved in B. as ‘being concrete’, and maintains that what we are really gesturing towards when we utter ‘Cocca might have not existed’ *really just is* ‘my teapot might have not been concrete’. Furthermore, he does not think that being not-F is to be understood as ‘being abstract’: ‘It is a fallacy to treat “abstract” and “concrete” as contradictories, although they might be contraries’ (Williamson 2016: 7). The reason why we should not treat them as contradictories is that it seems to be central to our understanding of what it is to be abstract that abstract entities are necessarily and always so: abstractness is not a property that something can gain or lose. On the other hand, Williamson maintains that concreteness is something objects can gain or lose. The point is introduced in temporal terms:

What kind of thing has the Inn become, if it is no longer a river? Given that abstractness is not a temporary property, it has not become an abstract object (Williamson 1998: 266).

If this point is correct, then we should not think of concreteness and abstractness to be contradictories. It is possible for something to be neither concrete nor abstract. Such entity exists in the ‘logical sense of “exists”’ (Williamson 2002: 245). Call these objects ‘merely logical existents’ or ‘MLEs’. Bird (2006) suggests that unmanifested manifestations (entities in potency) can be understood as merely logical existents. I think he is on the right track. In order to understand and evaluate the suggestion, however, we have to say something more as to what it is to exist in the ‘logical sense’, or we will just have swapped one technical term for another and not gained much understanding.

Williamson offers two distinct characterisations of what it means to exist in the logical sense. According to the first, merely logical existents are those entities that only have modal properties. According to the second, they are contingently non-located in spacetime. In what follows, I will treat them as independent and competing accounts.

## 6.2. Mere Logical Existents as Only Modal

Williamson suggests that one way to characterise the difference between logical existence and *concreta/abstracta* is that the latter have non-modal properties as well as modal ones, while logical existents have modal properties only.<sup>100</sup> A concrete entity, such as myself, could be thus-and-so, but also *is* so-and-so: there is a way I am. On the other hand, a merely logically existent object, such as my putative brother Franklin, could be thus-and-so (he could be tall or short, funny or boring, etc.) but there is no way in which he *is*: he is neither tall nor short. The ways in which he *could be* are his only properties.<sup>101</sup> This is the conception of logical existence that Bird adopts in *Potency and Modality*:

The main difference between the realised and the unrealised possibilities is, roughly speaking, that only the former have non-modalised properties. That is, someone who does make an origami swan

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<sup>100</sup> Supposedly, then, we can distinguish between *concreta* and *abstracta* subsequently by adding a further, unspecified, clause.

<sup>101</sup> Obviously, we have to exclude negative properties in order for this theory to work—my brother is not tall because he lacks the property of being tall, and not because he has the (negative) property of being not-tall.

has created something with the property of looking like a swan, but the possible origami swan that I could have made but didn't, does not have this property. Rather it is such that it possibly looks like a swan (Bird 2006: 503).

This understanding of merely logical existence is problematic for the dispositionalist. The reason is this: it is all too natural for her to identify modal properties with powers, and non-modal properties with categorical properties. Powers and dispositions are, after all, irreducibly modal properties: what else there is to powers that what they *could* do? We can then articulate the suggested analogy as follows:

**Non Modal:** An entity is actualised (namely, concrete or abstract) iff it has powers as well as categorical properties, and is merely logically existent iff it only has powers.

**Non Modal** has obvious unpalatable consequences for many theories of powers: if pandispositionalism is true, *i.e.* the thesis that all properties are powers, then it would follow that no manifestation is manifested or actualised, and everything is merely potential. But this would amount to a refutation of pandispositionalism and a vindication of Armstrong's (1997) 'always packing, never travelling' objection.<sup>102</sup> Of course, one could argue that this is a *positive* consequence, since Pandispositionalism is an unpalatable position anyway.<sup>103</sup> Although I do believe that Pandispositionalism is ultimately untenable, I do not think that the question whether it is true ought to be settled by our theory of unmanifested manifestations, so I take this as a bad result.

Furthermore, **Non Modal** produces unwelcome consequences even for those dualistic metaphysics that admit both dispositional and categorical properties, such as Lowe

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<sup>102</sup> Also known as the 'reality regress'. See Ingthorsson (2015).

<sup>103</sup> The belief that pandispositionalism is untenable is usually linked with the idea that it entails a vicious regress: see for instance Swinburne (1980), Foster (1982), Blackburn (1990), Armstrong (1997), Heil (2003), but especially Lowe (2006; 2010).

(2006; 2010), Molnar (2003), and Cartwright's (1989).<sup>104</sup> Consider the most common candidates for categorical properties that dualist powers theorists usually recognise:

- a) Qualia or phenomenal properties.
- b) Mathematical, geometrical, or in general ‘structural’ properties.
- c) Orientations, relative spatiotemporal locations.

It is *prima facie* plausible to map the distinction between phenomenal and psychological properties with the distinction between categorical and dispositional—and thus think that phenomenal properties such as qualia are categorical (Mumford 1998, Jacobs 2011, and in a sense Williams 2019). But it would be disastrous for power metaphysics if it turned out that only mental properties (of the phenomenal kind) can be actualised: an unpalatable form of idealism would follow. So, let's discard a) without further ado.

The second option is apparently more tempting: both concrete and abstract objects seem to have mathematical or structural properties, regardless of their being mental or not. The problem is to find a notion of ‘structural properties’ permissive enough to fit all *concreta* and *abstracta*, but austere enough to not apply to any unmanifested manifestation. I am not very optimistic that it can be done: whatever mathematical structure sets or numbers have can plausibly be applied to *possibilia*: *possibilia* can be counted (Williamson 1998), ordered, and in general modelled. Indeed, there is no reason why concrete and abstract entities can be modelled mathematically or geometrically and *possibilia* cannot. Isn't possible world semantics a perfect example of how to model possibilities with abstract entities such as sets, after all? Presumably, if an entity can be modelled, then it has the corresponding structural or mathematical property.

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<sup>104</sup> As well as those Powerful Qualities view that take ‘Qualities’ to be categorical—perhaps Heil (2003) would qualify.

Our best shot seems to be *c.*, spatiotemporal location. Concede that spatiotemporal locations are the only categorial properties (Molnar 2003).<sup>105</sup> The suggestion is, then, that merely logical existents (umanifested manifestations) do not have a location and hence are purely modal, whereas concrete beings (manifested manifestations) do, and hence are also categorial—and thus, in act. The suggestion is *prima facie* appealing. Even if we resist a reduction of concreteness to spatiotemporal location (Cowling 2017) the two are clearly closely intertwined. The problem is that this, alone, is not enough to characterise satisfactorily what it is to be merely logically existent. For also abstract objects, such as pure sets, numbers, or Platonic universals, lack spatiotemporal location. This would mean that *abstracta*, too, only have modal properties, and hence are mere logical existents? The whole point of introducing the ‘logical sense’ of existence was to deny that non-concrete entities have to be abstract.

### 6.3. Mere Logical Existents as Contingently Non-Located

Even leaving **Non Modal** aside, it is hard to shake off the idea that spatiotemporal location is a key element in distinguishing between the three categories. We have seen, however, that spatiotemporal location *alone* cannot deliver the right results. Williamson (1998; 2002; 2013) suggests that mere logical existents are distinct from *abstracta* because the former lack spatiotemporal location only contingently, whereas the latter lack it necessarily. This also seems to be the characterisation endorsed by Bird in *Nature’s Metaphysics*.

I think that power theorists should not embrace this characterisation, either. The problem with it is that it spells trouble if one wants to embrace also a dispositionalist theory of modality—which is the project that ultimately interests me here. That is to say: while I think that Williamson’s second characterisation is viable for a metaphysics of powers in general, it is not viable for a metaphysics of powers that aims to ground modality. Since *ex hypothesis* the minimal acceptable metaphysics of powers must give Dispositionalism a shot,

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<sup>105</sup> Cartwright and Pemberton (2013) also suggest as much, when they talk about the stage-arrangement of nomological machines.

we cannot accept Williamson's second characterisation nor Bird's proposal. Recall: Dispositionalism can be minimally characterised as the conjunction of the following:

**DPoss**: 'possibly  $p$ ' is true iff *and because* there is some power whose manifestation, if manifested, would make ' $p$ ' true.

**DNec**: 'necessarily  $p$ ' is true iff *and because* there is no power whose manifestation, if manifested, would make 'not- $p$ ' true.

It is hard to square Dispositionalism and the view according to which mere logical existents are *contingently* non-located entities. The problem is this. Assume as a starting point that there are unmanifested powers, as stated by **Independence**. This means that some power has a manifestation which is in potency (in what follows, I use being in potency and being unmanifested interchangeably for mere reasons of readability). If we understand being in potency as being contingently non-located, we have the following situation:

**Independence**: For some power P, i) P is directed to M, ii) M is not spatiotemporally located and iii) it is possible that M is spatiotemporally located.

Given Dispositionalism, the global modality occurring in clause iii) is to be grounded upon, explained by, or reduced to a power. Accordingly, the *kosher* way to express **Independence** should be the following:

**Independence\***: For some power P, i) P is directed to M, ii) M is not spatiotemporally located and iii) there is a power  $P^*$  whose manifestation is that M is spatiotemporally located.

But of course  $P^*$  is in turn a power whose manifestation is unmanifested, because otherwise  $M$  would be located and hence manifested. This means that **Independence\*** entails:

**Independence\*\*:** For some power  $P$ , i)  $P$  is directed to  $M$ , ii)  $M$  is not spatiotemporally located and iii) there is a power  $P^*$  whose manifestation (that  $M$  is spatiotemporally located) is unmanifested.

Again, we would have to analyse being in potency in terms of being contingently non-located, which in turn is to be understood in terms of unmanifested powers. An infinite regress ensues. I think this regress is vicious.<sup>106</sup>

A subset of vicious infinite regresses are generated as a consequence of continually attempting to overcome an explanatory failure that arises at the first level of the analysis. The problem in the case of, at least a subset of, vicious infinite regresses arises at the first level of analysis, and continues to recur at each level thereafter (Bliss 2013: 410).

In short, Bliss suggests that the fact that there is an infinite regress is merely symptomatic that something went wrong at the very first step:

The explanatory failure that occurs at the first level of the analysis consists in the fact that the explanans is of the same form as the explanandum: the phenomenon for which we are seeking an explanation reappears as its own explanation... As with the turtle's case. In order to explain what holds the world up in space, we posit the existence of a world turtle. In order to explain what keeps the world plus world turtle up, we supply a second world turtle, and so on. What we are seeking to explain is how something stays up in space, and, yet, at each stage of the analysis we posit the existence of something whose capacity to stay up in space is in need of explanation. Invoking turtle

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<sup>106</sup> There are a number of different accounts of what constitutes viciousness, and they do not always line up nicely. For instance, confront the account that I present here with Maurin's (2007) procedural theory, or Aikin's (2005) distinction between global and mediate perspective regresses.

qua object of support after turtle qua object of support shows us that we have explained nothing about how anything is supported at all (Bliss 2013).

I think that the regress above qualifies as vicious, according to Bliss' theory.<sup>107</sup> We started off by asking ourselves ‘what it is to be unmanifested?’ and we realised that the answer made reference to being unmanifested again. The problem is not that there is an infinite sequence of answers, so that there is no ultimate step that fully and ultimately satisfies us, but rather that we do not advance at all, regardless of the number of steps taken. Not only we are never fully satisfied. We don’t even begin being satisfied by the answer. No explanation has been given, because we did not advance by a single step. This is the defining feature of vicious regresses: that the exact same question we asked at the beginning appears in the answer.

The regress bears similarities with the one presented by Psillos (2006) concerning ‘whether powers need further powers to act’, which runs as follows:

to say that, for instance, fragility is directed to its manifestation even when it is *not* manifested is to say that fragility (F) has the power to manifest itself even when it is not manifested... It seems then that there is an answer to the... question [what do powers do when they are not manifested?]: when unmanifested, F has the *power* Q to manifest itself; that’s what it does! (Psillos 2006: 139).

Whilst it is controversial whether Psillos’ original argument hits the target (Marmodoro 2010) it is hard to see how we could avoid its close relative, if we adopt the second Williamsonian characterisation. It seems to me that the vicious regress is inevitable if we understand what it is to be unmanifested as being *contingently* non-located in spacetime whilst adopting a dispositional theory of modality. We need to make some tweaks to the proposal.

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<sup>107</sup> See also Passmore: [I]t is the first step in the regress that counts, for we at once, in taking it, draw attention to the fact that the alleged explanation or justification has failed to advance matters; that if there was any difficulty in the original situation, it breaks out in exactly the same form in the alleged explanation (Passmore 1961:31).

## 6.4 A New Framework

It is hard to shake off the idea that there is something right about the previous proposal. Spatiotemporal location seems to be precisely the sort of thing that could explain the difference between manifested and unmanifested manifestations perspicuously, but we have seen that it is not enough. We need something more to distinguish between MLEs and *abstracta*.

If we think that the problem of Williamson's account of MLEs, when applied to the manifestations of powers, is that it is formulated in modal terms, in a context in which the grounding of modality is the *explanandum*, then we could escape the problem by invoking a different, non-modal explanation. One way to do this is to invoke a non-modal notion of essence (Fine 1994, Hale 2013, Lowe 2016) and re-formulate the principle by saying that something is a mere logical existent if it is not part of its essence that it is spatiotemporally located. Adopting Fine's symbolism:

**MLE**  $a$  is a mere logical existent iff  $\neg\text{Located}(a) \wedge \neg\Box_a \neg\text{Located}(a)$

In English: logical existents are the kind of things that are not located, but it is not part of their nature that this is the case.

I suggest that this characterisation of MLEs allows us to clarify what is the difference maker between manifested and unmanifested manifestations, and thus solve Too Much Possibility via the Actualisation Route. The property that manifested manifestations have and that unmanifested manifestations lack is simply that the former have a spatiotemporal location, whereas the latter do not. However, this is not enough to conclude that unmanifested manifestations are abstract objects, making a mystery of the actualisation of manifestations: entities in potency are not essentially non-located, and thus can be brought about. The Actualisation Route is to be understood thus:

1	$\text{Directed}(P, M)$	<b>Directedness</b>	P is directed to M
2	$\exists x (x=M)$	1., $\exists I$	M is something
3	$\text{Located}(P) \wedge \neg \text{Located}(M)$	<b>Independence</b>	P is located and M is not located
4	$\exists x (x=M \wedge \neg \text{Located}(M))$	2,3	M is something and it is not located

This means that the answer to Key Question involves spatiotemporal location—but, importantly, that is not the whole story about unmanifested manifestations: to fully grasp them, we have to also include information about their essence. Insofar as the properties of being spatiotemporally located and Fine’s non-modal essence operator are well understood, this proposal seems to finally provide a satisfactory answer to Key Question and an informative account of unmanifested manifestations, one that does not simply swap a technical term for another. Of course, I still need to show that the the proposal *is* convincing. I will spend the rest of the present chapter, as well as the majority of the next two, in fleshing it out and drawing its consequences. This is important, because cashing out the Actualisation Route in this way does more than simply solving Too Much Possibility—it has significant and far reaching consequences for powers ontologies in general. Let’s start to lay these in the open.

By taking spatiotemporal location and its essentiality as factors, we can generate the following matrix:

- a) Essentially located entities
- b) Essentially non-located entities
- c) Non-essentially located entities
- d) Non-essentially non-located entities

Which allows us, in turn, to offer the following definitions of being abstract and being concrete:

**Concrete:**  $a$  is a concrete entity iff it is non-essentially located.

Formally:  $\text{Located}(a) \wedge \neg \Box_a \text{ Located}(a)$ .

**Abstract:**  $a$  is abstract iff it is essentially non-located.

Formally:  $\neg \text{Located}(a) \wedge \Box_a \neg \text{Located}(a)$ .

This characterisation has some very interesting consequences. For a start, it allows us to understand what it is that happens when a power brings its manifestation about, that is, when the manifestation is actualised. Becoming actualised is simply to acquire a spatiotemporal location. A manifestation is manifested by acquiring a spatiotemporal location, thus becoming concrete. I find this characterisation of what it means to be ‘brought about’ to be informative and intelligible. We have to note, however, that it has an incredibly important consequence for Dispositionalism.

## 6.5 Some Consequences

From this characterisation it follows that powers cannot have abstract entities as their manifestation. To see why this is the case, note that according to the schema, *abstracta* are the kind of things that are not located by their very nature. If an abstract entity were to be the manifestation of a power, then it would be a power that *could not* bring about its manifestation. This means that it is a power had with minimal degree: a power whose manifestation cannot be actualised. But a minimal power (that is, a power with degree zero) is not a power at all!<sup>108</sup> Another way to see this is considering the first thesis about powers that I have assumed, **Modal**.

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<sup>108</sup> This is particularly clear if one adopts Vetter’s semantics for gradable dispositions (Vetter 2015: §3).

**Modal:** Powers being directed to their manifestations tell us what something would or could be or do.

Powers tell us what something could be because having is enough to ground the possibility of its manifestation, as per DPos. But this only works if the power *can* bring about its manifestation. But if the very nature of the manifestation of a power prevents the power from being successfully exercised, we find ourselves in an inescapable conundrum. Note that the situation here is much more serious than the cases of self-finking or self-preventing manifestations (for instance, the power of a soap bubble to roll is prevented by some other property of the bubble: its stickiness, or its propensity to pop), because those cases involve contingent properties: we can always *prevent* or fink the self-preventer (*e.g.* freeze the soap bubble) in a way that allows for the power to be exercised, *in some circumstances*. But nothing like this can be the case when it is the very essence of the manifestation that prevents the power from acting: there is no changing something's essence, by definition. A power being *for* something makes it possible. Therefore, there cannot be powers whose manifestation is abstract.<sup>109</sup>

This is troubling for the ambitious brand of Dispositionalism I mentioned in the introduction, the one that aims at grounding all truth of *metaphysical* modality (Vetter 2015) as opposed to just those of *natural* modality, when we understand the former kind of modality to concern *any entity whatsoever*—including *abstracta*. I think that this point cuts deeper than David Yates' (2015) elegant argument against the ambitions of Dispositionalism on the basis of formal inconsistencies. I will discuss these points more in detail in chapter 10, but here's a brief flash-forward: Yates argued that Vetter's account of necessity, based on

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<sup>109</sup> This suggests that the presence of primitive essences might come in handy for the Dispositionalist, if her goal is to ground *metaphysical* modality: she could take a page off the essentialist page and account for the truths of mathematics and logic by invoking the essences of numbers and operators (Hale 2013).

**DNec**: ‘necessarily  $p$ ’ is true iff and because there is no potentiality whose manifestation, if manifested, would make ‘not- $p$ ’ true

results in an inconsistency, if we assume that there are no potentialities directed at abstract objects (or, in general, at truthmakers for mathematical and logical truths), for it makes it necessary that some mathematical sentence and its negations are both necessary. Vetter’s (Vetter 2018) reply was centred around the idea that it is OK to postulate very light-weight, extrinsic powers (as part of the ‘plenitude of powers’) that *do* have *abstracta* as their manifestations: she argues that her account is not inconsistent because *there are* powers for it to be the case that  $<2+2=4>$ , and that *it is not ad-hoc* to postulate them. I find her arguments, as far as they are concerned with resisting the accusation of ad-hocery, fairly convincing (see §10.4-5). But, if my theory of unmanifested manifestations, and the entailed account of actualisation are correct, we have to conclude that no such power can be posited: powers that are directed at abstract entities cannot bring their manifestations about, and therefore are no powers at all, because such entities are not the kind of thing that can become manifested: they cannot acquire a spatiotemporal location.

Here’s the upshot. First, this means that we need to find another way to resist Yates’ argument from formal inconsistency, or Dispositionalism will collapse. The easiest way to do so is to abandon the ambitious version of Dispositionalism, and maintain that the theory can only provide an account for *natural modality*, where there is no pesky abstract entity to spoil everything. This does not quite amount to accepting **Causality** into our metaphysics of powers—we need something more in order to show that causality and powers are inextricably linked, to the effect that *all* causal interactions involve powers and that *all* powers are causal powers. Although this position does not amount to **Causality**, it is easy to see that the minimal metaphysics that I am presenting here would fit rather comfortably with a theory of powers that aims to ground or identify the activities of powers with causation (*e.g.* the sort of causal primitivism invoked by Mumford and Anjum 2011), for at least we know that the entities that are involved in causation are all the entities

that can be manifestations of powers, and we do not have to offer an explanation for why certain powers are involved in causal goings-on and others are not. I do not intend to discuss the link between powers and causation in any detail in this dissertation; I just wanted to point out that the minimal metaphysics that I am presenting could fit easily other classical projects of powers theorists.

However, for the purposes of Ambitious Dispositionalism, the present stance has similar consequences as adopting **Causality**: there is a limit to the reach of powers, as it were; there are entities that are beyond and unfettered by the activities of powers. More colourfully: *abstracta* (and therefore a number of modal truths concerning them) do not care what powers there are nor what they do. In the Introduction I had characterised the difference between natural and metaphysical modality in terms of a restriction concerning the entities that modal truths can be about, so that metaphysical modality concerned every entity whatsoever.

If powers cannot have abstract entities as manifestations, then they have nothing to do with some of the modal truths that concern, and are made true by, *abstracta*; therefore, the modality that can be grounded by powers cannot be metaphysical modality, understood as the modality that concerns every entity whatsoever. So, Dispositionalism has to retreat to a more modest form, and maintain that powers can ground all modal truths concerning *natural*, or non-abstract entities.<sup>110</sup> If we aim to account for metaphysical or absolute modality at large, we will have to adopt a more complex theory: perhaps something like Yates' disjunctive 'Weak Dispositionalism', according to which

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<sup>110</sup> One worry that might plague Modest Dispositionalism is that it might be hard to prove that the modal discourse grounded in powers is closed under entailment; Vetter (2015) takes such closure to be a key *desideratum* of Dispositionalism (it is part and parcel of the required formal adequacy), so Modest Dispositionalism might be a non-starter. But I wonder whether the Dispositionalist could not mimic the Essentialist, and draw a similar distinction to that between constitutive and consequential essence, to the effect that powers *per se* do not need to ground a logically closed modal discourse: only the extension of that modal discourse plus the preferred logic needs to do so.

$\langle p \rangle$  is possible iff  $\langle p \rangle$  is true or there is a power to bring it about that  $p$ . Given interdefinability, we get... [that]  $\langle p \rangle$  is necessary iff  $\langle p \rangle$  is true and there is no power to bring it about that  $\neg p$  (Yates 2015: 419).

or we find a way to find a hybrid theory which combines elements of Essentialism with elements of Dispositionalism (I will return to this in §9 and in the Final Remarks). That is to say, one possible reaction to the consequences of the minimal metaphysics is to think that *pure Dispositionalism* can only be modest; an ambitious Dispositionalism will have to incorporate external elements and most likely be disjunctive in some form.

There is a different possible reaction, one which doubles down on Ambitious Dispositionalism. The way to do so, however, is a difficult one: it involves showing that mathematical and logical truths are made true not by *abstracta*, but by concrete entities—that is, to reject mathematical & logical Platonism. Of course, the project is not unheard of (Fields 1980 and Rayo 2013 are the obvious examples that spring to mind), but it is surely a formidable task. Both strategies would require a whole lot of additional work in order to be properly assessed and be made workable. But this belongs to the *semantic task* of Dispositionalism, rather than the metaphysical one that this dissertation is concerned about, so I will not pursue this line of inquiry here. Perhaps Ambitious Dispositionalism is not doomed, but surely it has a lot of work to do.

A second consequence of adopting this characterisation of MLE is that the matrix generates a fourth slot—the essentially spatiotemporally located entities. It is not immediately clear what these could be. My preferred hypothesis is that they are the space-time points themselves.<sup>111</sup> It is hard to conceive how a space-time point could fail to have a location, for it seems to me that their identity is exhausted by being located where they are; there is nothing more to *what* they are than *where and when* they are. If so, it seems natural to think that they are essentially located: a non-located spacetime point seems to be a contradictory entity, just like a square circle. The hypothesis fits more naturally with a

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<sup>111</sup> Another hypothesis: it could be the *substratum* of certain theories of substance such as Armstrong (1997) and Moreland (2013).

substantivalist view of spacetime, but I do not see any reason why it couldn't work within a relationalist framework, too: nothing in the schema above suggests that we have to treat any of these entities as fundamental.<sup>112</sup> We can sum up the results in the following schema:

	Essentially	Spatiotemporally located
Concrete	X	✓
Abstract	✓	X
Logical Existence	X	X
Spacetime points	✓	✓

There is a final consequence that is worth drawing, before moving on. It is another cost of the theory. Understanding mere logical existents in terms of *non-essential non-location* and therefore formulating the framework for powers ontologies making use of a primitive notion of essence seems to run counter the very spirit of Dispositionalism. Finean essences are ‘non-modal’ in the sense that they are not *reducible* to simple metaphysical necessity—not that they do not have modal consequences. Indeed, Fine and other essentialists such as Hale (2013) propose to ground alethic modality in its entirety upon essences, based on the fact that if it is true in virtue of the nature of  $a$  that  $p$ , then it is necessary that  $p$ . This, evidently, creates an embarrassment for Dispositionalists, if their project is to ground metaphysical modality *tout court* upon powers, for it seems that in order to make sense of powers themselves we have to invoke a notion that has modal consequences, and cannot be analysed in terms of powers (or the circularity of Williamson's second characterisation would ensue once again). This results in a further blow to Dispositionalism's ambitions: not only did I suggest that it might not be able to ground the most general kind of modality, but now I am suggesting that it might not be the only source of *natural* modality, provided

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<sup>112</sup> Indeed, if the considerations presented in §4 are correct, then it follows that no power is *absolutely* fundamental, in the sense that it is not dependent upon anything else: all powers depend upon their manifestations. I will return to this point in §8.

that we assume that concrete entities have essences, obviously. I set out by saying that I wanted to develop the best metaphysics of powers to help out the Dispositionalist project, and yet I am continuously chipping away at its ambitions. One might fear that dispositionalists might find the truncated version of their theory that my metaphysics supports to be utterly uninteresting. The point is a fair one, but I would urge not rush to dramatic conclusions, either.

While I recognise that the appeal to non-modal essences is not ideal, we have to keep in mind that essences were going to prove tricky for Dispositionalism anyway. The metaphysics that I have proposed gives non-modal essence a key role which other theories of powers do not. But this does not mean that Dispositionalism could *ignore* essences, just because they were not embedded in their metaphysics (or, at least, not so explicitly). Dispositionalists still have to say something about essences, and account for the whole set of modal sentences that employ the term: it still makes sense to talk of the essence of {Socrates}, presumably—and more insidiously, of the fact that the modal (or even causal) profile of a power is essential to it!

One way to deal with the phenomenon is to simply adopt a modalist account of essence, and argue that there is nothing more to it than mere necessity or a strict conditional. In order to do so, they have to deal with what we can call ‘Fine-Sentences’ such as:

**Fine Sentence:** It is essential to {Socrates} that it has Socrates as a member, but it is not essential to Socrates that he is a member of {Socrates}.

They can deal with them either by simply rejecting their truth, or by offering an alternative explanation. The latter option does not seem promising at all. Alessandro Torza (2015) has presented convincing formal arguments against the possibility of reducing the essence in terms of any operator definable in first order modal language. He also presented some interesting arguments against more sophisticated forms of modalism, involving impossible

worlds. But note that it is not necessary to go this far: Dispositionalism does not have the expressive means to even talk about impossible worlds. The potentiality operator that Vetter uses does not introduce hyperintensional contexts, so it is useless to introduce impossible worlds as a way of modelling hyperintensional phenomena; in general admitting any ‘disposition impossible’ (Jenkins and Nolan 2012) would fatally undermine D<sub>Poss</sub>, and with it Dispositionalism. This seems to pose the greatest challenge for those who seek to be reductionist about essence: they need to do so with merely intensional resources, such as powers. But, if we accept Fine-Sentences, it is obvious that essence is not merely intensional!

So the only strategy open to the ambitious Dispositionalist is to flatly reject that FS is true. Of course, *in absentia* a theory-independent epistemology of modality (which is not coming any time soon), to some degree which modal sentence we believe to be true will depend upon which theory of the foundations of modality we accept—so, it is in principle open to dispositionalists to just say that Fine Sentence is false, just like they will bite the bullet and concede that ‘there could have been nothing rather than something’ is not true (Cameron 2008, Pruss 2002, Vetter 2015: 273 ff). However, I find Fine Sentence considerably more plausible than the possibility of ontic nihilism; it seems to me to be an unacceptable cost to pay. I would rather renounce an ambitious form of Dispositionalism than maintain that it is essential for Socrates to be a member of {Socrates}. But this stands on the very shaky grounds of intuitions and personal idiosyncrasies. It is not an argument, and I will not pretend that is one. I am happy to leave the choice to the dispositionalist’s philosophical good conscience, to cite Goodman (1954: 32): either treat essence in purely intensional, modal terms and reject Fine-sentences as false, or admit that essences cannot be reduced to powers and, insofar as they have modal consequences, admit that Dispositionalism’s ambitions have to be limited. In what follows, I simply assume that the second is preferable.

## 6.6 Mere Logical Existents and Essences

The consequences of introducing essences do not raise worries only for a Dispositionalist theory of modality, though, but could *prima facie* represent a threat to a theory of merely logical existents. One could raise an objection along these lines:

Suppose that it is essential to Socrates that he is human. Suppose that being human entails that Socrates is spatiotemporally located and hence concrete. Thus Socrates cannot be an unmanifested manifestation. Yet, it seems exactly the kind of thing that you want to say can be in potency: surely Phaenarete and Sophroniscus had the power to generate Socrates (since they did) and plausibly this was a preventable (non-maximal) power: they could have failed to generate him.

Schematically, the argument consists of two moves:

1. The essence of Socrates is to be human.
2. Being human entails being concrete.
3. Therefore Socrates cannot be a manifestation.

Consequently, there are two ways to resist it: rejecting either the first or the second premiss.

Williamson seems to take the former path:

Necessitists and permanentists typically deny some popular essentialist theses...many philosophers regard membership of a natural kind as essential to its members. Thus a tiger is essentially a tiger, and gold is essentially gold. Hence a tiger is always necessarily if anything a tiger, and gold always necessarily if anything gold. Given those claims, necessitism implies that tigers are necessarily tigers, and gold necessarily gold. But presumably there could have been no tigers and no gold: once there were no tigers and no gold. Consequently, necessitists and permanentists should reject the essentialist theses as stated (Williamson 2013: 8).

Williamson maintains that nothing is lost by rejecting 1., and that the necessitist can replace ‘Socrates is essentially human if anything’ with ‘Socrates is essentially human if concrete’ without losing anything: ‘those are just the modifications one would expect in switching from a contingentist framework to a necessitist one. They do not affect the underlying strategy of explaining modal matters in terms of essential natures’ (Williamson 2013: 391). I think that Williamson underestimates the costs of such a move. He seems to treat the essentialist position as attributing conditional properties to entities: Socrates has the property of being essentially human if anything. But the essentialist would object: essences are simple properties (being human) that are selected by the essentiality operator. The clause ‘if anything’ simply shows that the operator *needs to have an argument*. The Finean operator needs an object to select the essential truths about that entity—it does not attribute as a brute fact conditionalised properties such as ‘human if anything’. So, replacing ‘if anything’ with ‘if concrete’ is not as painless as Williamson makes it to be: it would imply that only concrete things can be the argument of the essentiality operator; that only *concreta* have essences. This does not seem right: we have a better grasp of the essence of mathematical entities than tigers, or so it would seem. For instance, in Cartesian coordinates, we may define the property of being a sphere of radius R, centred at  $(x_0, y_0, z_0)$ , as the property of being an X such that all points  $(x, y, z)$  that lie at X’s outer boundary satisfy the formula  $(x - x_0)^2 + (y - y_0)^2 + (z - z_0)^2 = R^2$ . This is surely a better candidate as being something’s essence than Socrates’ having the parents he had, or the table being made of *this* wood, as Kripke (1980) would have it.

Of course, we could, once again, flat out deny that entities have essences, or have any essences that entail spatiotemporal location: Socrates is not essentially human. But this seems a costly move, and not one that I feel powers theorists can adopt. It would mean accepting the essentiality operator but denying almost all common assumptions about the results. The move would be legitimate only if we could offer a non-*ad hoc* motivation, and it is unclear to me how we could do this.

However, I think that rejecting the second point is not as costly. I see no reason for a friend of powers to say that being human *entails* being spatio-temporally located. Being human is either a power, or a structured bundle of more fundamental powers.<sup>113</sup> Being concrete is essential to neither of these features: the only essential feature of powers is their directedness relations.<sup>114</sup> And of course powers can be directed even if they are not located in spacetime: what they cannot do is to *bring about* their manifestation without being actualised. Of course, no non-concrete entity can *act* humanly, or do the essential activities of humans. But that simply means that no power which is not actualised can bring about its manifestations, which is hardly a surprise. It does not mean that a power lacks its directedness when it is not actualised. Even if we think that being human is a structure of more basic powers, there is no reason to think the entailment holds: as noted above, abstract entities can display structure and structural properties: indeed, there is not much more to a geometrical figure than shape.

So, if being concrete is not essential to being human, how is it entailed? Unless we take ‘being human’ as a conjunction that has ‘being concrete’ as a conjunct, it is hard to see how it could follow syntactically. But assuming that this is the case would beg the question. The best hypothesis that I can think of is this: the powers (or at least, some of them) that are characteristic of being human (that is, the powers that being human is directed towards) *presuppose* being embodied, and it is taken as an analytic truth that bodies are in spacetime.

Assume that it is essential to humans, qua mammals, to lactate, and in order to lactate one needs to have a body. Hence concreteness is entailed by being human. I think this train of thought is not very dangerous to the picture presented here. What the friend of powers needs to say is that, of course, being embodied is a pre-condition for a range of characteristic essential activities of humans. But that means only that such essential

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<sup>113</sup> I take the fact that this position is surprisingly close to the original Aristotelian (Witt 2003, Kosman 2013) as a positive indication that the two main strands of Neo-Aristotelian metaphysics (powers and essences) can interact in interesting and productive ways.

<sup>114</sup> Here it is clear that I am treating powers as ‘pure powers’ and not the ‘mixed powers’ defended by Williams (2019). However, I suspect that even admitting powers with some *character* could be compatible with what I say, but cannot discuss it in detail.

activities are not immediate manifestations of being human—that being embodied is a necessary intermediate step: the power of being human (I speak as if it was a simple unified power instead of a structured cluster just for simplicity's sake) has as immediate manifestation that of being embodied, and if that manifestation is prevented from being brought about, *then* of course none of the following powers will be able to obtain. A defence along these lines, I suggest, allows us to accept much of the standard essentialist (that is, objectual essentialist) claims at face value.

### 6.7. Some Puzzles About Spatiotemporal Location

This does not exhaust the worries and puzzles that my proposal has to face. In particular, the idea that unmanifested manifestations are not spatiotemporally located is an inviting nest for all sorts of troubles. Let me discuss some that I find particularly pressing.

Given my theory, it seems that for a manifestation to become manifested is for it to acquire a spatiotemporal location. One might worry that this has unpalatable consequences. *Prima facie*, my account would exclude the possibility of *mental* powers ever being actualised and their manifestations manifested:

- i) To be actualised is to acquire a spatiotemporal location. Mental properties are not in space. Therefore, there cannot be actualised mental powers.

There are two ways to go about this. Either we bite the bullet, and accept that power metaphysics are committed to the view that mental phenomena are located in space (perhaps because they are identical to some physical phenomena) or we weaken the spatiotemporal locational constraint, and simply maintain that to be actualised something simply needs to acquire a *temporal* location. I have no problem in remaining neutral about this. Nothing substantial would change, in what follows, if we adopt one option rather than the other. I will keep speaking of spatiotemporal location, instead of mere temporal

location, just for terminological consistency, but I think that I would choose the latter option if pressed on this.

A second worry is this: according to the characterisation that I have provided, unmanifested manifestations are akin to abstract objects, insofar as both are not located in spacetime. Asking about the location of an abstract object seems to be a category mistake: ‘where is number 22?’ is just the wrong kind of thing to ask. On the other hand, uttering a question about the location of a manifestation does not seem infelicitous in the same way as asking for the location of a pure set is. Our embarrassment in the case of manifestations seems due to the fact that ‘[w]here, when and in what way this property or distribution of events will be manifested is left indeterminate’ (Mumford 2004: 194; see also Oderberg 2017), rather than the question being a category mistake. And yet, our matrix would have it that both are non-located, and so one would expect that the same explanations could be given in both cases. In short:

- ii) Asking about the location of an abstract entity is infelicitous because it is a category mistake. Asking about the location of an unmanifested manifestation does not seem to be infelicitous *in the same way*; perhaps it is not a category mistake. What explains the difference?

Let’s start by noting that there is one obvious difference between the two cases: appealing to simple facts about spatiotemporal location was not enough to distinguish abstract entities from mere logical existents. We need essence, too. So, there is a difference between the way in which abstract objects are non-located and the way in which objects in potency are not. This is enough to dispel the puzzlement, and we can explain why the question concerning their location is infelicitous in different ways by adopting a pragmatic theory of category mistakes, along the lines of Magidor (2013).

According to Magidor’s theory, category mistakes are infelicitous because they generate presuppositional failures (Magidor 2013: 131-45). Some sentences, when uttered,

*presuppose* that some other sentences are part of the conversational context. So, for instance, uttering ‘the king of France is bald’ presupposes that there is a king of France—the utterance is felicitous only if the participants in the conversation presume that sentence to be true (or, in a more dynamic picture, *have no problem in accepting it among the conversational context*, that is, they are ready to accommodate the presupposition). Category mistakes are infelicitous precisely because we do not and, most importantly, *could not* accept their presuppositions:

the predicate ‘green’ is a presupposition trigger. In a sentence of the form ‘ $x$  is green’, the predicate triggers the presupposition that  $x$  is coloured... but in most contexts of conversation, participants in the conversation do not take it for granted that the number two is coloured, and moreover, they take it for granted that the number two is *not* coloured, making it very hard to accommodate this presupposition (Magidor 2013: 131-2).

The hypothesis is that (non-rhetorical) questions carry with them, among other things, the presupposition that it is possible to answer them; as Wittgenstein put it: ‘If a question can be framed at all, it is also possible to answer it’ (*TLP* 4.5). So, in particular, questions of the form ‘where is  $x$ ?’ carry the presupposition that there is or at least could be a location  $L$  such that  $x$  is at  $L$ .

Such presupposition cannot be accepted in the case of numbers, because it is *essential* to abstract objects that they are not located in spacetime; therefore the question is a category mistake. On the other hand, it is not part of mere logical existents’ essence that they are not located. Indeed, some of them eventually end up being located somewhere: they are manifested. In their case, the question *could* be answered. So, the presupposition that the question is answerable *could* be accepted in the conversational context. Indeed, in a Stalnakerian framework we can even make sense of the embarrassment that we experience when we try to come up with an answer: given that the manifestation is not actualised at the time of the question, it is both metaphysically and epistemically possible that the manifestation will either be located at a number of spatiotemporal points or nowhere at all.

If we understand a question as a request to rule out some epistemically possible worlds from the context, it is evident that the question ‘where is the yet unmanifested manifestation of P?’ will be infelicitous, because the recipient of the question is not in a position to give an answer that would reduce the number of epistemic possibilities:<sup>115</sup> she cannot answer in an informative way, because there is no determinate fact of the matter yet, and there might not be one. But this is not a *category mistake*, because both speakers can easily accommodate the presupposition that *it is possible to answer the question*, because both may (truly) believe that the manifestation *can* be actualised. An approach along these lines could dissolve the puzzlement concerning our different attitudes towards questions of spatiotemporal location, I believe.

A third puzzle about the characterisation of manifestations being unmanifested (or in potency) as being non-located in spacetime concerns the fact that we often think of powers as being temporally oriented. It is fairly common, for instance, to think that there is a temporal asymmetry between powers and their manifestations: manifestations can be located after their powers, but not before them: they are forward-looking. These theses are non-trivial (Vetter 2015; Mumford & Anjum 2011). The worry is not as much that adopting my categorial scheme would commit us to a particular position in the debate, but rather whether we can make sense of the debate in the first place. Consider a sentence likely to be at the heart of the controversy concerning the forward-looking nature of powers:

- (1) A power’s manifestation cannot predate the power itself.

Powers theorists such as Mumford & Anjum will, presumably, think that (1) is true: if powers are simultaneous with their manifestations, then *a fortiori* manifestations cannot predate them. But it seems that somebody who wished to deny (1) inhabits a consistent area of logical space (Vetter (2015) suggests that at least in some cases backward-looking

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<sup>115</sup> This is in line with the idea that, if assertions are to be informative as per the Gricean first maxim (Grice 1989), the function of an assertion is to ‘rule out’ a number of possible worlds. See Stalnaker (1999).

potentialities are acceptable). It seems that there could be a genuine disagreement between those who think that (1) is true and those who deny it. If unmanifested manifestations are not in time and space, how can we hope to even make sense of (1)? In short:

iii) How can we make sense of the debate whether powers are ‘forward-looking’, if manifestations are not temporally located at all? How are we to make sense of sentences such as (1)?

An easy solution would be to trivialise the problem. We could cash (1) out in terms of

$$(2) \forall P \forall M \forall t \forall t' (t < t' \rightarrow \neg(Pt \wedge Mt))$$

That is, for every power P, manifestation M, and times  $t$  and  $t'$ , if  $t$  precedes  $t'$  then it is not the case that M is located at  $t$  and P is located at  $t'$ . This would follow trivially from my account, according to which for all unactualised manifestation M and every time  $t$ , M is not located at  $t$ :  $\forall M \forall t (\text{Unactualised}(M) \rightarrow \neg Mt)$ . If M is not located at all, then *a fortiori* it cannot be located at a time earlier than P. So my account entails (2). But obviously (2) would be an uncharitable reading of (1). What we really mean by uttering (1) is obviously something like

$$(3) \forall P \forall M \forall t \forall t' (t < t' \rightarrow (\neg \diamond(Pt \wedge Mt) \wedge \diamond(\exists t''(t < t'' \wedge Mt'')))$$

In English: No manifestation can predate its power, but it can follow it. Note that nowhere in (3) does it appear that M is unmanifested and therefore non-located, which is where the putative crux lies. The problem becomes clear when we consider that possibility operator appears in the second conjunct, for one might naturally translate (3) in dispositionalist terms as follows, where  $\rightarrow$  stands for ‘is directed towards’:

$$(4) \diamond \exists t'' (t > t'' \wedge M_{t''}) \text{ iff } \exists P (Pt \rightarrow M_{t''})$$

In English: there could be a time  $t''$  after  $t$  such that  $M$  occurs at  $t''$  only if there is a power  $P$  that is directed at  $M$ -at- $t''$ . It is (4) that cannot be explained by our current hypothesis, according to which potential entities are non-located. If the manifestation of a power included the *time* of actualisation, then the Williamsonian picture that I have sketched would be in trouble. The manifestation cannot be a *dated state of affairs*.

But is it so obvious that we have to make sense of (3) in terms of (4)? If we examine it more closely, it becomes apparent that a conception of manifestations as fine-grained as that depicted by (4) has problematic consequence for any theory of powers. Consider some object,  $a$ , that has a power  $P$  for a period of time  $t$  to  $t''$ . Assume that manifestations are always temporally posterior to their powers—no simultaneous nor backward causation is admitted. Presumably, then, at time  $t$ ,  $a$  could bring about that  $M$  at any  $t_i$  such that  $t < t_i < t''$ . Say that the manifestations of  $Pa$  at  $t$  are  $M_{t'}$  and  $M_{t''}$ . At time  $t'$ , however,  $a$  no longer can bring it about that  $M_{t'}$ : its only manifestation is  $M_{t''}$ . Similarly, at  $t''$ ,  $a$  can no longer bring about either manifestation. Now recall that the identity of powers is determined by their manifestations. Since  $P$  at  $t$  has different manifestations than  $P$  at  $t''$ , it cannot be the same power. So, entities change all their powers at every instant. This seems implausible.

The problem arises only because we decided that (4) was the only way to make sense of (3)—that unactualised manifestations had to have a temporal location. If we think that powers are directed at dated manifestations (that is, entities whose spatiotemporal coordinates are part of the thing's identity conditions), we cannot help but over-inflate our ontology, and incur counter-intuitive consequences as those just sketched. In order to avoid these problems, it is common to think that powers are directed at universals, and therefore at types and not tokens:

Can we say that the powers are directed towards the properties rather than the particular instantiations of those properties at particular times and places? In a significant sense, yes. For the power is indeterminate in respect of time and place of its manifestation. Each manifestation will be somewhere and somewhen but the somewhere and somewhen are not necessary for the having of the power. They are among the contingent details of its manifestation. What is necessary to its manifestation is the universal only (Mumford 2004: 194).

However, we have seen that if powers are only directed at types and universals, Dispositionalism is likely going to incur significant problems. I think that a powers ontology for Dispositionalism would be better off in allowing particulars to be among the manifestations of powers.<sup>116</sup> And we must do so while avoiding the issues sketched above: ontological over-inflation and the constant change of the instantiated powers (which would result in a sort of Heraclitean *fluxontologie* of the sort described in Plato's *Theaetetus*) while retaining the ability to discuss meaningfully sentences like (1). Fortunately, these problems are not a consequence of my view. Indeed, they can be dispelled by adopting it. Here's a very quick sketch of how this can be done (I will return on this in §8).

According to my view, unmanifested manifestations are not located in spacetime, and therefore cannot be dated themselves: the temporal location *cannot* be part of the identity conditions of the manifestation (let it be a state of affairs, for the time being): powers cannot be directed at something like [a being F at  $t$ ]. Manifestations are just not that fine-grained. In this regard, they resemble the universals of Mumford's proposal. If this is so, then how are we to make sense of (1)? The answer is simple: in the same way as somebody who thinks that powers are directed at universals: by rejecting that (4) is a good paraphrase of (1).

My suggestion is that we take a page off the book of the radical powers metaphysics examined in §3, and admit that powers bring about their manifestation (the state of affairs) *through* a process unfolding over time. That is to say, if we think that the

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<sup>116</sup> I will return to this point at §8.3, where I discuss in more detail the ontological category of manifestations.

*exercise* of a power just is, or gives raise to, a temporally extended process which terminates in the state of affairs that is the manifestation (this is easier to imagine if we think that states of affairs are ‘snapshots’ taken out of, or abstracted from, the temporal continuum), then we can make sense of the debate concerning the temporal orientation of powers without having to think that manifestations are dated entities. This is because processes are usually temporally extended, and therefore if powers have to bring about their manifestations through a process, this will have to take some time: ‘when mutual manifestation partners are together, it takes time for them to have their full effect’ (Mumford & Anjum 2018b). Naturally, how much time it takes for a power to bring about its manifestation depends on the specific power under consideration—matter of study of empirical investigation.

If this is so, then the disagreement about the forward-looking nature of powers really is nothing over and above a disagreement about the *topology and direction of time*. From the fact that bringing about a manifestation through a process takes some time and the fact that time only flows in one direction, we can explain why one might think that a potentiality’s manifestation cannot predate its possession. If, on the other hand, time will in fact reverse, or it has a circular structure, or there are loops, or we could build time-travelling machines, then powers will not be forward-looking, and it will be possible to have powers whose manifestation is in the past. There is no need to embed the time-index in the manifestation itself: whether manifestations can only be *after* their power will depend on the nature of the process involved in the power’s exercise, and the structure of time itself. This solution works for those who think that powers are only directed at types as well as it does for a theory such as mine which admits also (temporally indeterminate) tokens. This, of course, will rule out the idea that we can reduce time’s arrow to the causal arrow via powers: I will discuss the relation between powers and time in more detail particular in §8.

## 6.8 Conclusions

In this chapter I have presented my answer to Key Question and therefore my suggestion as to how proceed on the Actualisation Route to solve Too Much Possibility: the difference maker between a manifested and an unmanifested manifestation is that the former is located in spacetime, whereas the latter is not. This does not suffice to fully capture the kind of metaphysical picture that is involved in a satisfactory answer: we need to add a further factor, related to the essentiality (or lack thereof) of the determinable property of being located. This allows us to construct a matrix expressing the difference between being concrete, being abstract, being unmanifested, and being a spatiotemporal point, as well as accounting for what it is to become actualised. This matrix represents the core of the minimal metaphysics of powers that I aim to develop: every theory of powers (for whatever purpose) should include at least these categories and entities. Adopting this view has some immediate consequences for the Dispositionalist project: in particular, it seems to spell troubles for its most ambitious brand, according to which powers can ground metaphysical or absolute modality. On the other hand, adopting this framework will allow us to overcome some of the expressive limitations that hampered a dispositionalist treatment of *de re* truths involving merely possible individuals, thus allowing one to respond to some of the critiques presented in chapter 5.

## **Chapter 7. What (Ontological Category) Do We Talk About When We Talk About Manifestations?**

Now that we have moved past the obstacle of Armstrong's Too Much Possibility and we have given a satisfactory answer to Key Question, we can start exploring the metaphysics of powers more systematically. In particular, we can turn to the following question: what kind of things can be the manifestations of powers? To which ontological category can they belong?

Trying to answer Key Question, we have already discussed universals (both Aristotelian and Platonic) and found them somewhat wanting. Furthermore, in presenting the four-fold schema we have already noted that one constraint that putative manifestations have to meet is not to be essentially spatiotemporally located—I take it that this excludes events, whose identity conditions surely include at least their spatiotemporal boundaries.<sup>117</sup> This leaves us with tropes and states of affairs. An ontology of tropes for powers is defended by Molnar (2003), while Neil Williams has recently argued that the best candidate for manifestations are states of affairs (2019). In order to answer the question, I will adopt the following methodology: I will present three *desiderata* that the manifestation of powers ought to meet, and then check whether the candidates can meet them.

### **7.1 The Criteria**

The first, obvious criterion is that they must be able to be mere logical existents and concrete: they need not be essentially located or essentially non-located in spacetime. This is the only truly mandatory *desideratum*.

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<sup>117</sup> Even if we adopt a theory of events richer than the traditional Quine-Lemmon one, according to which 'Physical objects ... are not to be distinguished from events... Each comprises simply the content, however heterogeneous, of some portion of space-time, however disconnected or gerry-mandered' (Quine 1960: 131), such as Kim (1969, 1976) and Cleland (1991), at least the time of the event will always figure in its identity conditions – we just cannot understand what an event outside of spacetime would be.

**Scheme:** Manifestations of powers (independent) must not be essentially non-located; Manifestations of (independent) powers must not be essentially located.

I have already introduced the second *desideratum* while discussing processes in §3, **Precision**:

**Precision:** Manifestations must be fine-grained enough to differentiate between distinct powers.

Finally, the last *desideratum* of manifestations of powers is **Generality** (Molnar 2003, Mumford 2004):

**Generality:** Our disposition-ascriptions are ordinarily indeterminate under various respects; in particular, the indeterminacy with regard to the time and place of manifestation is often invoked.

My account allows us to explain **Generality** of time and place very straightforwardly: manifestations of powers (whatever they are) are metaphysically indeterminate in that regard, at least as long as they are unmanifested—they are not spatiotemporally located, they are not dated. This allows me to cut some of the ontological costs of the theory. Recognising that powers are directed at *token entities* and not just types such as universals (be they tropes, individuals, or states of affairs, as we will see in a moment) obviously entails a certain ontological profligacy (at least quantitatively): there will be a lot of entities in my domain (all my distinct possible grandchildren will be MLEs, and all the possible states of affairs that they could find themselves in). However, maintaining that unmanifested manifestations are indeterminate with respect of time and place allows me to cut down the numbers a bit: if I accept states of affairs, I will have to accept that [Dory paints] and [Franklin paints] are two different merely logical existent entities; however, I will not have to distinguish between [Dory paints at 12.30 Monday 15 June 2070] and [Dory paints at 17.15

Tuesday 20 June 2070]—manifestations are not *that* fine-grained. Same goes for place, *e.g.* [Franklin sings in the living room] and [Franklin sings in the shower]. So, I will have an inflated ontology, but perhaps not as inflated as the one of the possible worlds theorist, either of the Genuine or Ersatz kind. Hardcore Actualism comes ontologically cheaper than possible worlds theories, but it is not the incredible thrift that one could have hoped, either.<sup>118</sup>

However, disposition ascriptions can be generic in other ways, apart from time and place of manifestation: for example, they might fail to specify the individual identity of the manifestation: Blaz is funny if he has the disposition to make people laugh generally—it would be weird to say that he is funny if he has the disposition to make Seren laugh, Sarah laugh, Alex laugh, etc. It is fairly uncontroversial, I think, that most of our disposition ascriptions display this kind of generality; it is this that has led some (*e.g.* Mumford 2004) to hypothesise that powers are directed *only* towards universals (where it was implicit that universals are qualitative and not individualistic, to use Dasgupta’s 2014 terminology).<sup>119</sup> However, this proposal is problematic for Dispositionalism, insofar as the theory aims to ground *de re* modal truths, as we have seen in §3.

This seems to present a dilemma for my view: on the one hand, I have to admit that powers can be directed towards individualistic entities in order to sidestep the critiques I have moved to universals-based theories of manifestations (§5.2-3) and allow Dispositionalism to account for *de re* truths avoiding Leech-style worries (Leech 2017). For that purpose, it is very useful to have individual-specific powers, such as the power to make only Jamie, and *and not a perfect duplicate of Jamie*, angry. My theory is evidently allowing for individualistic manifestations, and in general individuals as manifestations: after all, the

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<sup>118</sup> Thanks to Stephen Mumford for pressing me on this.

<sup>119</sup> It is hard to offer a precise characterisation of the distinction—see the discussion in §5.3 on pure and impure universals. Roughly, we can understand ‘individual’ facts as follows: a fact is individualistic iff whether it obtains depends on how things stand with a particular individual (or individuals) and qualitative otherwise’ (Dasgupta 2014). An easy rough guide to the distinction is whether it can be expressed only using an individual constant in first order logic or not. For instance, [Jeremy smiles] is an individual fact, for it cannot be expressed in FoL without introducing a constant, whereas [somebody smiles] only requires a variable and is therefore qualitative.

whole point of Williamson's introduction of mere logical existents is to make sense of constant domains of *individuals*—insofar as my framework is akin to Williamson's, then we should think that individuals can fail to be located.

On the other hand, doing so seems to condemn me to deny **Generality**, at least as far as individual identities are concerned: I cannot say that that the manifestations are indeterminate *in that way*. One way to avoid this problem would be to recognise both qualitative and individualistic manifestations, and maintain that powers can be directed at both. This would pose a formidable challenge to the task of finding a unified ontological category for manifestations: what category could contain both classes?<sup>120</sup>

Fortunately, we can escape the dilemma. **Generality** is a piece of evidence of our *linguistic behaviour* that we need to account for. But such an account does not need to be straightforwardly metaphysical: we can either maintain that such indeterminacy is due to the metaphysical indeterminacy of the manifestation (manifestations happen to be entities indeterminate just in the right ways; this is not available to me in the case of individualistic facts), but it could also be the case that such indeterminacy of dispositions ascriptions are to be explained by *semantic mechanisms*. Since the evidence is a linguistic phenomenon, this would do equally well: take, for instance, the case of many theories of vagueness: the indeterminacy detected in our linguistic behaviour is often not explained by a corresponding metaphysical indeterminacy, but by semantic (or epistemic) mechanisms. However, this solution still poses some constraints on our metaphysics: we need to grant that the underlying metaphysics is capable of grounding the semantic machinery, as it were. I will suggest that my preferred candidates to be the manifestation of powers, tropes and states of affairs, can account for individualistic generality in this way: despite being perfectly determined entities under that regard, we can account for our linguistic behaviour tinkering with the semantics.

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<sup>120</sup> Of course, if we think that purely and impurely individual universals are unproblematic, then universals would do; however, I have argued (although briefly) that individual universals are problematic.

## 7.2 Tropes

Can tropes be merely logical existents? Unless we endorse Schaffer's (2001) Spatiotemporal Identity criterion:

**Spatiotemporal Identity:**  $x$  and  $y$  are distinct tropes iff they are either not exactly resembling, or at distant locations ( $\text{Distance}(x,y)>0$ ).

I do not see any reason to think that tropes must be essentially located in spacetime, and, indeed, the very possibility that there are non-spatiotemporally located tropes is considered to be a good reason to reject Schaffer's criterion of identity. One of the problems that afflict Spatiotemporal Identity is that it cannot allow for a one-category ontology, unless one is also thoroughly committed to reductionism with regard to everything non-concrete.<sup>121</sup> For instance, Campbell notes that:

The problem then is this: if the basic entities are all tropes, and tropes are all particulars, and particulars are all located, what of non-spatiotemporal beings? Can it be a truth of analytic ontology, a truth about the ultimate structure of the world, that non-spatio-temporal beings are *impossible*? Is it right to rule them all out, in one fell swoop, *a priori*, without need to consider their individual merits? For apart from divinities, spirits and angels, this would banish Platonic Forms, Berkeleyan Ideas, Kantian Unities of Apperception and perhaps sets and numbers too. [...] A philosopher of a naturalistic bent is tempted to view this wholesale exclusion of other-worldly, beyond-nature items with complacency. It does, after all, have the advantage of theft over honest toil. But dialectically, it is an impossibly weak position. (Campbell 1990: 53-4).

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<sup>121</sup> Admittedly, Schaffer openly assumes Ontological Naturalism, and dismisses the worry about non-located entities: 'I must confess to not caring about whether the number of angels dancing on the heads of nonspatiotemporal pins has been counted over-formally or not'. However, there are other and more urgent problems for SI than angels: plausibly, Schaffer will want to concede that the number two has the property of being even and prime, while three has the property of being odd and prime. Is the primeness of two and three a universal they share? Must every trope theorist buy into a four-category ontology along the lines of Lowe (2006), or at least a two-category one? Supposedly, the main reason to buy tropes in the first place was to avoid the mysteries of universals—it would be rather unpleasant to find out that we have to take all those issues on board anyway, having lost in the process the benefits that universals usually bring (e.g. explaining similarity).

Most trope theorists that assume that tropes are necessarily or essentially spatiotemporal located (Campbell 1981) do so on the basis of a commitment to Ontological Naturalism (Schaffer 2001: 251), understood as ‘the doctrine that reality consists of nothing but a single all-embracing spatio-temporal system’ (Armstrong 1981: 149). But, of course, my theory is *already* at odds with Ontological Naturalism, since it countenances both abstract entities and mere logical existents. So, Naturalism definitely cannot be the reason why tropes have to be essentially spatio-temporally located, at least if we want to integrate them in an ontology of powers. If the framework that I am proposing is the best categorial scheme for powers metaphysics, then it follows *a fortiori* that powers metaphysics will not fare very well with Naturalism.<sup>122</sup> Are there other reasons to think that tropes are essentially located?

Here’s one suggestion.<sup>123</sup> One might think that one advantage of tropes over universals or states of affairs is that they do not need to invoke a mysterious relation of instantiation or non-mereological composition<sup>124</sup> to explain property possession. The proponent of Spatiotemporal Identity can say that for a particular  $x$  to have a certain property F *just is* for both  $x$  and trope F to be co-located. In short:

**Trope Predication:**  $Fa$  iff and because i)  $a$  is located at R, and ii) F is located at R.

However, I am not very optimistic that Trope Predication could be a viable theory, and that trope theories can have the ideological upper hand in this respect. Consider, for example, the case of a statue and the clay that constitutes it. The statue and the clay are obviously co-located. However, it is customary to attribute them different properties, both modal and not. Modal: the statue would not survive smashing, while the lump of clay would. Non-

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<sup>122</sup> See Tugby & Giannini (forthcoming) for an argument to the effect that also Vetter (2015) would be better off abandoning her commitment to it.

<sup>123</sup> Another common reason would be this: being a particular is defined in terms of being located. See Maurin (2002) for an argument that we should take particularity to be a primitive, instead.

<sup>124</sup> A trope ‘is part of the particle. It is not a spatiotemporal part’ (Lewis 1986b: 86).

modal: the statue has aesthetic and representational qualities; the clay, arguably, does not.<sup>125</sup> According to TP, the statue and the lump of clay should have the same tropes, since they are co-located. But then how are we to explain the fact that they have different properties?

Of course, some options are available to the trope theorist to salvage Trope Predication: for instance, she could adopt a broadly Lewisian solution (Lewis 2003). This involves accepting modal realism, counterpart theory, and introducing a *qua*-operator that screens out contextually non-salient counterpart relations, the trope theorist might say that in context  $c_1$  the object (and its co-located tropes) have certain modal properties in virtue of the salient counterpart relations  $C_1$  with other-worldly objects, while in context  $c_2$  there is another salient counterpart relation  $C_2$  with some other object, and hence some other tropes. Thus,  $x$  *qua*-statue cannot survive smashing because there is no relevant counterpart of  $x$  that is both a statue and smashed, whereas *qua*-lump,  $x$  has counterparts that survived the smashing. It is not immediately clear how to extend this strategy to the non-modal, aesthetic and representational properties, but then again that case was more controversial. The problem is that such an account of modal properties is decidedly not in line with Dispositionalism: we have to invoke concrete possible worlds and counterparts to make it work. That is, Trope Predication might be salvaged, but not in a Dispositionalist framework.

If we reject Trope Predication, we have to offer a more elaborate theory of what it is for an object to have a trope or for a trope to exist. The explanatory challenges that we have to face once we abandon Trope Predication will largely depend on our preferred conception of tropes. So far, I have not distinguished between different families of trope theories, and in particular between those who conceive of tropes as stand-alone, fundamental entities ('junior substances' as Armstrong 1989 described them) that compose or constitute objects and whose identity is, therefore, independent and prior to the object they will compose or the other tropes they will be associated with, and those theories according to which tropes are somewhat parasitical on the particulars that they inhere to:

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<sup>125</sup> This latter thesis is more controversial, admittedly. The modal case is enough, in case.

that is, their identities depend, in part, on the object they belong to. The trope of Socrates' paleness is the entity that it is also because *it is Socrates'* and not Plato's paleness. Call the former entities 'tropers' or 'module tropes' (Garcia 2015), and the latter 'modes' (Lowe 2006).

The friends of modes will most likely invoke a primitive formal ontological relation (see Lowe 2006, Simons 2012, Hakkarainen ms.) to explain what it is for a mode to exist and to inherit to a particular (for instance, Lowe invokes a primitive *sui generis* relation, 'characterisation'). Friends of module tropes, on the other hand, can simply say that a trope exists or not, be it in space-time or not—but they will have to offer an account of bundling (one that avoids regress and the possibility of lone tropes) compatible with tropes (and their bundles) not being located.

A thorough discussion of which theory of tropes is overall preferable would obviously outstrip the scope of this dissertation, and I will not attempt to argue that one conception is superior to the other. I will limit myself to observing that both seem *prima facie* compatible with the minimal metaphysics under discussion, and that there is no overwhelming reason for not thinking of tropes as non-essentially non-located. If this is so, tropes can be in potency, and thus be good manifestations for non-maximal powers. Of course, there is more left to say about the complete identity criterion for tropes. But this will largely hinge upon independent reasons, such as the role (or existence) of particular substances. All the options available should be compatible with tropes being in potency.

Tropes obviously fare well in terms of precision. Can they account for individualistic generality, though? Tropes are, after all, particularised properties: they are either individuals (if tropers) or individualised properties (if modes) and hence they have a very precise individual identity. This does not mean, however, that we cannot make sense of general or indeterminate disposition ascriptions: we just need to offer a semantic, rather than metaphysical, solution. In particular, we just need to appeal to (exact) equivalence classes. I think that the best solution for the trope theorist is to give a semantic account to **Generality** (remember that **Generality** only requires that our *power ascriptions* are sufficiently

general), and formulate truth conditions for power ascriptions roughly along these lines: ‘ $x$  can F’ is true iff there is some trope  $a$  that is the manifestation of Px, and  $a$  belongs to the exact resemblance class of the Fs,  $a \in [F]$ . Appealing to equivalence classes allow us to produce the required generality and indeterminacy in our disposition ascriptions without having to maintain that powers need to be directed only at qualitative entities—it is, after all, the standard strategy of trope theorists (and in general nominalists) of all stripes to make sense of general talk of properties (see Rodriguez-Pereyra 2002 for details). The lesson here is that it is relatively easy to obtain generality from specificity, while going the other way around is much harder (this is also the lesson that Fine 1994 taught: going from fine-grained to coarse-grained is easy; vice versa, not so much).

Therefore, we can conclude that tropes could be a viable ontological category for the manifestation of powers.

### 7.3 States of affairs

Can states of affairs be mere logical existents, and hence manifestations of powers? David Armstrong has offered two quite different ontologies of states of affairs. It will be useful to quickly rehearse the differences before considering whether they can be mere logical existents.<sup>126</sup>

Initially, Armstrong (1978a; 1978b) adopted a ‘Compositional’ or ‘Combinatorial’ view of states of affairs: these are particulars that result from the (non-mereological) composition of a ‘thin’ particular (a bare individual) and an immanent universal. Bare individuals and immanent universals *compose* the state of affair. States of affairs so conceived are caught in a complex web of dependency relations. On the one hand, since states of affairs are composed by bare individuals and immanent universals, they metaphysically depend upon their components: the state of affairs [Fa] depends for its identity on the identity of its components, F and  $a$ . The converse does not hold: according to Armstrong,

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<sup>126</sup> I am much indebted to Andrea Raimondi for helping me clarifying the details of the two positions—I have pillaged his doctoral thesis, ‘Dispositionalism: A theory of Properties’ (2018) and generally his mind for bibliographic references and clarifications on this point.

it is contingent which states of affairs there are, and the same bare individuals and immanent universals could fail to produce a state of affairs; indeed, the contingency of the non-mereological tie between particulars and universals is what requires the existence of the additional category of states of affairs in the first place: something more than the components is required to act as truthmaker for contingent singular claims (Armstrong 2004). On the other hand, Armstrong is adamant that the components cannot exist on their own, outside states of affairs. This results in a tension in dependency relations, which has been much discussed, so I will not add to the debate.<sup>127</sup> I assume that the tension is not fatal to the position, and a suitably refined distinction of dependency relations can be provided, in the spirit of Bennett (2017). What I am interested in is whether states of affairs, thus conceived, can be merely logical existents. Read what follows as a conditional question: if combinatorial states of affairs are viable at all, can they be thought of as non-essentially non located?

Later in his life, Armstrong offered a rather different ontology of states of affairs (Armstrong 2004), according to which states of affairs are the fundamental building block of reality—they are not posterior or dependent in any way on their ‘components’. On the contrary, their components (bare particulars and immanent universals) ‘only exist at the limit of abstraction’ (Armstrong 2009) of states of affairs. Universals and thin particulars are *aspects* of states of affairs or thick particulars (Heil 2015). In other words, according to this picture, states of affairs are structured and complex, but their complexity is not grounded in the composition of their parts: they are structured entities which are mereologically simple and fundamental (or at least ungrounded). It may be instructive to think of them as standing to particulars as irreducible distributional properties (as described by Parsons 2000; 2004; Cameron 2015) stand to properties. Following Raimondi (2018), let

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<sup>127</sup> For instance, it is one of the cases which prompted Bennett (2017) to posit a multiplicity of building relations or Barnes (2018) to maintain that dependency is not asymmetric. Others, on the other hand, take this as a refutation of Armstrong’s original view (I have seen for instance Mike Raven arguing that since grounding is univocal and asymmetric, combinatorial states of affairs are metaphysically impossible).

me dub this the ‘Tractarian<sup>128</sup> conception of states of affairs’. Again, I will not be as much concerned with the viability of the view in general, but rather on whether states of affairs thus conceived can fail to be located.

The only reason I can think of for wanting to maintain that Tractarian states of affairs are essentially located is to distinguish them from facts. If we understand facts along broadly Fregean lines, simply as true propositions (or Fregean Thoughts) and want to resist their association with states of affairs, we may offer the following argument:

1. Facts are just true propositions
2. Propositions are Fregean Thoughts
3. Fregean Thoughts are abstract
4. Therefore facts are essentially non-located
5. Facts are distinct from states of affairs
6. Therefore states of affairs are essentially located

The argument is obviously fallacious: assuming 5. involves only a negation outside the scope of the essence operator:

$$(\Box_{\text{Fact}} \neg (\text{Located}(\text{Fact}) \ \& \ \neg \Box_{\text{SoA}} (\text{Located}(\text{SoA})))$$

while 6. involves the negation within its scope:

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<sup>128</sup> Armstrong’s terminology does not fit perfectly with Wittgenstein’s. Armstrong’s states of affairs are most naturally associated with Wittgenstein’s *Tatsachen*, which are the fundamental building block of the world: ‘the world is the totality of facts’ (*Die Welt ist die Gesamtheit der Tatsachen*, *TLP* 1.1). *Tatsachen* are, in turn, understood as *obtaining Sachverhalten* (*Was der Fall ist, die Tatsache, ist das Bestehen von Sachverhalten* *TLP* 2), and these, finally, are defined as ‘combinations of objects’ (*Der Sachverhalt ist eine Verbindung von Gegenständen. (Sachen, Dingen.)* *TLP* 2.01). Armstrongian states of affairs are characterised by the fact that they are complex, but not by virtue of their parts or components, and that they are absolutely ungrounded and fundamental—it is not obvious to me that this is the case with Wittgensteinian *Sachverhalten* and therefore, *Tatsachen*. This largely depends on how we interpret propositions 2.0122: ‘Things are independent in so far as they can occur in all *possible* situations, but this form of Independence is a form of connexion with states of affairs, a form of dependence’ and 2.014: ‘The possibility of its occurring in states of affairs is the form of an object’.

$$(\Box_{\text{Fact}} \neg (\text{Located}(\text{Fact}) \ \& \ \Box_{\text{SoA}} \neg (\text{Located}(\text{SoA}))$$

So, even if we want to distinguish facts from states of affairs, for whatever reason,<sup>129</sup> we would not need to commit to the idea that states of affairs are essentially located to do so.

What about combinatorial states of affairs?

I think there is no major hurdle in thinking that combinatorial states of affairs are not essentially located, too. We have already granted that particulars can be merely logical existents—*a fortiori*, bare individuals can be.<sup>130</sup> Can immanent universals exist without being located? I do not see why not. Remember, we have characterised immanent universals thus:

**Aristotelian Universals:** A universal F exists *iff* there is some particular x such that x instantiates F.

Unless we take instantiation to be analysed in terms of co-location, there is little reason to think that only concrete entities can instantiate immanent universals. So far I have treated instantiation as a formal ontological relation, much like characterisation in the case of modes (Lowe 2006, Hakkarainen ms).<sup>131</sup> Indeed, we can take instantiation to be the glue that holds states of affairs together: ‘States of affairs hold their constituent together in a non-mereological form of composition, a form of composition that even allows the

<sup>129</sup> One such reason might have to do with how fine-grained they are: how fine-grained states of affairs are depends on how fine-grained natural properties are: it is completely an *a posteriori* affair. On the other hand, it seems that no such answer can be given to how fine-grained propositions (and hence facts) should be, and that it is *up to us* to decide when two facts are the same. Thanks to Annina Loets for suggesting this.

<sup>130</sup> Again: assuming that bare individuals are metaphysically possible. I am not thereby committing to their possibility.

<sup>131</sup> On alternative conceptions of instantiation: Strawson (1959) treats it as a ‘non-relational tie’, and Armstrong (1997) as an internal relation. Nothing in the (admittedly, very sketchy) elucidation of what a ‘non-relational tie’ is suggests that it has to hold between *concreta*. And, obviously, internal relations can hold between non-located objects: surely the Platonist about numbers will maintain that the fact that 4 is divisible by 2 is due to an internal relation between the two! Of course, treating instantiation as an internal relation presupposes that we modify AU and offer an independent characterisation of the existence conditions for immanent universals. If this cannot be done, all the worse for Armstrong’s theory of instantiation.

possibility of having different states of affairs with identical constituents' (Armstrong 1997: 118). There is no reason to think that such non-mereological form of composition should only hold between concrete entities.

Of course, David Armstrong was a staunch naturalist, and hence in *A World of States of Affairs* he attempted to do reduce mathematical entities and set/classes to concrete states of affairs—for instance, by treating numbers as instances of unit-determining properties within complex states of affairs or mereological sums (e.g. the second-order property 'swans currently on the lake would be instantiated seven times within a given region of space'). But, of course, a commitment to Naturalism is quite independent from the adoption of an ontology of states of affairs or thick individuals. I cannot think of a good argument to the effect that states of affairs must be located in spacetime; on the contrary, I think there are good reasons for the friend of states of affairs to think that there could be non-located states of affairs: again, it seems the only way to have a properly general one-category ontology, one which could make justice to truths about *abstracta* and *concreta* alike (without having to take on the Armstrongian—fairly unsuccessful—reductive project).

As far **Precision** and **Generality** are concerned, I think that states of affairs are on par with tropes.<sup>132</sup> Both theories of states of affairs will concede that its constituents are essential to it, but we can still grant linguistic individualistic-indeterminacy by the same semantic mechanisms used by tropes: a disposition ascription is true iff there is at least one member of a certain equivalence class such that it is the manifestation of the power token in question. So, each token power P has only one state of affairs as its manifestation, say [Fa]. Furthermore, there is an equivalence class [F] such that [Fa] belongs to [F] if and only if F is a component of the state of affairs, so that [F]: {[Fa], [Fb]... [Fn]}.

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<sup>132</sup> Although it should be noted that, if we adopt a Tractarian view of states of affairs and the structuralist view of ontological categories as that defended by Westerhoff (2005), according to which we 'try to get informations about the different components of states of affairs not by any direct information about them but by considering specific *relations* between them' (2005: 8) we might lose some of our precision, for it might be hard to distinguish the *adicity* of the properties involved (Westerhoff 2005: 146-70).

This means that, insofar as the chosen criteria are concerned, tropes and states of affairs are perfectly on par: they can both serve as manifestations of powers equally well. The choice between tropes and states of affairs (as well as the one between the particular version of each theory) is to be settled by independent considerations.

#### 7.4 Universals and the Liberal Stance

What about universals? In chapter 5, I have argued that universals were inadequate as manifestations of powers for two reasons. The first was that they struggled to make room for *de re* truths about mere *possibilita* — pure and impure properties could not be obtained by abstraction from the particulars, if these particulars were taken to lack existence. However, it would seem that a friend of universals is free to accept my minimal metaphysics and therefore accept in her ontology mere logical existents, and then abstract the pure and impure properties from them, while still maintaining that powers can only be directed at Aristotelian<sup>133</sup> universals.<sup>134</sup> The point is perfectly right: my minimal metaphysics offers the resources also to those who think that universals are the manifestations of powers to account for that problematic set of truths. Should we think, then, that also universals could be manifestations?

The point is not easy to adjudicate. The answer will largely depend upon how much weight we should give to the other argument against platonic universals that I have given in §5.3, concerning the relationship between universals and their instances, and Independence. Note, however, that the argument has to be re-fitted slightly if targeted to someone who adopts both the minimal metaphysics and properly derived universals as manifestations: in chapter 5 I was considering the proposal to adopt universals as a way to disarm Too Much Possibility, by invoking the difference between their being instantiated or not. But, in the context of the minimal metaphysics, that dialectical move is no longer required: Too Much Possibility has been disarmed independently of an appeal to universals being uninstantiated.

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<sup>133</sup> Platonic universals do not make the cut, since they are abstract and hence essentially not-located.

<sup>134</sup> Many thanks to Barbara Vetter for pointing this out to me.

This relieves the friend of universals of some explanatory burdens — while, at the same time, making their adoption less explanatory, since they are no longer indispensable for admitting powers. I have to confess that it is unclear to me how much weight the second argument carries, in this new dialectical context. It seems to me that many of the strategies that I will adopt to make sense of what it means for a mere logical existent to become manifested can now be adopted by the friends of universals, too (e.g. the appeal to eternalism and processes to ground the truth of dated sentences about the future that I sketched in 6.7 and will develop more fully in 8.3-5). Furthermore, the categorial framework of the minimal metaphysics fits rather naturally with the view that instantiation is location (Cowling 2014), thus doing away with a mysterious fundamental instantiation relation that could be considered problematic. Finally, universals would certainly pass the criterion of Generality with flying colours.

On the other hand, thinking that powers are directed at impure universals abstracted from MLEs retains some problems (somewhat related to the points raised in §5.3). More fine-grained universals are presumably thought to stand in determinable/determinate relations with more coarse-grained universals: being scarlet is a determinate of being red. So, presumably, more fine grained universals still, such as Jamie being scarlet, ought to be considered determinates of being red — but this seems a bit odd: we think that determinables entail the disjunction of all their determinates (being red entails being either scarlet or magenta, etc). But extending this further to the particular-level of fineness of grain seem odd: being red would entail either Jamie being scarlet or Pedro being scarlet or Dory being scarlet... and so on for all possible individuals. That is to say, universals ought to encode all possible particulars. This seems to bake too much information in what it is to be red. On the other hand, if the impure universal of Jamie being scarlet were not a determinable of being red, then how would they be related? This raises worries similar to those I have discussed in §5.3 about the relation between universals and their instances.

A thorough discussion of this issue would lead us a but too far astray. I think we can extend the irenic spirit adopted above with regard to tropes vs states of affairs also to

universals: it seems to me that the minimal metaphysics is, in general, compatible with the idea that universals are manifestations of powers, but gives us no special reason to think that manifestations must be universals (contra the positions discussed in chapter 5) — the choice must be independently motivated.<sup>135</sup> The difficulties that beset the proposal of having universals seem to be mostly in-house issues that concern universals only (e.g. the relationship between super-fine grained universals with more coarse-grained ones).

I think that the proponent of the minimal metaphysics of powers can take a fairly liberal stance here: all candidates seem to pass the three proposed criteria for being manifestations. Choosing between one or the other seem to be, more than anything, an independently motivated choice: as far as the candidates meet the three *desiderata* imposed (Generality, Precision, and fitting in the four-fold schema of §6), they are equally good from the point of view of Dispositionalism. I take this neutrality to be a point for the minimal metaphysics.

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<sup>135</sup> E.g. Vetter (2015) is committed to universals as manifestations mainly because she cashes out the notion of locality that characterises her theory in terms of taking a predicate operator (POT), rather than a sentence operator, as fundamental; her choice has relatively little to do to the role that universals play in solving Too Much Possibility.

## Chapter 8. Radicalising the Theory

The minimal metaphysics of powers presented in §6 is built around **Independence** and **Directedness**. If attractive, it should be the minimal common denominator of any project involving powers, and in particular it should be the theory adopted by Dispositionalists who want to be able to communicate with other powers theorists. How are we to judge if it is, indeed, attractive? We have already seen that it can solve some problems for both powers ontologies (Too Much Possibility) and Dispositionalism (*de re* truths about mere *possibilia*), among other things. It also presents ambitious Dispositionalism with some difficulties, as briefly discussed in §6.5-6. In order to argue for its overall appeal, I will zoom out from the task of grounding Dispositionalism for a moment, and focus more on the Integration desideratum.

I do so with two aims in mind. The first is to further explore and clarify the picture that I have presented earlier, by drawing out some of the consequences of the theory, in particular with regard to its relation to issues in fundamentality and time. The second is to show how the minimal theory is amenable to being strengthened, if need be, by some of the other common theses about powers that I have mentioned in the Introduction, and how this could be beneficial to Dispositionalism. Although these further theses are not of primary interest for Dispositionalism, a considerable part of the appeal of the minimal framework is that it is compatible and consistent with such stronger versions of powers metaphysics, and thus the same ontology that can ground Dispositionalism can be employed in other debates.

### 8.1. Production and Dependency Problems

In arguing against Physical Intentionality and in favour of the idea that all manifestations of powers do in fact exist, I have maintained that powers depend metaphysically on their manifestations, where by metaphysical dependence I mean something depending *for their identity* upon the identity of something else. In the case of powers the idea was that the

identity of the power was (at least in part) determined by the identity of their manifestations.

However, it is hard to deny that the direction of the dependence seems to be the other way round: there is a strong intuition to the effect that it is the *manifestations* that should depend upon the powers, in some sense. After all, the powers *bring about* their manifestations. I suspect that it is this intuition that motivates and underpins the understanding of manifesting as coming into being, which caused so much trouble in the previous chapters. This, in a sense, is what is at the root of an additional thesis of powers ontologies, namely **Productivity**. For instance, Mumford and Anjum explicitly state that

Powers, we maintain, are productive of their manifestations... [denying this] would do more harm to the metaphysics of dispositions than good... Powers would have lost their potency and thus would no longer be any use in explaining how one thing brought about another (Mumford & Anjum 2011: 8).

Is the theory of powers that I have presented so far incompatible with **Productivity**? That would be an unwelcome result, for it seems that **Productivity** plays an important role in one of the currently most worked-out account of causation by powers, and is in general a principle that seems to capture a widespread intuition. Declaring it incompatible would suggest that one and the same metaphysics of powers could not ground both causation and modality, for instance,<sup>136</sup> and that the idea that manifestations depend upon their powers is misguided. Fortunately, I do not think that **Productivity** is incompatible with my account of powers and in general with the sort of metaphysical dependence of powers upon their manifestations that I have so far insisted on. In this section, I will argue that the minimal metaphysics allows us to say that powers are productive of their manifestations, at least in a weak sense in which manifestations depend for their actualisation upon their powers. I am not sure whether this sense of **Productivity** is the same as what Mumford and Anjum have

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<sup>136</sup> Although, naturally is far from obvious that causation requires production.

in mind, or whether it is too weak—mainly because it is not wholly clear what *they* have in mind when they talk of powers producing their manifestations. Even if they have something stronger in mind, I think that the ‘Weak Productivity’ that I propose is a step in the right direction, and will just have to be supplemented by something else to match their desired thesis; unless this ‘something more’ involves entities coming into existence, I do not see any insurmountable hurdle.

So: is my minimal framework compatible with **Productivity?** *Prima facie*, my situation is uncomfortable: I have just argued that powers depend upon manifestations. Were I to subscribe to **Productivity**, it would follow that manifestations depend upon powers, too. This suggests that there is a criss-crossing, symmetric dependence between powers and manifestations. But normally we think that dependency relations are asymmetrical! In short, the following three theses seem to be inconsistent:

1. Powers depend upon their manifestations.
2. Manifestations depend upon their powers.
3. Dependency is asymmetric.

One way to solve the problem is simply to reject 3. and maintain that dependency relations can be symmetrical. The idea has been recently defended by Elizabeth Barnes (2018), citing as examples *inter alia* Armstrongian states of affairs, bundles of tropes that avoid the ‘bare mass’ problem, and structuralist ontologies in mathematics. However, I do not think that this is the best route to take here. I do not intend to offer an argument against Barnes’ thesis. Rather, I wish to highlight that rejecting 3. would not solve all uneasiness in the case of powers. Take the ‘productive’ dependency of manifestations upon powers: the intuition suggests that it holds because powers *bring about* their manifestations. But, if the dependency involved were symmetrical, it would mean that it makes sense to say that powers depend upon their manifestations because manifestations *bring about* their powers. But this is absurd. Something similar can be said for the metaphysical dependency involved

in 1., although this could be plausible under certain conceptions of the identity conditions of powers—namely, those that maintain that powers are captured by counterfactual conditionals and hence their identity also includes the stimuli, as Bird (2007) does.

I think there is another, better solution at hand. In discussing the argument against physical intentionality, I have already made use of different notions of dependency: I argued that metaphysical (identity) dependence entailed rigid ontological dependence, at least if this latter is taken in its modal/existential variety. I propose to solve the tension between the three theses by disambiguating ‘depends’ as it occurs in 1. and 2.: either two different notions of dependence are involved (Paolini-Paoletti 2019) or two different *relata* are. This is consistent with the thesis that the dependence relation(s) involved are asymmetric. Thus, it is possible to adopt both my proposed framework and accept the productivity thesis so central to radical powers metaphysics.

In the previous chapters, I have characterised the metaphysical dependency involved in 1. as follows:<sup>137</sup>

**MD\***: [ID(P)] depends upon [ID(M)].

That is, the *relata* of the dependency relation are two facts: the fact that P has the thick identity it has, and the fact that M has the thick identity that it has. Clearly, when we speak of the dependency involved in 2., it is something else we have in mind: we are interested in saying that powers bring about their manifestations, and therefore that it is the *actualisation* of M that depends upon the power. According to the minimal metaphysics, we can understand actualisation as the acquisition of spatiotemporal location on the part of the manifestation. Following the model of MD\*, we can hypothesise that the dependence holds between two facts concerning location or concreteness:

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<sup>137</sup> I assume a predicativist account simply for ease of exposition. Everything could be restated in operationalist terms.

**Location Dependence:**  $[Located(M)]$  depends upon  $[Located(P)]$  or, alternatively,  $[Concrete(M)]$  depends upon  $[Concrete(P)]$ .

Location Dependence states that the fact that  $M$  is located depends upon the fact that  $P$  is located. Of course, this is just a first stab at the dependency involved in **Productivity**. Real production might involve something more substantial—so that my account does not automatically entail the thesis. For instance, I find it plausible that on Mumford and Anjum's (2011) understanding of the principle, for genuine production to take place, an irreducible process must link power and manifestation, roughly as follows:

**Process Production:**  $P$  productively brings about  $M$  iff there is an uninterrupted process  $\varphi$  essential to  $P$  that has  $[Located(M)]$  or  $[Concrete(M)]$  as its natural endpoint.

I will not devote much time here to investigate how, exactly, we are to cash out **Productivity**: my only goal is to show that the fact that **Productivity** involves a dependence relation which runs in the opposite direction than MD\* does not entail that the two cannot be held consistently together. So, however **Productivity** is to be cashed out, the point for our current problem is this: it is immediately apparent that the *relata* of the two dependency relations are not the same, or that the dependency relations criss-crossing each other are not the same. This is particularly apparent when we consider that  $M$  has the identity that it has even if it is not located. We can then easily derive their distinctness by Leibniz's Law by considering 'obtaining' to be a (higher order) property of facts:

- a.  $\diamond (O[ID(M)] \wedge \neg O[Located(M)])$ .
- b.  $x=y \rightarrow \forall F(Fx \leftrightarrow Fy)$ .
- c.  $[ID(M)] \neq [Located(M)]$ .

Note that nothing has been said about the details of the two dependency relations involved. The same relation, as far as the defence I have given so far goes, could figure in both statements, and yet be asymmetrical: the *relata* are simply different.

However, one might complain that this does not capture fully **Productivity**: we might want to say that the dependence obtains between powers and manifestations themselves, rather than between *facts* involving powers and manifestations. So, the *relata* would have to be the same two entities: P and M themselves. In that case, we can preserve the proposed solution by distinguishing between the two kinds of dependencies involved (see Paolini-Paoletti 2019 for this latter approach) and say that powers depend<sub>1</sub> upon manifestations, while manifestations depend<sub>2</sub> upon powers. Presumably, we should at that point offer a proper elucidation of the notions of dependency involved: ‘metaphysical dependance’ and ‘productive dependence’.

I do not think that such a treatment would raise any significant difficulty, compared to the one that I have just sketched. So far, I have expressed metaphysical dependence as a binary plain dependence relation between (thick) identity facts, but it is often simply expressed by a more finely characterised dependency relation between *entities*:

**MD:**  $x$  depends for its identity upon  $y$ .

If it is possible to offer more fine-grained dependency relations by adding a qualifying clause, then we can suggest a general model for dependence relations:

**General Dependence:**  $x$  depends for  $F$  upon  $y$ .

*Prima facie*, it seems perfectly innocuous to use this blueprint to engineer productive dependence in the same lightweight way captured by Location Dependence. Very simply:

**Productive Dependence:**  $x$  depends for its being spatiotemporal located/for its being concrete upon  $y$ .

Note that the property used to characterise this relation of productive dependence is the determinable ‘having a spatiotemporal location’, rather than any determinate location.<sup>138</sup> I think this is enough to offer a first elucidation of the dependence under scrutiny. In particular, I propose the following elucidation of production:

**Weak Production:**  $P$  produces  $M$  at  $t =_{\text{df}} M$  depends for its location/concreteness upon  $P$  and  $M$  is actualised at  $t$ .

I think that **Weak Production** allows us already to capture most of the philosophically interesting aspects of **Productivity**: it suffices to capture the intuition that manifestations depend upon their powers, without forcing us to deny that powers depend for their identity upon their manifestations, nor giving up on the idea that dependence is asymmetric. I am inclined to say that a theory that can accommodate the former can reasonably be said to have thereby accommodated the latter, but of course it is up for debate whether a stronger characterisation is needed.<sup>139</sup> Perhaps the notion of productivity that Mumford & Anjum or Groff have in mind is something more substantial than this, and the extra element is doing some essential work. In that case, however, the burden is on them to specify what is this ‘harder thing to do’ (Williamson 2013): unless it involves creating new entities *ex nihilo*, I suspect that whatever the harder thing to do is, the minimal framework could accommodate it.

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<sup>138</sup> One might be tempted to the idea that productive dependence really concerns determinate properties, and these in turn ground their determinables (and hence, indirectly, the determinable dependence). However, I think there are good arguments to resist the idea that determinables need be grounded or less fundamental than their determinates (see Wilson 2012), and hence I think there is no obvious reason to think that a formulation of productive dependence based on determinables is not viable.

<sup>139</sup> Thanks to Stephen Mumford for pressing me on this. I will suggest a way to bridge the gap from Weak Production to a stronger Productivity in §8.4.

**Weak Production** is based on idea that there are many kinds of dependence, and not all of them have the same direction. Similar ideas have found some support recently, in the debate about grounding. Having a quick look at them might be useful to clarify my proposal.

## 8.2 Fundamental Matters?

Jessica Wilson (2014) and Karen Bennett (2017) have argued that we should not try to understand the notions of dependence and priority in terms of a unified concept, such as grounding: our ‘in virtue of’ explanations are not themselves, nor track, a unique ‘big-G’ relation. Rather, we should recognise a family of such relations that share some key features, but are significantly different in other respects—‘building relations’ (Bennett) or ‘small-g’ relation (Wilson).<sup>140</sup>

Bennett offers two reasons for thinking that this is the case: The first is that a unified big-G relation is just too coarse-grained (see also Koslicki 2015). The second reason is that any suitably general big-G relation will get things wrong. In particular, it will either misrepresent reality, or lose its asymmetry.<sup>141</sup> Bennett’s argument against ‘Generalist Monism’ runs as follows:

The problem is that there is a case to be made that any highly abstract, very general relation that holds whenever a more specific building relation will fail to be asymmetric... Why think that the

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<sup>140</sup> Bear in mind that, while it is quite easy to count the two dependency relations I am interested in here among Wilson’s small-g relations (although they do not actually appear in her list) it is not obvious that what I am interested in fits seamlessly with Bennett’s building relations: I have stressed that metaphysical dependence is a ‘determinative’ rather than ‘constitutive’ relation (Dasgupta 2018, Kovacs forthcoming) and Bennett’s arguments are more straightforwardly concerned with the latter family.

<sup>141</sup> Selim Berker (2018) has recently offered two interesting arguments to the effect that we must believe in a unified Big-G grounding. One of his arguments, however, relies on the fact that dependency relations display an ‘asymmetry dovetail’, that is, never happen to criss-cross. I think that his point begs the question here. His argument from transitivity in favour of big-G is much more interesting; unfortunately, I cannot discuss it with the thoroughness that it would deserve. I will just note that, if we are persuaded by his argument from transitivity but not from his argument from asymmetric dovetailing, we are free to admit that big-G grounding is symmetric, after all, but all the small-g dependencies are not. This would still be consistent with what I am saying, although I do not find it very appealing.

general relation is not asymmetric? It fails to be asymmetric if it is possible for two different specific building relations to hold in opposite directions between the same entities... thus if the relevant kind of case is possible – if two things can mutually bear different building relations to each other –  $B_1$  and  $B_2$  cannot be versions of a more general building relation  $B$  (Bennett 2017: 26).

Bennett invokes as examples Schaffer's (2010) Priority Monism (where grounding and composition move in opposite directions) and cases of downward determination. The relation between powers and their manifestation would be, then, another example. Interestingly, Bennett includes causation in the building relations; what I have dubbed ‘productive dependence’ is precisely the kind of building relation would be involved in causal goings-on, according to Mumford & Anjum, so the account would fit nicely in her overall framework.

Note, however, that not every kind of ‘dependence’ I have talked about so far would turn out to be asymmetrical. I have argued that existential dependence follows from metaphysical dependence, and there is no reason to think that it will not also follow from productive dependence. In that case, it would mean that powers and manifestations are symmetrically existentially dependent. Recall the link between metaphysical dependence and existential dependence:

**Identity-Existence:** If  $x$  depends for its identity upon  $y$ , then necessarily,  $x$  exists only if  $y$  exists.

Similarly, we should expect the link between productive dependence to be as follows:

**Production-Existence:** If  $x$  depends for its being located upon  $y$ , then necessarily,  $x$  exists only if  $y$  exists.

Thus, if  $x$  metaphysically depends upon  $y$ , but  $y$  depends productively upon  $x$ , we obtain that necessarily,  $x$  exists if and only if  $y$  exists. But this is not a problem, given how I have cashed out existential dependence so far: on the contrary, this is exactly the kind of result that we should expect, given my acceptance of merely logical existents! There is no reason to think that the truth of ‘Necessarily, if  $x$  exists then  $y$  exists’ should preclude the truth of ‘Necessarily, if  $y$  exists then  $x$  exists’. Just think of the case of two necessary existents, *e.g.* numbers—the ontology of Dispositionalism *is* necessitarian, after all. From this we should draw the conclusion that existential dependence, cashed out as it is in modal/existential terms, is properly speaking not a dependency relation. The point is an overly familiar one: in order to have the required asymmetry, we need to formulate the principle using operator introducing a hyperintensional context, such as ‘because’ or ‘in virtue of’ and so on, and not simply a strict implication.<sup>142</sup>

One reason to resist the idea that we can save both the intuition that powers depend upon their manifestations and that manifestations depend upon their powers without giving up on the asymmetry of dependence by simply distinguishing different relations has to do with the notion of *fundamentality*. Plausibly, we still want to concede<sup>143</sup> that the following principle is true:

**Fundamental:** If  $x$  depends upon  $y$ , then  $y$  is more fundamental than  $x$ .

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<sup>142</sup> The reason for not treating rigid existential dependence as a proper dependency relation is then due to its coarse-grainedness, rather than its being non-symmetric; asymmetry is not assumed as a necessary condition for being a dependence relation here—the point is not, therefore, undermined by the arguments of Barnes (2012; 2018). Kovacs (forthcoming) thinks on similar grounds that necessitists, in order not to trivialise existential dependency, have to transform it in ‘concrete existential dependence’. There is no real difference between our two views: I dismiss the ‘modal/existential’ version of existential dependence as not a genuine dependence relation in a faux-necessitarian framework; he modifies the modal/existential account in a necessitist framework to avoid its triviality. Tomato, Tomahto.

<sup>143</sup> The principle is (often implicitly) commonly assumed, but not universally so: Barnes (2018:65–8) for instance maintains that ‘dependence needs to be separated from talk of grounding, priority, in virtue of, and so on. These relations are relations that aim to take us from the derivative to the fundamental... dependence is something distinct from theoretical gizmos—like grounding, priority, in virtue of—tailored specifically to take us from the less fundamental to the more fundamental. Dependence can do a lot of interesting work in our theories, but it can’t do that’. In case dependence had nothing to do whatsoever with fundamentality, the problem does not even arise.

There is no doubt that ‘more fundamental than’ is asymmetrical. The critic could construct a dilemma: either invoking the two distinct dependence relations was useless, for we still get the result that an asymmetric relation holds symmetrically, or one of the two relations is not a ‘real’ dependence, and thus we can maintain that it does not support **Fundamental**.

The dilemma is a false one: we do not need to accept either horn. The idea to get out of the dilemma is to follow Bennett, and maintain that ‘the *more fundamental than* relation – and relative fundamentality generally – is implicitly indexed to particular building relations’ (Bennett 2017: 162). Indeed, I am very sympathetic to the idea that ‘when I say that one thing is more fundamental than another, what I really mean is that it is more fundamental *in virtue of particular patterns of particular building relations*’ (Bennett 2017: 163) and that a more general notion of relative fundamentality, if available at all, should be constructed either by generalisation or by weighted sum,<sup>144</sup> that is, a sort of vectorial composition.<sup>145</sup> So, accepting that there is a complex network of dependence relations between the different categories does not preclude us to meaningfully ask questions about relative fundamentality, albeit the picture proposed might put in question the idea that there are absolutely fundamental entities (that is, that building relations are well-founded), for it would seem that everything that is either a power or the manifestation of a power cannot be absolutely fundamental. If both Pandispositionalism and Dispositionalism are true, that is, if both all properties are dispositional and powers are the sole source of metaphysical modality, it would follow that the absolute fundamental cannot have any properties—so, presumably, there is no absolute fundamental level. Pandispositionalism is incompatible with absolute fundamentality. Even if we reject Pandispositionalism, it would still be the case that entities that are somehow connected to the network of powers *cannot* be absolutely fundamental: if there are absolute, ungrounded *fundamentalia*, and if whatever goes on in the world does so through the activity of powers, then it follows from the above considerations

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<sup>144</sup>  $x$  is more fundamental than  $y \equiv_{df}$  For all dependence relations  $R$  and all  $\zeta$ , the weighted sum of all the indexed *more fundamental<sub>R</sub> than* relations between  $x$  and  $y$ , and between  $x$  and  $\zeta$  and  $y$ , etc., favours  $x$  as overall more fundamental.

<sup>145</sup> The idea should attract Neo-Aristotelians: ‘prior is said in many ways’, after all. See Arist. *Metaph.* 5 11.

that fundamental entities *just don't do anything*: they are necessarily idlers. Although not inconsistent, this is admittedly a strange picture, and one that is rather distant from what foundationalists normally present. Powers ontologies (and therefore Dispositionalism) sit more comfortably and naturally with some form of anti-foundationalism—be that of the infinite descending sort (Bohn 2018) or the coherentist kind (Thompson 2018). Incidentally, this result partially vindicates the metaontological assumptions that I have made in fn. 32 against positions (such as Cameron 2010b) according to which we ought to be ontologically committed only to the absolutely fundamental entities. Be that as it may, the result I am first and foremost interested in is that the minimal metaphysics presented here seems to be consistent with one of the key theses of radical powers ontologies, namely **Productivity**, at least if it is acceptable to cash it out in terms of **Weak Production**.

### 8.3. Time for Powers

Another thesis (*e.g.* Mayr 2011, Mumford & Anjum 2011, Groff 2013; ms) typically adopted by radical powers theorists is **Dynamism**: the idea that powers are dynamic and active. A world of powers is not a passive mechanism that receives its activity from an external source, but is itself the source of change. I think it is important to show that we can add **Dynamism** to the minimal theory, because such a feature is often taken to be one of the key advantages of powers ontologies over the ‘passive’ world of the Neo-Humeans (Williams 2019), and furthermore it is plausibly one way to get from **Weak Production** to the stronger **Productivity** that Mumford and Anjum have in mind.

I will address the compatibility of **Dynamism** and the minimal theory of powers by taking a somewhat long detour in the metaphysics of time. There are three reasons for this: first, it would be hard to properly address the topics of dynamism and change without specifying what kind of metaphysics of time is acting as a background. However, specifying such framework is not a trivial matter. Recently, Donatella Donati (2018) and Marius Backmann (2018) have argued that (radical) powers ontologies are not compatible with any of the established metaphysics of time. Were they right, it would be very hard to assess

whether the minimal theory could accommodate **Dynamism**, since we would lack a precise background framework for fleshing out discussions about change.

Furthermore, if they were right powers ontologies in general and Dispositionalism would be in considerable trouble: it is hard to see how we could adopt a powers ontology if it failed to fit in with any theory of time, even if powers proved to offer a better theory of modality (or laws of nature, causation, free will, etc.). So, it is paramount to show that powers ontologies are compatible with at least one metaphysics of time.

Since an exhaustive treatment of the compatibility of powers with metaphysics of time would take us too far afield, I will limit myself to arguing that powers ontologies are compatible with Eternalism, and can do so while accepting Dynamism; I will do so by showing how Donati's arguments against the compatibility of Eternalism and radical powers can be resisted.

I choose to focus on Eternalism not only because I find the view independently attractive, but also because there are certain key similarities between Eternalism and my minimal theory of powers. This is the second reason for focussing on the metaphysics of time: if Eternalism and the minimal metaphysics share important features, if I manage to show that Eternalism is compatible with dynamic powers, I will thereby offer a reason to think that the minimal framework is.

Finally, this detour on the metaphysics of time aims to further clarify the minimal theory by drawing out some of its consequences, and to show how it offers a good ground for Dispositionalism. Vetter (2015: 292) suggested that the semantics of Dispositionalism would benefit from the adoption of an Eternalist framework when it comes to accounting for cross-temporal modal sentences, such as 'I could be taller than Socrates'—showing that the minimal theory can reap those benefits is a point in its favour. But there is more: discussing the relation between the minimal theory and time will allow us to better clarify the treatment of dated truths of possibility, such as 'Jamie can run a marathon on June the second, 2021' and the debate concerning the direction of powers given in §6.7. Let's dive into it.

We can characterise Eternalism as follows:

- a. The domain of the most natural, unrestricted existential quantifier used to univocally express ontological commitment (Sider 2011, van Inwagen 2009) includes present, as well as past and future times and entities. Present, past, and future times and entities exist *simpliciter*.<sup>146</sup>
- b. There is no unique, objectively privileged time or temporally located entity. A description of reality can be correct and complete without specifying what time is present.<sup>147</sup>
- c. Times and objects are ordered by the fixed, unchangeable relations *being before than/being after than/being simultaneous with* which can be specified without mentioning what time is present.
- d. Fundamental ideology is tenseless.<sup>148</sup>

Donati characterises radical powers theories as follows:

- i. Powers are primitive. They cannot be analysed in terms of counterfactuals, conditionals, etc.
- ii. Powers are *productive*. Change consists in the production of new causal powers, via the transformation of old causal powers... although change *is* still taken to consist in variation of properties over time, this change *is the result* of causal production. This “production” results from the transformation of old powers into new ones. Production is a real feature of reality. And the “new causal powers” mentioned in the principle are manifestations of the old ones’ (Donati 2018: 155).

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<sup>146</sup> Eternalism thus understood would trivially follow from the necessitist ontology here adopted. Therefore, this thesis can be bolstered thus: All entities that exist in time (present, past and future) exist and are concrete. Thanks to Jamie Taylor for pointing this out.

<sup>147</sup> This is just the negation of Cameron’s (2015) *Privileged Present* thesis.

<sup>148</sup> This does not mean that tensed language can be reduced without loss of meaning!

**iii.** Powers have modal consequences. ‘In particular, they generate a *sui generis* modality called “natural modality”. Natural modality is intermediate between metaphysical possibility and necessity. That is, there are sentences  $p$  such that  $p$  is metaphysically possible but not naturally possible (see Mumford & Anjum 2011; 2018)’ (Donati 2018).

These three theses roughly correspond to the last principles that I have spelled out in the Introduction:<sup>149</sup>

**Strong Causality.** Powers are causal powers.

**Productivity.** Powers are productive: they bring about their manifestation by *producing it*.

**Dynamism.** Powers are *dynamic* and active. A world of powers is not a passive mechanism that receives its activity from an external source, but is itself the source of change.

**Tendency.** Powers confer a tendential, *sui generis* kind of modality, stronger than mere metaphysical or natural possibility and always and necessarily short of natural and metaphysical necessity.

In particular, Dynamism and Productivity play a central role in Donati’s arguments.<sup>150</sup> By resisting her arguments, I will offer a reason to think that the minimal metaphysics can safely accommodate these two further theses.

#### 8.4 Eternalism, Productivity, & Dynamism

I will consider three worries that Donati raises in relation to adopting a radical powers metaphysics together with Eternalism. By radical powers metaphysics I mean specifically

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<sup>149</sup> Note that Donati uses ‘natural modality’ in quite a different way than I do—her term seems to be closer to what I have called Tendential modality.

<sup>150</sup> She offers a final argument, centred around **Tendency**. Since I end up rejecting the principle in the last chapter, I shall not discuss its consequences for the philosophy of time.

theories that include **Productivity** and **Dynamism**. These worries are almost identical to those that can be raised concerning the radicalisation of my minimal framework, so by dispelling them we should kill two birds with one stone.

Donati's first argument is based on the idea that there cannot be production in an eternalist framework, because it is static. Since, in a sense, also my picture is a static one (for nothing new comes into existence), her argument, if sound, would have the upshot that my framework is not compatible with production, contrary to what I have argued in the previous section. Her argument can be reconstructed as follows:

1. Powers bring about (produce) their manifestations.
2. To bring about a manifestation means to bring it into existence: the domain of the most natural, unrestricted existential quantifier used to univocally express ontological commitment undergoes an expansion when a power is successfully exercised. *After* a power has acted successfully, *there is something more and new*.
3. According to Eternalism, the domain of the most natural, unrestricted existential quantifier used to univocally express ontological commitment is constant.
4. Therefore, the domain of the most natural, unrestricted existential quantifier used to univocally express ontological commitment is both constant and growing.
5. ⊥

The key move here is 2., that powers are productive iff the change that they originate involves *new powers coming into existence* as a result. But nothing, strictly speaking, comes into existence according to the eternalist. Everything that will be already *exists simpliciter*, tenselessly.

It should be clear by now how I intend to resist the argument. Donati's argument is based on the idea that a power manifesting consists in bringing its manifestation into existence from non-existence. I have argued in §6 that this is not how powers theorists should think of actualisation, and that they should not think of unmanifested

manifestations as non-existing entities. Being manifested should be thought of as becoming concrete. Furthermore, this case should qualify as a case of genuine production: in the previous section I have introduced the notion of productive dependence and **Weak Production** for this purpose. No problem here.

However, there might be a catch, for there is a natural follow-up worry: What does it mean that something *becomes concrete* (namely, spatiotemporally located) at some time  $t$  in an eternalist framework? Similarly, what does it mean that something becomes actual in my picture? Surely it is tenselessly true that it was located there—it has always been located at  $t$ : so how can it *become* concrete? Let's try to spell this out more clearly. According to my picture, a manifestation  $M$  becoming manifested means that it does acquire a spatiotemporal location. This suggests that it did not have a spatiotemporal location *beforehand*. But, if Eternalism is true, temporal facts are all fixed and unchanging: the facts have always been there. So, in a sense,  $M$  has always been concrete, that is, it has always been manifested. Nothing is going on.

Note that this complaint somewhat mirrors a classic objection to the reductive Russellian account of change that is normally adopted by Eternalists:

**RA:** An object  $a$  changing from being F to being G =<sub>df</sub> There is a time  $t$  such that  $a$  is F at  $t$  and there is a time  $t'$  such that  $t < t'$  and  $a$  is G at  $t'$ .

The objection, to my knowledge first formulated by McTaggart, is that **RA** is not a good account of change *because there is no change according to RA*. The (timeless, tenseless) facts are always the same, so nothing really changes. The objection runs as follows:

If my poker, for example, is hot on a particular Monday, and never before or since, the event of the poker being hot does not change. But the poker changes, because there is a time when this event is happening to it, and a time when it is not happening to it.

But this makes no change in the qualities of the poker. It is always a quality of that poker that it is one which is hot on that particular Monday. And it is always a quality of that poker that it is one which is not hot at any other time. Both these qualities are true of it at any time—the time when it is hot and the time when it is cold. And therefore it seems to be erroneous to say that there is any change in the poker. The fact that it is hot at one point in a series and cold at other points cannot give change, if neither of these facts change. (McTaggart 1927, chapter XXXIII, sections 315-6).

The situation is very similar to the one involved in my account: manifested manifestations have always been (timelessly, tenselessly) located somewhere in spacetime, and therefore there is no genuine actualisation—no change takes place. But if no genuine change takes place, how can the picture be said to be dynamic?

The best answer to offer to both objections is, following Sider (2001), to distinguish between two perspectives that are available to the eternalist when it comes to discussing things or facts in time. One is the ‘atemporal perspective’ which ‘contemplate[s] the whole of time’. This perspective can be formulated by using simple predicates, *i.e.* predicates that lack a temporal clause: ‘is red’, ‘is tall’, ‘exists’, etc. These are the sort of predicates (quantifiers, relations, etc.) that we employ when we add the clause *simpliciter*: so, for instance, our most natural and fundamental existential quantifier, the one that is supposed to *really* carve up nature at its joints and tell us what there is *simpliciter*, takes the atemporal perspective (Sider 2011). It is according to this perspective that we can say that all facts remain unchanging: what facts there are, *simpliciter*, is constant both according to the eternalist and the minimal metaphysics. But this is not the perspective we use when discussing change: ‘when discussing objects in time, we typically do not take this atemporal perspective’ (Sider 2001: 56). In that passage, Sider is interested in defining what it means to adopt the temporal perspective with regard to parthood, and defines having a part at a time as follows:

**P@T:**  $x$  is part of  $y$  at  $t$  iff  $x$  and  $y$  each exist at  $t$ , and  $x$ ’s instantaneous temporal part at  $t$  is part of  $y$ ’s instantaneous temporal part at  $t$ .

I am not concerned with his definition of parthood here<sup>151</sup> as much as with the clause of ‘at a time’ that gets added to the predicate ‘being a part of’. To adopt the temporal perspective means precisely to add such clause to our predicates and take the corresponding properties to be temporalised. My contention is that it does not make sense to speak of change unless we take the temporal perspective.

If McTaggart is saying that, according to Eternalism, facts never change from an atemporal perspective, he is absolutely correct; but this cannot be a problem for a theory of change (reductive or not), because a theory of change cannot be given in the atemporal perspective anyway. This point generalises to every metaphysics of time—even growing blockers can take the atemporal perspective (e.g. discussing hypertime or logical truths) but of course they cannot make sense of change while doing so.

Once this is clear, the worry can be dispelled: in order to make sense of a manifestation becoming actualised, we need a two-step explanation. First, assume that there are some entities  $xx$  located at time  $t_1$  (that is, *existing at*  $t_1$ ) and some entities  $yy$  located (*existing at*)  $t_2$ . Then introduce the notion of being accompanied, so that  $x$  is accompanied by<sup>152</sup>  $y$  only if  $x$  exists at  $t$  and  $y$  exists at  $t$ . We can now make sense of the actualisation of some M by saying that M was not accompanied by any entity that exists *at*  $t_1$ , and that M is accompanied by some entity that exists *at*  $t_2$ . More generally:

**Co-Location:** M is actualised at  $t_2 \equiv_{\text{df}}$  there is some  $x$  such that  $x$  is not accompanied by M at  $t_1$  and  $x$  is accompanied by M at  $t_2$ .

We can still make sense of mere logical existents in this framework. Logical existents are those entities that exist *simpliciter*, but are not accompanied by anything at any time. These

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<sup>151</sup> Sider is interested in using P@T to give a 4-dimensionalist theory of persistence and change—hence his interest in parenthood specifically. However, one can be an eternalist without subscribing to 4-dimensionalist theory of persistence and change, and so disregard his notion of temporal parts.

<sup>152</sup> I had originally chosen the expression ‘co-located’. Thanks to Jamie Taylor for pointing out the potential confusions that would arise from doing so.

are the entities that are never actually brought about—in this, they are similar to *abstracta* (the difference being that it is not *essential* for them to be). Yet, manifestations that are only *momentarily* unmanifested, but which will be (*e.g.* my death) are not accompanied by anything up to a point in time, and then are accompanied by something (*e.g.* my drinking the deadly poison).

It makes sense to say that something *becomes actualised* if, adopting a temporal perspective, we say that the world was unaccompanied by M up to  $t_1$ , and then it is accompanied by M from  $t_2$  onwards. Tenselessly speaking, of course, in an Eternalist framework all the powers have already been exercised (or not): the future is fixed. All the powers that (tensedly speaking) will bring about their manifestations have, tenselessly speaking, already done so, and the powers that will not (tensedly speaking) bring about their manifestations have already, tenselessly speaking, failed to do so. However, from a temporal perspective we can still make sense of the idea that powers act and manifestations occur at some time.

Let's move to Donati's final objection against radical powers and Eternalism. The argument, stripped to its bare bones, can be summed up as follows:

1. Eternalism entails a reductive account of change along the lines of RA:  $\langle Fa \text{ at } t_1, Ga \text{ at } t_2 \rangle$ .
2. A reductive account of change along the lines of RA is incompatible with radical powers metaphysics.
3. Therefore, Eternalism is incompatible with radical powers.

Since what I have said above suggests that my framework entails a Russellian reductive account of actualisation, the objection is all the more dangerous if it is sound—it would show that my framework is incompatible with radical powers ontologies. Spelled out as above, it is not really clear why radical powers ought to be incompatible with RA. This can be fleshed out both in terms of Production and of Dynamism. Let's look at these in turn.

### 8.4.1 Production

The first objection runs along these lines:

‘Powers *produce* their manifestations. You just showed me how a power is *followed* by its manifestation, but not that it brought it about. The Humean can do that much. A powers-based account of change (or causation) requires more!’

This is absolutely correct. But the fact that I can describe what it means that M is actualised in terms of a pair of states of affairs <M is not accompanied by any xx at  $t_1$ , M is accompanied by some yy at  $t_2$ > does not mean that *that's all there is to it*. We also need to add the fact that M is productively dependent upon P, for one. We have established previously, via **Weak Production**, that this is sufficient for capturing the idea that powers are responsible for the obtaining of the manifestations. The fact that we can describe an event by using just an ordered pair of property-instantiations does not mean that we have *fully* described it and accounted for it. This point is absolutely central to my argument—*mutatis mutandis*, I will employ the same strategy to resist also the **Dynamism**-based objection.

The key point is that RA is ambiguous between a *description* of the phenomenon and its *explanation*. We are tempted to think that the right-hand side of the principle is what explains the left-hand side—that the left-hand side reduces to it: that RA is spelled out as ‘iff and because’. But this would be a mistake. Eternalism entails RA only insofar as it is understood as a *materially adequate description* of the phenomenon of change (biconditional only): considering it a (reductive) explanation of change is a further, quite independent, and much stronger thesis.

The point that I would like to convey is that we should distinguish between a modest, descriptive reading of RA (iff), and an ambitious, reductive one (because).

Eternalism surely offers the resources to *describe* change in terms of a sequence of property-instantiations, *e.g.* as an ordered pair of states of affairs such as  $\langle Fa \text{ at } t, Ga \text{ at } t' \rangle$ , but that does only commit the eternalist to maintain that a certain biconditional holds:

**RA<sub>D</sub>:** An object  $a$  changing from being F to being G *iff* there is a time  $t$  such that  $a$  is F at  $t$  and there is a time  $t'$  such that  $t < t'$  and  $a$  is G at  $t'$ .

This only tells us how we can *represent* change from an eternalist perspective. And surely, such representation of change gets something right: even the most radical powers theorist would concede that the ordered pair  $\langle Fa \text{ at } t, Ga \text{ at } t' \rangle$  captures *something* of change. What the radical powers theorist denies is that such a picture is the full story about change: a fully satisfying description and explanation will have to involve powers, production, processes—what have you. But it does not mean that the minimal scheme offered by RA<sub>D</sub> cannot be enriched or is incompatible with powers. What she must reject is this further thesis, which represents a *reductive explanation* of change and which we should sharply distinguish from RA<sub>D</sub>:

**RA<sub>E</sub>:** An object  $a$  changing from being F to being G *iff and (fully) in virtue of* there is a time  $t$  such that  $a$  is F at  $t$  and there is a time  $t'$  such that  $t < t'$  and  $a$  is G at  $t'$ .

It is only this latter, stronger principle which is incompatible with radical powers-based accounts of change, because it asserts that there is *nothing more* to change than such variation of properties. But this is quite the extra step: nothing in the doctrine of Eternalism by itself forces us to go down this path.

Compare this with the situation of the perdurantist:

Lewis formulates perdurantism as the view that “something... persists by having different temporal parts, or stages, at different times” (1986: 202). Crucially, this formulation includes the ‘by’-locution,

which indicates an explanatory claim—to say that an object persists by having temporal parts is to say that facts about persistence are grounded in, or obtain in virtue of, facts about temporal parts. This conception of perdurantism goes beyond the ontological account since ontological claims are not, by themselves, explanatory... it is one thing to say that persisting objects have temporal parts whenever they exist; it is another thing to say that objects persist because they have temporal parts. One can accept the first claim while rejecting the second, so the explanatory idea goes beyond the ontological (Wasserman 2016: 244-5).

Eternalism is in trouble only if it entails this second, stronger thesis: that there is nothing to change but a sequence of property instantiations. Similarly, my framework is in trouble if it entails that all there is to actualisation is such an ordered pair—without any room for production. But this is not the case: there is room for **Weak Production**. In order to offer an adequate description and account of change or actualisation, it is not enough to say that a property is instantiated at a time and another at another time, or that an entity is not co-located with anything at a time and is co-located with something at another time. We also have to say that there is a power directed towards it, and that it depends productively upon that power. This way, we can enrich RA by adding elements unique to the toolkit of powers metaphysics.

#### 8.4.2 Dynamism

The second way to flesh out Donati's argument relies on **Dynamism**. I interpret the thesis as maintaining that causal goings-on and the action of powers in general is inextricably related to the unfolding of irreducible processes. The exercise of a power is, or results in, a process starting to unfold. For instance, Mumford and Anjum state that 'the cause will be depicted as merging into and becoming the effect through a natural process' (2011: 107) and that

[W]e see causation as an unfolding process whereby  $a$  turns into  $b$  (as in Martin 2008: ch. 5). The combined powers of the cause... become the effect... as part of what it is to be those powers (Mumford & Anjum 2011: 119).

The idea can be made more precise by appealing to the following principle. I have mentioned it earlier, under the heading MAP, as an example of a more substantial way of cashing out **Productivity**: I want to advance the hermeneutical suggestion that we can obtain Mumford and Anjum's (2011) stronger Productivity by uniting **Weak Production** with **Dynamism**:

**DYN:**  $P$  dynamically strongly produces  $M$  iff there is an uninterrupted process  $\varphi$ -ing essential to  $P$  that has  $M$  as its natural endpoint.

I will not devote much time rehearsing the various theories of processes: I have presented them in enough detail in §3. For the purposes of this argument, the only relevant feature is that processes are assumed to be irreducible to sequences (*e.g.* ordered pairs) of events. We can now present a more substantial version of Donati's argument:

1. Eternalism entails the Russellian reductive account of change, RA.
2. RA: An object  $a$  changing from being  $F$  to being  $G \equiv_{\text{df}} \langle Fa \text{ at } t, Ga \text{ at } t' \rangle$  such that  $t < t'$ .
3. If RA is true, change can be analysed as a sequence of events or states of affairs.
4. Radical powers metaphysics is committed to the idea that change occurs in virtue of the unfolding of a process.
5. Processes cannot be reduced to a sequence of events or ordered series of states of affairs.
6. Change can be analysed as a sequence of events (3) and cannot be analysed as a sequence of events (5).

The same reasoning as above applies here. Eternalism only entails RA<sub>D</sub>, that is, it merely entails the simple biconditional—and not an explanation of the phenomenon, such as RA<sub>E</sub>. Thus, Eternalism is perfectly consistent with the idea that there is more to be said about change than what RA<sub>D</sub> represents—and what can be added does not need to be reducible to a Humean-friendly ontology. The same, *mutatis mutandis*, is the case with my framework: just because I have resisted the objection that (according to my view) there is no actualisation because everything that will be located is already (tenselessly speaking) located,<sup>153</sup> it does not mean that Co-Location tells us the whole story about how manifestations are brought about. It is an acceptable minimal description only.

Let me offer an example of how one might enrich RA to get a more accurate picture of change or causation from the point of view of the radical powers theorist. Mumford and Anjum argue that causation by powers is best represented not by neuron diagrams (as standard practice since Lewis 1973) but rather by vectors in quality spaces. The idea, in short, is that we take manifestations to be locations on a certain quality space—for ease of exposition, limit the example to one-dimensional quality spaces, *e.g.* hot and cold.<sup>154</sup> We then represent the current state of the object with regard to the quality space as a vertical line: this would be the current temperature of the object. We then represent its powers in action as vectors moving in a direction: the powers to heat as vectors pointing in one direction, and the powers to cool as vectors pointing in the opposite direction.

Mumford and Anjum recognise that such a diagram only represents a *moment*: “The vectors depicted within a quality space are meant to indicate how things dispose in that particular situation. The vectors represent only the operating dispositions but the model

<sup>153</sup> By appealing to a temporal description of actualisation along the lines of **Co-Location**, M is actualised at  $t_2 \equiv_{\text{df}} \text{there is some } xx \text{ such that } xx \text{ are not co-located with } M \text{ at } t_1 \text{ and } xx \text{ are co-located with } M \text{ at } t_2$ .

<sup>154</sup> For some objections to the vector model, see Bird (2016) and McKittrick in McKittrick, Marmodoro, Mumford and Anjum (2013).

does not show, for instance, any actual change or movement within that quality space' (Mumford and Anjum 2011: 26). Assuming that the quality space is one-dimensional and the two poles are, respectively, F and G, that we represent directedness by introducing a primitive operator ' $\rightarrow$ ' such that ' $P \rightarrow F$ ' is read as 'P tends to F', and finally that we can associate a real number to the intensity or degree of a power, we can represent a situation in a vector space where there are two powers disposing, respectively, towards F and G as follows:  $nP \rightarrow F$ ,  $mP^* \rightarrow G$ . We can then represent a change in the vector space as an ordered pair of such situations, consistently with RAd. For instance, we can represent an increase in the degree of one of the powers and a decrease in the other as  $\langle(nP \rightarrow F, mP^* \rightarrow G), (n+1P \rightarrow F, m-1P^* \rightarrow G)\rangle$ . This gives us the evolution of a situation with two conflicting powers where one power becomes stronger and the other weakens. To simplify, assume that there is just one power in action; say, increasing in intensity. We can then offer the following improved description of change:

**RAd+**: An object  $a$  changes from being disposed towards  $F$  to being *more* disposed towards  $F$  iff  $\langle(nPa \rightarrow F) \text{ at } t, (n+1Pa \rightarrow F) \text{ at } t'\rangle$ .

The radical power theorist will still think that this is not enough—there is more to change than this. As was suggested in DYN, what we need is for the two elements of the ordered pair to be connected by a primitive process. But we can simply add this requirement to RAd+. As a first stab, we just need to add the clause that there is the relevant process between the two relevant instants.<sup>155</sup> Informally, we can just say that some entity  $a$  undergoes change iff  $a$  is disposed thus-and-so at some time  $t$ , has some different disposition at some later time  $t'$ , and there is a primitive process  $\varphi$  involving  $a$  which takes place between  $t$  and  $t'$ . More formally, we can depict what is going on as something like this:

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<sup>155</sup> Or that the productive dependence holds, if we are satisfied with Weak Production.

**RA<sub>D</sub>++:** An object  $a$  changes from being disposed towards F to being *more* disposed towards F iff  $\langle(nPa \rightarrow F) \text{ at } t, (n+1Pa \rightarrow F) \text{ at } t'\rangle$  & there is (the right kind of) process  $\varphi$  such that there is  $\varphi$ -ing between  $t$  and  $t'$ .

This description seems, *prima facie*, to be quite close to what radical powers theorists think is going on in cases of causation (in this case, in case of an increase in intensity in the tendency to F)—that is to say, it seems to sit well with DYN. Note that this representation of change is perfectly consistent with RA<sub>D</sub>: it just contains *more elements* than those that would be available to *any* eternalist, for it requires the ontological toolkit which comes with radical powers. But this should come as no surprise: after all, Eternalism is not a theory of properties or causation, but merely of time. We should expect that a better description can be afforded by an integrated theory of time, powers, processes, etc. Assuming that something like RA<sub>D</sub>++ is a more adequate description of change for the radical power theorist, she can then offer an *account* of change in the following terms:

**RA<sub>E</sub>++:** An object  $a$  changes from being disposed towards F to being *more* disposed towards F *iff and fully in virtue of*  $\langle(nPa \rightarrow F) \text{ at } t, (n+1Pa \rightarrow F) \text{ at } t'\rangle$  & there is (the right kind of) process  $\varphi$  such that there is  $\varphi$ -ing between  $t$  and  $t'$ .

Obviously, this is just a rough sketch. However, I think that it illustrates how powers metaphysics can be consistent with RA<sub>D</sub> without being trapped and limited to RA<sub>E</sub>. Only the former is entailed by Eternalism (and, *mutatis mutandis*, by my framework for the case of actualisation) and hence Donati's objection against the consistency of radical powers (and, more specifically, against powers theories that incorporate **Productivity** and **Dynamism**) is unsound. I have thus shown that both Eternalism, and my minimal metaphysics are compatible with these two 'radical' theses.

Can we conclude that these two clauses are also compatible with Dispositionalism? I do not see why they should not be. I have shown that both features are compatible with my

theory of the status unmanifested manifestations—which is the kernel of my preferred powers ontology for Dispositionalism. Thus, I claim that the proposed minimal metaphysics of powers for Dispositionalism can be ‘radicalised’ by adding both **Productivity** and **Dynamism**, if need be—at least, adopting an Eternalist theory of time. This is good news, because it means that Dispositionalists can work with the same toolkit as other friends of powers interested in pursuing other projects.

### 8.5 Time’s Arrow in a Static World?

There is, however, one last problem that might make it hard to square Eternalism with the minimal metaphysics. This is also relevant to the solution I have offered in §6.7 to the problem of how to account for the debate over the temporal direction of powers, so dealing with it will also allow me to flesh out that point in more detail. According to my theory, unmanifested manifestations do not have a spatiotemporal location—hence, manifestations (before they are brought about) cannot have determinate temporal coordinates: manifestations are not *dated*. Jamie might have the power to run a marathon on June the second, 2021, but such power is not to be understood as follows (I am adopting here Vetter’s symbolism):

(1) POT[run a marathon on June the second 2021](Jamie).

This raises two closely intertwined questions: how can we account for the truth of ‘Jamie can run a marathon on 2 June 2021’, and how are we to understand the debate about the future-oriented nature of powers—namely, the debate on whether powers can only have future manifestations, or also past ones?

I have discussed my proposed solution to the latter question in §6.7; such a solution also allows us to provide a semantics for dated sentences of possibility, so it is quite important for me to show that we can accommodate such solution in an Eternalist

framework. Here is a bit more detailed exposition on how I think we should deal with the debate over the directionality of powers and dated possibility claims.

The central idea is that the disagreement about the forward-looking nature of powers can be reduced to a disagreement about the topology and direction of time. From the fact that bringing about a manifestation takes some time and the fact that time only flows in one direction, we can explain why one might think that a potentiality's manifestation cannot predate its possession, provided that we accept that the exercise of a power involves the unfolding of a process. That is to say, *if* we accept **Dynamism**, and *if* time flows only in one direction, then we can explain that powers have only future manifestations. If, on the other hand, time flows both ways, is circular, or contains loops, then it makes sense to speak of past manifestations of present powers (and potentially, of backward causation).

This idea is also the key element for answering the former kind of question, concerning the semantics of dated sentences. If we accept **Dynamism**, then sentences such as ‘Jamie can run a marathon on 2 June 2021’, ‘the sugar can dissolve at midday, but not at 9 am’ and so on are to be grounded in i) the direction of time ii) the spatiotemporal location of the powers, and iii) the nature of the powers (and hence, of the process). That is to say: given the temporal location of the power for M, the fact that time flows in a certain direction and has a certain topology and metric,<sup>156</sup> and the nature of the process involved in bringing about M (specifically, *how long* it takes the process to unfold), then we can establish when a manifestation might or might not be actualised, without having to invoke dated states of affairs.

For example: suppose it is now 11:59 am, and I have just dropped a cube of sugar in my tea. Is the sentence ‘the sugar can be dissolved at 12:00’ true? Assuming that time flows in one direction, this will depend on the specific nature of the powers involved—namely, how long the process of dissolution will take, which is grounded in the nature of

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<sup>156</sup> The metric need not be intrinsic to time—it can supervene on other facts.

the sugar's solubility and the water's power to dissolve<sup>157</sup> (and obviously other factors, such as atmospheric pressure). That allows us to give a truth-value to 'the sugar can be dissolved at 12:00' without having to attribute to the sugar a myriad of time-specific powers—the power to dissolve at 12.00, the power to dissolve at 12.01, etc., which would overcrowd an already populous domain.

The problem is that both these solutions rest on the assumption that *time flows*, and has a direction. Without this assumption, we could not distinguish whether the sugar at 11:59 can dissolve at 12:00 or at 11:58, nor be able to settle or give meaning to the debate about the direction of powers. Unfortunately, Eternalism is standardly taken to entail the *absence* of a flow of time, let alone its having a particular direction.<sup>158</sup> For instance, Donati (2018: 145) includes the lack of directionality of time in her characterisation of Eternalism: 'Objects are ordered by fixed relations (B-relations) within a four dimensional manifold, and there is (plausibly) no passage'. Indeed, the idea that Eternalism excludes a genuine passage of time and its directionality is widespread: 'Defenders of the block universe deny that there is an objective present, and usually also deny that there is any objective flow of time' (Price 1996).

This is obviously troubling: if Eternalism is incompatible with the flow of time, and I invoked the flow and direction of time to explain how undated powers can be the truthmakers for *dated possibility claims* and account for the debate about the direction of powers, then either I have to reject Eternalism or find another solution to these problems.

Since I find the solutions to these problems offered in §6.7 quite appealing, and I think that it is very important that a metaphysics for Dispositionalism be able to address them, the natural choice would be to abandon Eternalism (as suggested by Friebe 2018) and embrace a more 'dynamical' metaphysics of time, *e.g.* Moving Spotlight. Fortunately, I do not think that the choice is forced upon us: the dilemma is a false one. One can be a full-

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<sup>157</sup> Obviously, since these are not perfectly natural powers, it might be controversial whether these are genuine powers. In keeping with the fairly liberal conception of sparse properties adopted so far, I have no problem adopting these macro-phenomena for clarity of exposition.

<sup>158</sup> Indeed, this is often taken to be one of its merits, for it fits naturally with the kind of time-symmetric laws that fundamental physics is concerned with.

fledged eternalist and yet accept that time has a direction and flows in one way. In slogan form: Eternalism does not mean that the universe is static and time does not have a direction.

I can think of two strategies to deny that Eternalism entails a ‘static’ universe.<sup>159</sup> The first is to simply add a primitive direction of time on top of the eternalist four-dimensional manifold, as it were. This idea has recently been defended by Tim Maudlin (2007).<sup>160</sup> He notes that the question of the passage of time is irrelevant to the ontic thesis of Eternalism:

The belief that time passes, in this sense, has no bearing on the question of the ‘reality’ of the past or of the future. I believe that the past is real: there are facts about what happened in the past that are independent of the present state of the world and independent of all knowledge or beliefs about the past. I similarly believe that there is (*i.e.* will be) a single unique future... Insofar as belief in the reality of the past and the future constitutes a belief in a ‘block universe’, I believe in a block universe. But I also believe that time passes, and see no contradiction or tension between these views (Maudlin 2007: 109).

I will not rehearse Maudlin’s arguments—I assume that his points are sound and his position is at least coherent. I think that powers theorists can adopt Maudlin’s theory, and treat the direction of time simply as an additional primitive element of their ontology, even if they reject Maudlin’s account of governing laws: the former does not entail the latter. Indeed, given the initial distribution of powers and a primitive direction of time, we can derive the evolution of the universe (the pattern of instantiation of properties over the full

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<sup>159</sup> This slogan could be misleading. ‘The block metaphor sometimes leads to confusion, however. In an attempt to highlight the contrast with the dynamic character of the ‘moving present’ view of time, people sometimes say that the block universe is *static*. This is rather misleading, however, as it suggests that there is a time frame in which the four-dimensional block universe stays the same. There isn’t of course. Time is supposed to be included in the block, so it is just as wrong to call it static as it is to call it dynamic or changeable. It isn’t *any* of these things, because it isn’t the right sort of entity—it isn’t an entity *in* time, in other words’ (Price 1996: 12). By it, I merely mean that talk of a privileged direction of time is available to the eternalist.

<sup>160</sup> See also Earman (1974) for this ‘Heresy’.

four dimensional manifold) more economically than by positing i) the primitive governing laws, ii) the initial distribution, and iii) the primitive direction of time, as Maudlin does.

An alternative way to subscribe to the existence of time's arrow within an eternalist framework is to reduce the direction of time to some more fundamental phenomenon which does not include the directionality of powers. The most obvious way to do so is to reduce time's arrow to the increasing entropy's gradient (Dowe 1992; Albert 2000; 2015, Loewer 2012). This requires two elements: on the one hand, the fact that the entropy gradient of systems not in equilibrium tends to increase (in accordance to the second law of thermodynamics or the statistical mechanical laws that ground it: see Albert 2000; 2015), and on the other hand, the 'Past Hypothesis'; that is, the empirical hypothesis that the entropy gradient of the universe right after the big bang was incredibly low.<sup>161</sup>

Notoriously, Loewer and Albert support a Neo-Humean metaphysics and a Best System Approach to laws of nature (Loewer 1996; 2012, Albert 2000; 2015). However, a reductionist theory of the direction of time can be adopted by powers theorists just as well: the metaphysical commitments are not vital to the reductive strategy.<sup>162</sup> After all, all that the friends of powers wants to say is that the fundamental dynamical laws flow from the modally rigid properties of the micro-entities—that their behaviour derives from the powers of the particles that compose the relevant micro-states. This can be accommodated

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<sup>161</sup> The Past Hypothesis is necessary in order to avoid the Reversibility Paradox: The latter is necessary to generate the asymmetry of the direction of time and avoid the Reversibility Paradox: 'conditionalizing on a low entropy macro state in the past (e.g. that the ice cube was twice as large an hour ago) constrains the probabilities of trajectories so that entropy is likely lower between now and an hour past. The reason for conditionalizing on [the initial state of the universe] is that nothing short of placing the low entropy condition at the first instants of the universe insures that the second law holds throughout the universe's entire history' (Loewer ms.).

<sup>162</sup> For instance Albert (2016: 64), after having explained the *epistemic asymmetry* between past and future in terms of statistical mechanics and past hypotheses, writes: 'everything we've been talking about...comes straight out of the microscopic laws of motion and the past hypothesis and the statistical postulate. And all of those have exactly the same *mathematical form*, and carry exactly the same implication about the *trajectories of material bodies*, in anti-Humean conceptions of the world'. Thanks to Alison Fernandes for pointing me out that much of Albert and Loewer's views can be separated from their Humean metaphysics.

without problems: the dynamical laws governing the micro-states are time-symmetric,<sup>163</sup> so they can be grounded in powers that are not time-directed, and whose manifestations are not dated,<sup>164</sup> and so do not require anything that the minimal metaphysics could not provide.

Both Maudlin and Albert's theories of the flow of time are, then, compatible with the metaphysics of powers I am proposing, and both are perfectly consistent with Eternalism: they can still subscribe to what I take to be the linchpin of the *metaphysical* thesis of Eternalism, namely that B-relations are more fundamental than A-properties. But this does not mean that we cannot, then, *ground* the arrow of time in some facts about the four-dimensional manifold. Once we have the (non-fundamental) arrow of time, we can generate the directionality of powers and the semantics of dated possibility claims by adopting the strategy described above.

This would not entail that powers are no longer basic entities, because powers themselves have nothing to do with *dated* manifestations, and their identity does not depend upon their temporal orientation. The temporal orientation of powers is an extrinsic matter, one which depends on something other than the powers themselves, namely the Past Hypothesis—the low entropy gradient of the initial distribution.

Of course, this means giving up on the idea that a denial of time's arrow is part and parcel of any Eternalist metaphysics of time. I think this is no sacrifice. Some directionality is already implicit in the way we characterise the B-relations among events in the manifold:

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<sup>163</sup> Therefore, we should not be too worried that such a reductive account of time's arrow would prevent power theorists to ground the second law of thermodynamic (or in general, entropy) upon some fundamental powers: we do not need to postulate a dated manifestation to make sense of the increase of entropy. Thanks to Matt Tugby for raising this issue.

<sup>164</sup> Albert and Loewer are more ambitious than I need to be, and than the power theorist can be. They suggest that the Mentaculus can not only explain time's arrow, but offer a model of causation: they propose to analyse causation probabilistically – suggesting that C causes E if and only if just in case the probability of *E* conditionalised on C (plus some background facts) is higher than the probability of *E* plus background facts alone. The Mentaculus thus offers a model to explain not only the asymmetry of time and causation, but the *evolution* of the universe. Obviously, power theorists cannot accept a probabilistic reduction of causation (see Mumford and Anjum 2011; 2018). Friends of powers can adopt a reductive theory of the direction of time along the lines of Albert and Loewer without subscribing to the more ambitious explanation of the dynamic evolution of the universe, which is grounded in an unacceptable reductive theory of causation.

we speak of succession relations, which *are* directed: the battle of Waterloo *precedes* the death of Napoleon, which in turn precedes the October Revolution, and not *vice versa*. Of course, there is a topologically matching series of events in the other direction:

These sequences might be ‘matched’, in the sense that to every event in the one there corresponds an event in the other which has the same bodies in the same spatial arrangement. The topological structure of the matched states would also be matched: if state B is between states A and C in one sequence, then the corresponding state  $B^*$  would be between  $A^*$  and  $C^*$  in the other (Maudlin 2007: 108).

But two topologically matching series are not *the same series*. One might think that introducing a direction to time breaks down the perfect isomorphism between the dimensions of the spacetime manifold: time is not just another dimension, but regains a Newtonian special status, differing from space insofar as the latter is directionless, whereas time is not. While this is the case insofar as Maudlin’s primitivist theory is concerned, it is not if we adopt the entropy-based reductive theory. Accepting that space does not have a primitive privileged orientation does not mean that there cannot be a supervening orientation. Matter (more generally, entities) is not distributed homogeneously in the universe, and it makes perfect sense to speak of the centre of the galaxy, say, as opposed to its periphery on the basis of the concentration of matter in these regions. These unequal distributions of entities can be the base of supervening asymmetries. There *are* spatial asymmetries, just not fundamental or primitive ones:

Consider the up-down asymmetry. It plausibly reduces to the local gravitational gradient. Astronauts on the moon think down is the direction towards the centre of the moon, not wherever it was when they left Earth (Callender 2016).

The up-down spatial asymmetry is real and important (even if we consider only the *local* gravitational gradient) and can usefully be employed in scientific explanations, as well as in

semantics, even if it is not fundamental or primitive. The same goes for the temporal asymmetry. Both space and time do not have a *primitive privileged orientation*—but they might well have non-fundamental orderings, and this is all we need in order to account for the semantics of dated possibility claims and the debate over the direction of powers.

I think that this satisfies all the requirements of the metaphysical thesis of Eternalism whilst allowing us to appeal to time’s arrow; if we can do that, then the solution to the puzzle about the temporal direction of powers in terms of processes that I have sketched in §6.7 is available to us.

## 8.6 Conclusions

In this chapter, I have been preoccupied with showing that the minimal metaphysics of powers that I have presented in §6 is compatible with some of the key theses dear to more radical powers theorists, such as Productivity and Dynamism. This is important, because it shows that Dispositionalism can tread on the same ontological ground that other metaphysicians are standing on when investigating other phenomena (causation is the most obvious candidate).

Investigating how we can radicalise powers has yielded a number to interesting results that contribute to clarify also the minimal theory itself. Discussing **Production**, I have introduced and characterised a notion of productive dependence that goes from powers to their manifestations. If this move is legitimate, it would mean that powers theorists should recognise a variety of dependence relations and, as far as they intend to link relative fundamentality with dependence relations, they ought to conclude that in a powers ontology there is nothing that is absolutely fundamental—nothing is perfectly ungrounded or independent. That is to say, powers theorists should not be tempted by metaphysical foundationalism (Thompson 2018, Bohn 2018).

Examining how to implement **Productivity** and **Dynamism** to the minimal metaphysics in relation to the metaphysics of time also allowed us to tackle a more general problem for all powers ontologies, namely whether powers are compatible with any of the

existing theories of time. I have argued, *contra* Donati, Backmann, and Friebe (see Giannini ms\* for a more substantial treatment of the issue), that the minimal metaphysics, even after the addition of Productivity and Dynamism, is compatible with the adoption of Eternalism. If there is time for radical powers, *a fortiori* there is time for minimal powers.

More cautiously: proving conclusively that two metaphysical theories are compatible is a hard task—indeed, it might be not unlike an attempt to verify a theory, be it empirical or not. As in any other area of philosophy, new arguments can always crop up and undermine doctrines and connections thought to be on secure ground. Therefore, it would be rushed to conclude that I have proved for good that radical powers metaphysics is compatible with eternalism. However, I have shown that there is no sound argument to the contrary, yet. I think it is fair to shift the burden of the proof to the other camp, and conclude that we are warranted in thinking that there is time for powers.

Tackling the objections against the compatibility of Eternalism, **Productivity**, and **Dynamism** also allowed us to get a better grip on how these two theses could be accommodated within the minimal theory, and allowed me to clarify the solution to the puzzle concerning the direction of powers discussed in §6.7: now, I hope, it is clearer how a metaphysics of powers can deliver a semantics for dated future modal claims without having to include fine-grained, dated unmanifested manifestations: all we need is time's arrow and empirical knowledge of the nature of the processes involved in the exercise of the power—the debate concerning the direction of powers can be reduced to a debate concerning the direction of time.

## Chapter 9: Truthmaking Troubles

In the last three chapters, I have presented my preferred metaphysics of powers for Dispositionalism and showed that it can be radicalised. However, not all the consequences of the theory are equally welcome. Some serious problems arise once we accept mere logical existents in our ontology. According to my theory, unmanifested manifestations of powers exist, *simpliciter*. This profligate ontology causes two difficulties when interacting with a simple version of Truthmaking theory, according to which an entity makes the corresponding propositions or sentences true simply in virtue of existing.

The first problem is that, if one admits contrasting (or opposing) powers in one's ontology, then we have to admit the existence of contrasting manifestations. If both exist *simpliciter*, how can we avoid that they make true two contradictory sentences or propositions? For example, assume that Marzia has the power to swim and also the power not to swim. Assume that the manifestation of such powers are states of affairs: [Marzia swims] and [Marzia does not swim]. Both states of affairs exist: yet we cannot admit that 'Marzia swims & Marzia does not swim' is true.

The second difficulty is this. According to Dispositionalism, every possible state of affairs is the manifestation (manifested or unmanifested) of some actual power. I have argued that all the manifestations of powers do, in fact, exist *simpliciter*. Again, if we adopt Truthmaking theory, it would follow that everything that is possible is also the case: for every  $p$ , if  $p$  is possibly true, then  $p$  is true. This is an extremely implausible modal principle: were Dispositionalism forced to accept it, it would probably be enough to undermine the appeal of the theory. Worse than that: it would be inconsistent with **Independence**.

## 9.1 Conflicting Powers

We can spell out the first problem more precisely as follows:

1. Powers are directed towards their manifestations (either manifested or unmanifested).
2. Manifestations exist (either manifested or unmanifested).
3. Truthmaking Principle: sentences or propositions are true because their truthmakers *exist*.
4. Manifestations are truthmakers for some sentences or propositions.
5. There are pairs of incompatible powers, *i.e.* two powers whose manifestations are truthmakers for a pair of contradictory sentences or propositions.
6. Therefore, there exist manifestations that make true contradictory sentences or propositions.
7. Therefore, there are true contradictions.

Premises 1. and 2. are central parts of my account, so they are non-negotiable in this context. Premise 5. seems incontrovertible, too: some powers conflict with other powers in the world, such that their respective manifestations would be incompatible.<sup>165</sup> Finally, I have formulated Dispositionalism in terms of truthmaking: it seems hard to give up on *that*.

One might hypothesise that 5. is not that problematic. For instance, we could think that conflicting powers are to be modelled using a vectorial space (as in Mumford & Anjum 2011), and what appears to be conflicting powers leading to mutually incompatible manifestations can always be mediated: that there is always a joint manifestation which is not itself contradictory. For instance, suppose that there are two particles, Andy and Bertie. Andy and Bertie have a certain mass. The manifestation of such power is a certain gravitational field, which in turn has the power to move the two particles towards each other. At the same time, they are both also positively charged, which results in some

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<sup>165</sup> This does not require the existence of two-ways powers of the kind invoked by Steward (2013) i.e. multitrack powers that have both M and not-M among their manifestations (like the rational powers in Arist. *Metaph.* IX 1046b). Of course, two-ways powers would incur in the same problem.

electromagnetic field that tends to repel one particle away from the other. Plausibly, one could think that there is also a joint power between Andy and Bertie's mass and charge, which results, say, in the two particles retaining their initial positions: so, in a way, these two conflicting powers did not result in a contradiction (*i.e.* Andy and Bertie both moving towards and away from each other), but in the manifestation of the resultant force. Even assuming that we can generalise Mumford and Anjum's vectorial solution,<sup>166</sup> this would clearly not dispel the problem, for the *non-joint manifestations* of the powers would still exist: the manifestation of their mass alone, and the manifestation of their charge alone, still *exist*.

Another solution would be to hypothesise that the identity of powers is to be understood as a complete and maximal set of conditionals of the sort 'if P is placed in this precise location of this maximal network of powers, then M would ensue. If P is placed in this precise location of this other maximal network of powers, then M\*...'. This is, I take it, roughly what Neil Williams (2019) has in mind when he speaks of the 'blueprint' of powers. But such a solution requires us to have a conditional or counterfactual understanding of the nature of powers, according to which stimuli play as much of a role in the identity of the power as their manifestations, whereas I have assumed so far Vetter's model, according to which stimuli (or mutual manifestation partners) do not constitute the identity of powers, so I will discard it.

I think there is a simpler solution to the problem, and it is to deny 6. More precisely, it is to deny that 6. entails that the principle of non-contradiction is violated. The law of non-contradiction states that:

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<sup>166</sup> It is far from clear that we can do that legitimately. Alexander Bird argues that powers in multi-dimensional quality spaces are nothing like three-dimensional space, and hence that vectorial additions cannot work: 'However, it is a mistake to think of a multi-dimensional quality space as analogous to 3-dimensional physical space. In principle, we can rotate objects such as a measuring rod in 3 dimensions so that they are intrinsically unchanged, and thus can measure distance in any of the dimensions. And so in 2- or more dimensional space, the various dimensions are measured in the same units. This allows us to set up a system of co-ordinates to locate the position of any object in space. The direction of a given vector,  $r$ , can be understood in terms of how much one has to rotate one basis vector,  $u$  (*e.g.* a unit vector along the  $x$  axis), so that  $u$  and  $r$  are parallel. But these features are not in general possessed by multi-dimensional quality spaces. The different dimensions (hot-cold and dry-damp) are not measured in the same units. There is nothing akin to rotating a measuring rod so that although unchanged it points in a different direction' (Bird 2016: 29)

It is impossible that the same thing can at the same time both belong and not belong to the same object and in the same respect, and all other specifications that might be made (Arist. *Metaph.* IV 1005b19–23).

Given the resources of possible worlds talk, the contradiction between alternative possibilities is avoided by relativising existence and truth to a world:  $x$ , the truthmaker for  $p$ , exists *at* some world  $w$ , and therefore it is true only *at w* that  $p$ . The fact that  $p$  is true at  $w$  and not true at  $w'$  is not a contradiction, because contradictions have to involve ‘the same respect’. Hardcore actualists renounce the idea that the fundamental notion of existence and truth are relativised to a world,<sup>167</sup> so they have to find another solution.

The relevant clause that hardcore actualists have to appeal to here is ‘at the same time’—not completely unlike those preoccupied by the puzzle of change. While diachronic changes do not produce contradictions because they have different temporal locations (Marzia is swimming at 3 and not swimming at 4), unmanifested manifestations, being mere logical existents, do not produce contradictions because they do not have a temporal location at all. So, even assuming that there are two incompatible states of affairs, they couldn’t make it true that something is the case and not the case *at the same time*. They are simply indeterminate under that respect: they are not dated. Since the unmanifested manifestations are not located in space and time, they will not be able to make true a pair of dated propositions, needed to produce a contradiction, such as <Marzia swims at 3 on 25/04/2019> and <Marzia does not swim at 3 on 25/04/2019>, but only <Marzia swims> and <Marzia does not swim>. That is not a contradiction—or it would make diachronic change contradictory, too. Only concrete entities have a location, and hence we only need to make sure that it is not the case that both mere logical existents can be

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<sup>167</sup> To be fair, this is a bit too rushed—we do not need to say that hardcore actualists are using a different notion of truth than their foes, be them possibilists or software actualists. Indeed, saying so would make the discussion much harder. We can just say that hardcore actualists cannot exploit the relativisation of truth at a world to solve the problem of conflicting truthmakers of possibility claims, because there is only one world, so even if the notion at hand is the same, it cannot do any meaningful work.

actualised at the same time. This, I think, partially alleviates the tension, but it does not fully dispel the uneasiness.

The deeper root is this. What about propositions about abstract entities? Does this mean that there cannot be contradictory pairs of propositions about them? That would be an unwelcome result—clearly,  $\langle 2+2=4 \rangle$  and  $\langle \neg(2+2=4) \rangle$  are contradictory, even if their truthmakers do not have a spatiotemporal location. Possible world theorists have an easy time here: they only need to assert that  $2+2=4$  holds at all worlds, and any proposition that  $2+2=5$  must hold at some world, and hence the contradiction can be properly formulated because it concerns the same respect (namely, the world  $w$  where they both hold). Keeping with the analogy with time, Dispositionalists should say that  $2+2=4$  holds at all times. Perhaps it is not too unreasonable to argue that necessary truths hold at all times, and so we can explain the contradiction involved in the mathematical example even if numbers are abstract.

The question is: why this should not carry over to mere logical existents, and thus invalidate the initial reply? How are we to account for the difference between truths about *abstracta* and truths about mere logical existents? I think that the difference between the theory of truthmaking that I have to adopt to deal with truths about abstract entities and the one for truths about concrete ones goes deeper than the issues of contradictions, and is revealed in its magnitude by the second puzzle. Let's take a look at it first; hopefully, the solution to it will also make clear how I intend to account for the difference between the contradictions involving abstract entities and the lack of contradictions involving mere logical existents.

## 9.2 Megarian Actualism

The simplest formulation of Truthmaking Principle runs as follows:

$$\mathbf{TM}: A \rightarrow \exists x \square (\exists y x=y \rightarrow A)$$

Roughly, it states that for every true proposition, there is an entity which necessitates its truth. Many have disputed that necessitation is too coarse-grained to make sense of truthmaking (everything whatsoever would be a truthmaker for all necessary truths, for instance); there are more credible alternatives on the market,<sup>168</sup> but since they do not help in solving the problem I am about to introduce, we can run with the naïve, more familiar formulation for the time being.

The problem for my theory is that, if we take that *what exists simpliciter* determines *what is true simpliciter*, then from the fact that everything that possibly exists does in fact exist (Ontological Maximalism), it follows that everything that is possibly true is, in fact, true. So, for instance, Williamson notes that the Truthmaking Principle and Necessitism sit very uncomfortably together:

The inconsistency can be made plain in terms of Kripkean model theory with variable domains where all worlds are mutually accessible. TM requires the formula A to be true at a world only if its domain contains an individual  $o$  such that A is true at every world whose domain contains  $o$ . Thus the domain of every world contains  $o$  only if A is true at every world. Hence if all instances of TM are true in a model with a constant domain, every formula of the language is either true at every world or false at every world (on a fixed assignment). The combination of TM and necessitism is incompatible with contingency... the truthmaker principle drags us from the non-contingency of being to the non-contingency of truth (Williamson 2013: 393).

The situation is not very different for the Dispositionalist, provided that we are ontologically committed to the existence of unmanifested manifestations, and that we accept that possibility claims are grounded in powers. We seem to be committed to the disastrous:

**BAD:**  $\diamond p \rightarrow p$

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<sup>168</sup> For instance, invoking relevant entailment (*e.g.* Restall 2000), projection (Smith 1999. See Schnieder 2006), and more recently, some hyperintensional notions such as grounding (Correia & Schnieder 2012; See Fine 2015).

This would obviously be very troubling for Dispositionalism. Even if we avoid overt contradictions by appealing to the temporal indeterminacy of mere logical existents, we still derive a very unpalatable principle. This is still unacceptable, for not only is the principle independently implausible, but it would also entail Megaric Actualism. This is because Dispositionalism, if it aims at grounding alethic modality, is committed to axiom T (Vetter 2015; Kimpton-Nye forthcoming):

$$\mathbf{T}: \Box p \rightarrow p$$

which is formally equivalent to the principle ‘ad esse ab posse’:

$$\mathbf{T}: p \rightarrow \Diamond p$$

From T and BAD it follows that something is possible if and only if it is the case:

$$\mathbf{Megaric\ Actualism:} \Diamond p \Box p$$

But Megaric Actualism is incompatible with the minimal metaphysics of powers, because it entails the negation of **Independence**, which is one of the core principles of the minimal theory. We need to tweak or reject Truthmaking Principle.

There is a very obvious strategy to avoid BAD: we need to add a further clause to the truthmaker principle. What is true cannot be a matter of existence *simpliciter*. It should be a *qualified* way of existence that makes truths true. In short, we need to reformulate TM<sup>169</sup> according to the schema:

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<sup>169</sup> As I have said at the beginning of the section, in what follows I will employ and modify a truth-making principle cashed out in terms of necessitation simply because it is the most common and familiar—this does not mean that I am suggesting that it is the right formulation of the principle.

$$\mathbf{TM^*}: A \rightarrow \exists x \square ((\exists y x=y \wedge Fx) \rightarrow A)$$

for some condition  $F$ . The proposal raises two concerns:

- A) What property should we appeal to?
- B) Is this a legitimate move, or does it miss some key point of truthmaking?

Given the categorial framework I have presented, a plausible candidate to answer question

A) is suggested by the very formulation of the basic principle of Dispositionalism, **DPoss**:

**DPoss**: ‘possibly  $p$ ’ is true iff and because there is some potentiality whose manifestation, *if manifested*, would make ‘ $p$ ’ true.

The principle contains the clause ‘if manifested’. ‘Possibly  $p$ ’ is made true, according to **DPoss**, by the power tending to what *would be* the truthmaker of  $p$ —an entity which we are already committed to ontologically. Presumably, however, this same entity does not make true that  $p$ , *simpler*. The intuitive metaphysical reason to formulate **DPoss** as it is is that, if the unmanifested manifestation could make ‘ $p$ ’ true, it would thereby also make ‘possibly  $p$ ’ true, as long as we are committed to *ab esse ad posse*. This would make powers completely redundant. They would not be the truthmakers of possibility claims anymore: rather, it would be their manifestations, simply in virtue of existing.<sup>170</sup>

According to the theory proposed here, to become manifested just is to become concrete, that is, spatiotemporally located. So, the first proposal is to modify truthmaking as follows:

$$\mathbf{TM\ SpaceTime}: A \rightarrow \exists x \square ((\exists y x=y \wedge \text{Located}(x)) \rightarrow A)$$

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<sup>170</sup> Thanks to Lorenzo Azzano for pressing me on this.

Since unmanifested manifestations are not, by definition, located, they would not make any proposition true, therefore avoiding validating BAD.

The proposal is not without its shortcomings and costs. In particular, by imposing the condition that truthmakers have to be located in spacetime to make the corresponding relevant propositions true, it makes it hard to see how there could be truthmakers about *abstracta*. Abstract entities are not located in spacetime—which means that they cannot be the kind of entities that make propositions true. Yet, surely there are truths *about* abstract entities: that five is the successor of four, that two is prime, that there are sets, etc. are all true. But if the abstract entities that these sentences are ostensibly about are not their truthmakers, then what could make them true? Do we have to abandon the idea that every truth is made true by a truthmaker?

I would rather avoid rejecting Truthmaking Maximalism. Although I agree with Cameron (2019) that Truthmaking theory is not a theory of truth—that it, it does not aim to tell us what the property of being true *is*, nor what it is to be true—I find it hard to see what could possibly be the appeal of truthmaking if we give up on Maximalism: how can we ‘catch a cheater’, for instance (Merricks 2006), if the theory can have exceptions? Of course, this is a far cry from a conclusive or convincing argument in favour of Truthmaking Maximalism.<sup>171</sup> I will just stipulate that *ceteris paribus* a Maximalist form of Truthmaking is better than a non-Maximalist one. If this assumption is not shared by the

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<sup>171</sup> A more interesting argument has recently been offered in the form of a dilemma by Jago (2012; 2013), which fits perfectly our case. In short, his dilemma is built around the case in which there are truths which supposedly do not require truthmakers that are nevertheless necessitated by truths that do. The case of my theory of powers fits perfectly in this category, so if Jago’s argument is successful, we have a good reason to think that it applies to the case under consideration.

reader,<sup>172</sup> they are free to just avoid the problem currently at hand by rejecting Maximalism and simply stipulate that MLEs are not truthmakers.

### 9.3 Truthmaking Reconditioned

Is there any option which does not involve rejecting Truthmaker Maximalism? Admitting that these sentences lack truth-value would be disastrous. Does TM-ST force us to provide concrete truthmakers for truths about *abstracta*? Even assuming that the project is feasible (which is dubious), its success would raise serious concerns about the status and role of abstract entities: if they cannot even serve as truthmakers for claims concerning their existence, what theoretical role do they play? Are they not completely explanatorily idle?

I think that the solution offered, that is, to invoke the additional clause of spatiotemporal location, can be fixed and allows us to retain some version of truthmaking. Its main shortcoming is that it makes it hard to see how there could be truths about abstract entities, if these could not act as their truthmakers. It presents us with a dilemma with very unlovely horns: either there are no truths concerning the *abstracta*, or they are made true by concrete entities.<sup>173</sup> A similar argument could be construed with regard to certain sentences about merely logical existents, such as ‘There are mere logical existents’; since these are not, by definition, spatiotemporally located, they could not be the ST-truthmakers of the claim. My (admittedly, sketchy and speculative) proposal goes as follows.

In order to formulate my theory of being in potency, I admitted a primitive essence operator,  $\Box_x$ .  $\Box_x(p)$  was informally read as ‘ $p$  is true in virtue of the nature/essence of  $x$ ’. So far, I have treated the operator as simply a device which *selects* a special subset of truths. This assumed that  $p$  was already true, and that the Finean operator simply was needed to

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<sup>172</sup> They would have good reasons to think that Maximalism should be abandoned: Truthmaking’s woes to deal with negative existential sentences, as well as universally quantified sentences in an infinite domain (where a substitutional account of quantification won’t do) are well known. See Armstrong (1997); (2004), Molnar (2000), Beall (2000), Dodd (2017), Mumford (2007), Parsons (2006), Schaffer (2010), Simons (2005); (2007). Another particularly thorny case is the truthmaker version of the Liar paradox: ‘This sentence does not have any truthmaker’. For discussion of this case see Milne (2006); (2013); Rodriguez-Pereyra (2006); De Sa & Zardini (2006).

<sup>173</sup> It should be clear here that the solution to this problem is going to solve also the first puzzle presented above.

demarcate the special sentences from the rest. But one could also think that the essential operator has a more robust role: it *makes* the sentence true. We should not think of the Finean essence operator as a compound of some general notion of ‘true in virtue of’ and a general notion of ‘the nature of’—the operator is primitive (Fine 1995b, Romero 2019). If this is so, then not all sentences or propositions owe their truth to TM-ST: some are true in virtue of essences.

Assuming that the truthmaking principle is not formulated in terms of essences (*contra* Lowe 2006), we could maintain that there is a *plurality* of devices and relations that bestow truth—and that the truthmaking principle (understood as the link between plain or qualified *existence* and truth) is just one among them. That is, I suggest that we could be pluralists as to *why* a proposition is true: it could be true *because* its (ST-)truthmaker exists, or because it is made true by the essence of something.

Recently, Adam Griffith defended a pluralist theory of truthmaking which might line up nicely with my proposal. He notes that:

what distinguishes truthmaking pluralism from standard approaches to truthmaking is that it rejects an assumption made by most parties in the debate over truthmakers. It is the assumption that there is exactly one truthmaking relation and that it is a non-plural, non-determinable, and non-multiple-realizable relation that holds between each truth (that needs a truthmaker) and its truthmaker (Griffith 2015: 1160).

Rejecting ‘truthmaking monism’ and adopting, instead, Griffith’s domain-based truthmaking pluralism seems to take us in the right direction:

**Truthmaking Pluralism:** For each different domain of propositions  $D_1, \dots, D_n$  apt for truthmaking, there is a different relation  $R_1, \dots, R_n$  that serves as the truthmaking relation TR for the truths in  $D_1, \dots, D_n$ . Relations  $R_1, \dots, R_n$  are characterized or defined by the principles of truthmaking  $TM_1, \dots, TM_n$ , respectively.

Of course, I only distinguish two domains: those concerning spatiotemporally located entities, and those concerning non-located entities. Since truthmaking is *not* a theory of truth (Cameron 2019), that is, it does not purport to analyse truth nor explain what truth consists in, truthmaking pluralism does not entail alethic pluralism (the entailment seems to hold in the opposite direction, though).

We can, then, offer a first attempt of our pluralist theory of truthmaking:

$$\mathbf{TMV}: A \rightarrow (\exists x \square ((\exists y x=y \wedge \text{Located}(x)) \rightarrow A)) \vee \exists x \square_x A^{174}$$

Importantly, there is no spatio-temporal location constraint imposed on the second disjunct: some truths might hold in virtue of the essences of *abstracta*. If it could be shown that *all* truths about abstract objects are true in virtue of the essence of abstract objects, TMV might be able to account for every truth. This, in turn, would allow us to maintain that there are no ungrounded truths floating free of being. That is, while it seems implausible that TM-SpaceTime could do the work required to a maximalist<sup>175</sup> truthmaking theory, TMV might be up to the task. It is worth to note that invoking essences would not compromise the task of ‘catching ontological cheaters’ (Merricks 2006), for we are committed to the existence of the arguments of the essence operator (see Fine 1994; 1995, Teitel forthcoming).

Despite the fact that truthmaking pluralism does not commit us to alethic pluralism, some might feel uneasy about TMV. Surely the link between Truth and Being cannot be gerrymandered and so inelegant! Some of these worries will be due to the long-standing and deep-rooted prejudices against disjunctions, and as such they can be easily dismissed.

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<sup>174</sup> It is important that we do not read the disjunction as exclusive, or we would thereby deny that concrete entities can have essences—which is a substantial thesis that we better keep out of our principle of pluralist truthmaking.

<sup>175</sup> As Griffith (2015) notes, truthmaking pluralism does not entail a commitment to truthmaking Maximalism.

Others might be more warranted. While a thorough exploration of these themes would take us too far astray, let me say a couple of things that hopefully will help mitigate the queasiness.

Griffith distinguishes between *strong* and *moderate* varieties of pluralism:

Strong truthmaking pluralism says that there is more than one truthmaking relation and denies that the various truthmaking relations are unified in any substantial way... For the strong truthmaking pluralist, truthmaking would be disjunctive... According to moderate truthmaking pluralism, there is more than one truthmaking relation, but these various truthmaking relations are unified in a substantial way (Griffith 2015: 1161).

He maintains that in order to be ‘unified in a substantial way’ it is enough that all the truthmaking relations play the same theoretical role in our metaphysical theorising, which can be captured by the following list of principles:

- a) Truthmaking is the relation of being true in virtue of.
- b) Truthmaking connects representation (*i.e.*, truth-bearers) to reality.
- c) Truthmaking entails ontological priority: truthmaking grounds what is less fundamental (true propositions) in what is more fundamental (what exists).
- d) Truthmaking is not a purely modal relation (as necessitation or supervenience are).
- e) Truthmaking is an explanatory relation, *i.e.*, an entity that stands in the truthmaking relation to a proposition explains the truth of that proposition.
- f) Truthmaking is a relation of non-causal ontological dependence.

All of the above apply also to our case: despite the name, TMV is more unified than a mere disjunction. A thorough discussion of truthmaking would require a thesis-long independent treatment; however, the key point that I hope to get across is that there are ways to accommodate the theory I have developed in the last few chapters with (some version of)

the truthmaking principle: we can admit incompatible tropes into our ontology without thereby verifying BAD.

#### 9.4 Preserve the Letter at the Expense of the Spirit?

This leaves us with the last question, namely B: Is the strategy that I have sketched a legitimate move, or does it miss some key point of truthmaking? This point was raised by Williamson (2013). Necessitism is, quite evidently, incompatible with the conjunction of TM and the denial of the schema  $A \rightarrow \square A$ : truthmaking leads from the non-contingency of being to the non-contingency of truth. He considers an amendment to TM analogous to the one that I have proposed:

Someone might try to reconcile TM with necessitism by interpreting the explicit quantifiers in TM as restricted, say to concrete things... On the restricted principle, each proposition strictly implies the concreteness of something whose concreteness strictly implies that proposition (Williamson 2013: 401).

Against the proposal, Williamson writes that

[s]uch a reinterpretation preserves the letter of TM at the expense of the spirit. For on the truthmaking view at issue, if an object  $o$  is a truthmaker for the proposition that this tile is square, then  $o$  itself—not its possession of a property unnecessary for its being, such as concreteness—is sufficient for this tile to be square. For if the required sufficient condition is just for a given object to possess a given property that may be unnecessary for its being, we need look no further than the tile itself and its possession of the property of squareness. Thus the proposed reinterpretation of TM not only misses the spirit of truthmaker principle but undermines its motivation (Williamson 2013: 401).

I will offer just two quick observations to the effect that his point is not very cogent. The first, at the price of sounding pedantic, is that we do not need to modify TM as invoking existence *and* the possession of a further property, as I did with TM-SpaceTime. We could also adopt a restricted quantifier. That is, we can introduce a restricted existential quantifier

$\exists_L$  such that it applies to all and only spatiotemporally located entities, and thus reformulate TM as

**TM-SpaceTime\***:  $A \rightarrow \exists x \square ((\exists_{L,y} x=y \rightarrow A)$

But, more to the point, I think that Williamson's argument has the feeling of a slippery-slope fallacy. It is one thing to admit that *one specific* property (concreteness, or spatiotemporal location) does the heavy-lifting in truthmaking; it is quite another thing to say that if we admit anything but existence, we can completely trivialise truthmaking by allowing *any property* to complement existence (such as the squareness of the tile, the whiteness of the tile, and so on). Compare the case with McDaniel's (2017) metaontology of 'fragmented being', according to which there are multiple primitive restricted quantifiers in Ontologese, and the unrestricted one is just a disjunction of them. Just because there are fundamental restricted quantifiers, we should not be allowed to think that *any restricted quantifier whatsoever* is fundamental. Analogously, we need not think that any property whatsoever could restrict truthmaking, but spatiotemporal location (or concreteness) could.

Why should we think that this is the case? A blunt and brazen answer would be: because spatiotemporal location is the key factor in the schema that I maintain provides the best framework for powers ontologies, while being square or white, as Williamson's tile, is not. In other words, being spatio-temporally located is joint-carving or structural (Sider 2011), according to my theory. This is not as question-begging as it might first seem. Note that even in the original formulation of truthmaking it is not existence *simpliciter* that is involved—rather, it is existence *at a world*: it is true at  $w$  that  $p$  if and only if  $p$ 's truthmaker exists *at w*. Of course, proponents of truthmaking and possible-world talk will be quick in pointing out that existence at a world (just like truth at a world) is the more fundamental notion.

But why should we think *that*? The only reason I can see is that it allows us to enjoy the bountiful fruits of possible-world semantics. It is in virtue of possible worlds semantics

and its theoretical merits that philosophers have felt warranted in adopting truth-at-a-world and existence-at-a-world as fundamental notions. So why shouldn't the friend of powers avail herself of a similar move, with regard to the fourfold schema and spatiotemporal location? This is nothing more than a *tu quoque*, mind you. But I suspect it is a somewhat persuasive fallacy, in this dialectical context.

Here's a less eristic way to make the same point. I want to say that the schema I have provided in §6 is the best conceptual framework for a metaphysics of powers. i) If this is correct, and ii) if powers really are the building block of the world or at least they are among its fundamental materials, and iii) if we think that there are no true contradictions, *then* the four-fold schema has to capture the structure of the world, or at least part of it.<sup>176</sup> If the minimal metaphysics is the correct one, spatiotemporal location and essence have to be joint-carving, in Sider's (2011) sense of the word. I am tempted to say that the schema I have offered represents the minimal ontological categories that a powers ontology requires (at least in the sense of the most general categorisation required to make sense of the world) and that spatiotemporal location and flexibility are the two basic factors for a factored ontology (in the sense of Simons 2012; 2018) suited for the needs of powers, but properly defending this claim would sidetrack the main discussion excessively,<sup>177</sup> so I will not commit to that claim. I will simply contend, for the purposes of this discussion, that there are good reasons to think that spatiotemporal location allows us to draw a very special and privileged demarcation of entities, in a way that not every predicate can. If this is so, then the adoption of something like TM-ST is not *ad hoc* as it might first seem. Similarly, if the Neo-Aristotelian paradigm in which Dispositionalism is broadly speaking situated is true, essences are very special, and therefore the essence operator should have a privileged

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<sup>176</sup> I want to say that the four-fold schema represents the minimal required framework for a metaphysics of powers, not that it is exhaustive. Plausibly, there will be other factors that have to be added in order to map the structure of the world.

<sup>177</sup> It would require offering some account of what, exactly, is an ontological category, and defending the controversial claim that entities do not necessarily belong to one. See Westerhoff (2005) for an argument to the effect that categories are not necessary or essential (but note that his conception of ontological categories might be too lightweight and pragmatic for my purposes, and so I most likely could not accept his argument for the contingency of categories).

role in our fundamental ideology: so, perhaps, adopting TMV is not so unreasonable or gratuitous.

## 9.5 Conclusions

The interaction of my minimal theory of powers with truthmaking is not straightforward: there are problematic consequences that threaten the viability of the theory; first of all, claiming that manifestations exist *simpliciter* can cause troubles when we recognise that there are pairs of conflicting powers, whose manifestations would be the truthmakers for pairs of contradictory truths. Secondly, if we admit that all unmanifested manifestations exist *simpliciter*, and they are truthmakers, then a Dispositionalism grounded on the minimal metaphysics risks to entail that whatever is possible is also the case—a form of Megarian Actualism which would contradict one of the principles of minimal metaphysics. However, these consequences can be resisted. We can tweak Truthmaking in a way that is consistent with the metaphysics of powers by recognising that there are multiple truth-making relations that obey different principles: in particular, by recognising that in a quasi-necessitist ontology such as the one envisioned by my minimal metaphysics, existential truthmaking cannot be concerned with existence *simpliciter*, but rather with concrete existence, and that essence is more than just a function selecting subsets of truths, but it is a *distinct truthmaking principle*: the reading of the essence operator given by Fine, ‘ $p$  is true in virtue of the nature of  $x$ ’, should be taken seriously and the emphasis should be on ‘is true in virtue of’ as much as ‘the nature of’.

This tweak of truthmaking that I have suggested sits quite naturally with the overall Neo-Aristotelian framework that the theory is embedded in: the key elements of the Neo-Aristotelian conceptual scheme (namely, the four-fold schema of minimal metaphysics and essences) are those that do most of the heavy-lifting. Developing a worked out theory of truthmaking goes well beyond the scope of this dissertation: they will have to be the topic of future work. However, I think that the suggestions presented in this section offer a promising way out of the two difficulties mentioned above.

## Chapter 10. Independentist Troubles for Dispositionalism?

In the previous chapters, the tension between two core tenets of powers ontologies were at centre-stage: on the one hand, **Directedness**, the thesis that powers are *for* something; on the other hand, **Independence**, the view that powers can exist unmanifested. I hope that the tension has been dispelled by recognising the existence of unmanifested manifestation, and the clarification of their ontological status as non-essentially non-located entities—mere logical existents.

However, the tension with **Directedness** is not the only trouble caused by **Independence** for the project of Dispositionalism. There is the additional worry that **Independence** will interfere with the grounding of necessities. Indeed, some philosophers (most notably Mumford & Anjum 2011; 2018) think that ‘cases of necessity are never cases of dispositionality’ (Mumford & Anjum 2011: 177) because the modality conferred by powers is *sui generis* and always short of necessity. This is precisely due to the ineliminable possibility, supposedly granted by **Independence**, that powers are prevented from bringing about their manifestations. In short, they argue that **Independence** just is, or entails **Tendency**. **Tendency** would hamper the ambitions of even a modest form of Dispositionalism: if the minimal metaphysics of powers that I have presented so far entailed **Tendency**, it would not be a good metaphysics of powers *for Dispositionalism*.

So, if we want to develop a metaphysics of powers suitable for Dispositionalism, we better take a closer look at **Independence**, and find a way to grant the core principle without thereby compromising our ability to ground necessary truths; that is, we need to show that we can uphold **Independence**, which is part and parcel of the minimal metaphysics of powers, without having to buy **Tendency**, too.

The plan for this chapter will be as follows: I will first distinguish between two formulations of **Independence** and pick the most apt for framing the problem (§10.1). I will then show that **Tendency** follows from **Independence** if we accept that the (suitably formulated) principle is constitutive of powers *qua* powers (§10.2-3). This presents the

dispositionalist with two tasks: first, she must provide an argument to the effect that **Independence** is not constitutive to powers *qua* powers, and secondly she must provide an alternative theory about the source of **Independence**, in a way that preserves the principle's key role in the metaphysics of powers but does not hamstring the ambitions of Dispositionalism from the get go.

I will take on the latter task first, and present two models to explain the link between powers and **Independence**: Simple Degree Theory (§10.4-5) and Two-Tiered Degree Theory (10.6), and I will argue that the latter is to be preferred. Thus, whether **Independence** entails **Tendency** depends on what we take to be the source of the former: the nature of powers, or the fact that they come in degrees. Finally, I will turn to the first task: should we accept or reject the thesis that **Independence** is constitutive of powers *qua* powers? I will conclude (§10.7-8) that, on the basis of arguments from theoretical virtues, it is preferable to think that **Independence** is grounded in the degree of powers.

### 10.1 ‘Declare Independence’

I have often expressed **Independence** simply by the slogan: ‘powers can exist without bringing about their manifestation’ and, after settling for the Actualisation Route, ‘manifestations can exist unmanifested’. To see how this idea might interfere with Dispositionalism’s project of grounding necessities, we need to characterise the principle a bit more carefully. There are two ways to cash out the principle more precisely: one in non-modal terms, and one in modal terms. Assuming that we understand what it is for a manifestation to be actualised according to the theory presented in the previous chapters, we can spell them out as follows:

**IND-A:** For some power P such that P is directed at M, P is spatiotemporally located and M is not spatiotemporally located.

**IND $\diamond$ :** For some power P such that P is directed at M, *it is possible* that P is spatiotemporally located and M is not spatiotemporally located.

So far, I have largely employed IND-A. However, it is not the most commonly adopted among friends of powers<sup>178</sup> and there might be reasons for preferring the modal version. The main one is this: some philosophers think that **Independence** is *constitutive* of what it is to be a power. For instance, Mumford writes that ‘the possibility of unmanifested existence seems essential to being a dispositional property even though we can make sense of a disposition that is continuously manifested’ (2006: 481. See also Giannini & Mumford forthcoming). If this is the case, then it should concern *every* power whatsoever. IND-A merely states that *some* powers happen not to be manifested, so it would appear to have an insufficient scope: we should reformulate it using the universal quantifier. But extending IND-A to all powers would be absurd: it would entail that every power in fact fails to manifest. This would simply force the world to a halt. Since, evidently, this is not the case, a universally quantified IND-A is just false. This seems an exceedingly uncharitable argument to conclude that Independence is not a constitutive principle for powers, however: it’s too easy and too quick an argument for excluding that Independence is not part of what it is to be a power. On the other hand, generalising IND $\diamond$  does not entail anything like the world freezing over—it would simply allow the *possibility* of it happening, which, if we believe in the legitimacy of Shoemaker’s (1969) famous thought-experiment, should be conceded.

Secondly, some philosophers are attracted to **Independence** by an intuition about counterfactual states of affairs, rather than the mere empirical idea that some powers do not act. What they have in mind is that even though a given power P has been successfully exercised, *it might nevertheless have failed to do so*. For instance, Mumford & Anjum (2011:53, my emphasis) think that ‘when a causal process is interfered with or prevented in the token case, concerning individual events, it may prevent causation from ever occurring. *But, even if*

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<sup>178</sup> For instance: ‘Powers *can* exist in the absence or in the presence of their manifestations’ (Molnar 2003: 82; my emphasis).

*it did not, it could have done*. Obviously, IND-A is not enough to make justice to this intuition: the fact that some powers actually fail to manifest does not seem to justify, on its own, that those which did successfully bring about their manifestations could have failed, too.<sup>179</sup> It is hard to account for such intuitions, if all we can say about **Independence** is that in some cases powers actually have failed to bring about their manifestations.

Why have I adopted IND-A so far, then? Apart from mere reasons of convenience (we could spell out Too Much Possibility more perspicuously, having one modal operator less to worry about) the main reason behind my choice was due to the following worry. The modalised principle of **Independence** is *prima facie* hard to square with the very project of Dispositionalism. According to Dispositionalism, the modal facts expressed by sentential operators such as ‘◊’ and the corresponding possibility talk in natural languages are grounded in the local properties, namely, powers. Powers ground global modality; but at the same time one of the key principles that supposedly characterises *what it is to be a power* is formulated in modal terms. How can this work? It would seem that if we try to paraphrase the possibility in IND<sup>◊</sup> in terms of powers, we end up in a regress similar to the one discussed in §6.4 with reference to the Williamsonian characterisation of mere logical existents as *contingently* non-located entities, with the effect that in order to understand what it is a power we need to invoke a further power, *ad infinitum*.

I suggest that the analogy is not perfect, and the regress raising in connection to IND<sup>◊</sup> might not be vicious. Perhaps, it is even to be expected.<sup>180</sup> The goal of §6.4 was to clarify what it is for a manifestation to be unmanifested—what is the mysterious property of being in potency. This is a question we expected to make some progress with: what it is to be in potency was genuinely an obscure notion that we assumed we could get a better

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<sup>179</sup> Of course, we can justify the counterfactual claim by supplementing IND-A with some other principle — perhaps one invoking the fact that shared kind-membership entails shared modal properties (this point was inspired by a paper by Tom Schoonen). Still, the intuition matches much more naturally with IND<sup>◊</sup>.

<sup>180</sup> Simons (2018) observes, in connection with Lowe’s four-categories, that one of the most revealing symptoms of the fact that we are dealing with bedrock phenomena is that it is almost impossible to avoid starting regresses.

grasp on. On the other hand, I have stated already in the Introduction that I take powers to be primitive and un-analysable. But if we concede that **Independence** is supposed to be a constitutive part of what it is to be a power, is it really surprising that it cannot be spelled out without involving powers? Aren't we setting the bar too high, demanding that a (supposedly) key component of what it is to be a power be elucidated without invoking powers? Compare the case with that of essence. We can obviously ask for the essence of various entities, and demand an informative answer, but if we are to investigate the essence of essence itself (or the essence of the essence-operator)<sup>181</sup> we should not be surprised if the answer cannot be formulated without including the notion of essence itself.<sup>182</sup> But that just indicates that the term is a primitive! Similarly, it could be argued that  $\text{IND}^\diamond$  will contain a modal operator to be reduced to powers because powers are primitively modal, and **Independence** constitutes their nature. So, if we think that **Independence** is constitutive of what it is to be a power or anyway very closely intertwined with their natures, then we should not be too scared of the regress: we should not try to analyse the notion anyway.

Does this mean that  $\text{IND}^\diamond$  is to be adopted by those who think that the principle is constitutive of being a power, and  $\text{IND-A}$  by those who deny this, so that not only we find ourselves at a dialectical stand-off, but the two parties are talking past each others? I think that the standoff can be avoided, and that the two parties can meaningfully disagree without talking past each other:  $\text{IND}^\diamond$  can be adopted even by those who do not think that it is constitutive of what it is to be a power. To see why this is the case, simply consider that Dispositionalism supposedly grounds a logic as strong as T (Vetter 2015), if not S4 (Yates 2015) or even S5 (Kimpton-Nye 2019). Given T, we can derive  $\text{IND}^\diamond$  from  $\text{IND-A}$  very trivially: actuality entails possibility. So, given that there are unexercised powers and

<sup>181</sup> I assume that the question is legitimate—not that a good answer can be given. See Hale (2013) for the idea that operators have essences, and Wallner (forthcoming) for a prolonged discussion on the regress that ensues. Many thanks to Michi Wallner for discussions on this point.

<sup>182</sup> I assume here, as I did throughout the dissertation, that essence cannot be analysed in modalist terms. See Torza (2015) for a rigorous generalised argument against modalism.

unmanifested manifestations, it follows that it is possible for some powers to be unexercised. Therefore, in what follows, I will adopt the modalised version of Independence, and assume that it does not result in a vicious regress for Dispositionalism. The question concerns, then, the scope of IND $\diamond$ : those who think that Independence is constitutive of powers will insist that it holds universally, whereas those who think that Independence is not part of what it is to be a power will have the option of denying this.<sup>183</sup>

## 10.2 The Independence Problem for Dispositionalism

Why should we be interested in whether **Independence** holds constitutively of all powers or not? The reason is quite simple: those who think that IND $\diamond$  is a constitutive aspect of powers have to claim that **Independence** entails **Tendency**. More relevant to the point of this dissertation, if **Tendency** holds, then powers are not in a position to ground any necessity, and hence the whole dispositionalist project is at risk. That is to say, I will suggest that the following hold:

**Independence to Tendency:** If Independence is constitutive of what it is to be a power, then Tendency holds of all powers.

**Tendency to Contingency:** If Tendency holds, then powers cannot ground necessary truths.

In this section, I will try to spell out their reasons to think that these two theses holds. We can make their starting point more precise by formulating the view of **Independence** advocated by those who think the principle is constitutive as follows:

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<sup>183</sup> Of course, the disagreement is deeper and persists even if both parties agree that Independence holds necessarily of all powers: questions about constitutive principles are hyperintensional. However, I will argue that the disagreement is plausibly reflected even just at the extensional level.

**INDE:** It is true in virtue of the nature of powers that, for every power P, it is possible that P obtains and its manifestation, M, does not (is not manifested).

Given the way I have elucidated what it is to obtain or being manifested, we can reformulate the principle thus:

**INDE\*:** It is true in virtue of the nature of powers that, for every power P it is possible that P is spatiotemporally located and its manifestation M is not spatiotemporally located.

The most fervent proponents of INDE are Stephen Mumford and Rani Anjum. In their latest book, they endorse the idea that:

when there is a tendency towards E, without anything necessitating that it is so, E can be produced. It also means that there can be a tendency towards E, and yet E is nevertheless not produced, even though nothing was stopping it... The deeply tendential view that we offer suggests, in comparison, that the conditions can be non-trivially right for a certain effect, but that the effect still does not occur. This would not be because, as with the external principle of tendency, there is some external additive interferer that prevents the cause from realising its effect. With the internal principle, there is nothing that prevents the effect from occurring, but still, it need not occur, just because the modal nature of the cause is internally tendential (Mumford & Anjum 2018).

They think that accepting that powers are essentially independent means that they are essentially tendential, that is, that they confer a *sui generis* kind of modal force which is always short of necessity. This is an endorsement of **Independence to Tendency**. Powers cannot necessitate their manifestations directly, by pointing at them very strongly, as it were. But this is not all: there is a further, surprising consequence. According to Mumford and Anjum, not only powers cannot ground necessities on their own by pointing at them very strongly, but they are *utterly incompatible* with any kind of necessity: ‘the possibility of prevention leaves no room for any kind of necessity in causal production’ (Mumford &

Anjum 2011: 53). In a simplified slogan: where there are powers there is no necessity, and where there is necessity there are no powers. This is a surprising upshot, and it might well seem to be too quick and dramatic. That is to say, Tendency entails contingency. How do they justify these two theses?

Let's start by considering **Independence to Tendency**. From INDE we can trivially derive the following:

**Universal IND $\diamond$** : For every power P such that P is directed to M, *it is possible* that P is spatiotemporally located and M is not spatiotemporally located.

Universal IND $\diamond$  denies the existence of *surefire*<sup>184</sup> powers: that is, powers that cannot fail to bring about their manifestations. Rejecting surefire powers, in turn, trivially prevents us from understanding necessary statements as those made true by the manifestations surefire powers. That is to say, Universal IND $\diamond$  is inconsistent with the 'Naïve Dispositionalist Necessity' thesis, which can be spelled out thus:

**Naïve Dispositionalist Necessity**: 'Necessarily  $p$ ' is true iff there is some power P such that its manifestation M would make  $p$  true and P necessitates that M is spatiotemporally located.

We can read Mumford and Anjum's arguments against Causal Necessitism (Mumford & Anjum 2011: §3) as an attack against Naïve Dispositionalist Necessity: 'any causal process can be prevented or interfered with in some way as to affect the outcome' (Mumford & Anjum 2011: 53). But how are we supposed to get from the denial of Naïve Dispositionalist Necessity to the more surprising **Tendency**, and from there to universal contingency?

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<sup>184</sup> By this I mean powers that could bypass or be unaffected by any opposing power. I am not sure who used this expression first, but hopefully it is common enough not to need additional clarifications. See for instance Jaag (2014) and Williams (2019).

Surely, even if there is no *causal* necessitation, the effects (manifestations) might be necessary for other reasons. For instance, we can intelligibly reject Causal Necessitism and nevertheless hold that everything happens by necessity because logical Fatalism is true. Or maybe, even though every power to shatter the vase can be prevented, there is a vase-hating omnipotent deity that makes it the case that every vase is shattered miraculously, independently of anybody's causal contributions. And so on.

And yet, on more careful consideration, we can see that the stronger<sup>185</sup> thesis holds: if we adopt INDE, we have to conclude that powers are incompatible with necessity *simpliciter*.<sup>186</sup> According to INDE, it is essential to each power P that its manifestation M—the truthmaker for *p*—might fail to obtain. Assuming that *p* expresses a fact about *concreta* and hence cannot be true unless one of its truthmakers obtains, it follows that *if there is a power for p*, then necessarily it is possible that *not-p*. Formalising 'P is directed towards M' as P→M and 'makes exactly true'<sup>187</sup> with  $\models$  we obtain the following argument.<sup>188</sup> Note that I take Exact Negation to be valid in case *p* is a singular statement that can only be made true by a very specific state of affairs, and not something like 'something is red'.

1	$\Box_P (P \rightarrow M)$	Directedness
2	$\Box_P (P \rightarrow M) \rightarrow \Diamond (\text{Located}(P) \ \& \ \neg \text{Located}(M))$	INDE

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<sup>185</sup> Mumford & Anjum themselves sometimes seem to suggest that they reject only Naive Dispositionalist Necessity, writing that 'causation is consistent with there being necessitation in the world. But the claim is that causation does not itself provide necessitation' (Mumford and Anjum 2011: 64).

<sup>186</sup> Marmodoro (2016) has argued that powers, even of the independent kind, can unproblematically ground conditional necessity (although note that she takes powers to be more closely connected to counterfactuals than what I have done in this thesis).

<sup>187</sup> Fine (2014; 2017; 2017b; 2017c) utilises his notion of exact truthmaking only with semantic purposes, as a way to provide the meaning of sentences; he does not employ it in metaphysical or ontological theses, such as in the Truthmaking Principle that I have been using in this thesis. However, this is due more to his animadversion against the ontological use of truthmaking than with the formal apparatus itself ('truthmaking is fine as a guide to metaphysics as long as we junk the *relata* on the left, the things whose existence *makes* true, the *relata* on the right, the things *made* true, and the relation of *making* true'. Fine 2017: 556). I take it that it is perfectly OK to adopt the technical apparatus of exact truthmaking and using it for ontological/metaphysical purposes.

<sup>188</sup> Mumford and Anjum (2011:117) spell out the argument less precisely, but perhaps more perspicuously: i) If DF $a$ , then  $\neg \Box Fa$  ii) By contraposition, If  $\Box Fa$ , then  $\neg DFa$ .

3	$\Box_P (P \rightarrow M) \rightarrow \Diamond (\neg \text{Located}(M))$	&-elimination
4	$(\text{Located}(M) \Vdash p)$	Exact Truthmaking
5	$(\text{Located}(M) \Vdash p) \rightarrow (\neg \text{Located}(M) \Vdash \neg p)$	Exact Truthmaking Negation
6	$\Box_P (P \rightarrow M \mid \text{Located } M \Vdash p) \rightarrow \Diamond \neg p$	1, 2, 3, 5.
7	$\Box_x(p) \rightarrow \Box(p)$	Essence to Necessity
8	$\Box(P \rightarrow M \mid \text{Located } M \Vdash p) \rightarrow \Box(\Diamond \neg p)$	6, 7.

Informally, the argument states that if a power tends to the truthmaker of  $p$ , then  $p$  cannot be necessary, because the very same power that tends to the exact truthmaker of  $p$  entails (by INDE) that necessarily,  $P$  can fail to bring the exact truthmaker of  $p$  about, thus making it possible that not- $p$  is the case. If something is possible because there is a power for it, then, necessarily, also its negation has to be possible. According to Dispositionalism, all possibilities are grounded in powers; therefore, everything that can possibly be the case is also possibly not the case: universal contingency.

If **Independence** is essential to powers (and thus INDE is true), then there cannot be anything that fills the gap between powers and necessity. As long as something is the manifestation of a power, then it will be contingent. Powers are incompatible with necessity. Where there are powers, there is no necessity, and vice versa. This seems bad news for Dispositionalism.

There are two possible reactions on the part of the dispositionalist.<sup>189</sup> The first is simply to *deny* INDE. **Independence** is not an essential feature of powers *qua* powers: if it holds of a subset of powers, then it must do so in virtue of something special that characterises its members. The strategy argues that **Independence** is an important thesis, but it does not constitutes what it is to be a power, and therefore it does not necessarily hold of all powers. This seems the most obvious solution, but it is not as straightforward as it might seem at first. First of all, we need to first *disarm* the arguments in favour of INDE,

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<sup>189</sup> I think that Vetter (2015) either does not fully appreciate the fact that these two strategies are distinct, or is a bit on the fence about which one to commit to—there are hints in favour of both strategies throughout her book.

and then offer (non-question begging) arguments against it. Secondly, and perhaps more importantly, we need to do so without overreaching: that is, we must preserve the idea that **Independence**, even if not *constitutive* of powers qua powers, is nevertheless a very important principle about them (or a significant subset of them). **Independence** played a central role in shaping the way we think about powers, and arguably played a key role in resisting the conditional analysis, for instance. We cannot simply reject it; rather, we need to restrict it in a principled manner which allows us to ground all the necessities we need without compromising our intuitions. In short, we need to deny INDE and Universal IND $\diamond$  without rejecting IND $\diamond$ , nor downplaying its importance for many powers.

The second strategy consists in accepting INDE, but rejecting the argument offered above or, more precisely, it involves *working around it*. The idea is that we can show that necessities hold despite powers being essentially independent and tendential. In short, finding a way to *sidestep* **Tendency** and Mumford and Anjum's argument, rather than resisting it. The idea would be that even conceding that powers are incompatible with necessities, Dispositionalism can still manage to ground all necessary truths in some indirect way. Since this latter strategy follows the path of least resistance, it would be the most elegant and painless solution. I will consider this latter strategy in the next section, where I will argue that it is ultimately unsuccessful.

### 10.3 Sidestepping, Formal Inadequacy, and INDE's revenge

The core insight of the sidestepping strategy is that, from a formal point of view, we do not need to have any power directed at a necessarily actualised manifestation in order to obtain necessities: we don't need to have a power directed to the truthmaker of  $p$  in order to ground ‘necessarily,  $p$ ’. The key is to consider the duality of the modal operators: ‘necessarily’ is equivalent to ‘not possibly not’.

**DUAL:**  $\Box p \square \neg^\diamond \neg p$

Given this fact, we can then think the grounding of necessities can be perfectly orthogonal to **Independence**. All we need is to accept the following principle, which I have used throughout the thesis to characterise Dispositionalism:

**DNec**: ‘necessarily  $p$ ’ is true iff and because there is no potentiality whose manifestation, if manifested, would make ‘not- $p$ ’ true.

Even if all powers are preventable, in accordance to Universal IND $^\diamond$  and INDE, we could still have necessities in the world, simply by virtue of not having any power involved with the truthmaker of either  $p$  or its negation. If there are no powers that would make true that not- $p$ , then  $p$  is necessarily true: we don’t need to have any power directly involved in  $p$ ’s truth (by tending towards  $p$ ’s truthmaker). In this vein Vetter states that:

[DNec] links necessities to potentiality indirectly, *via* possibility. Intuitively, necessities mark the limits of the potentialities that objects have. More precisely, it is necessary that  $p$  just in case nothing has, had, or will have a potentiality to be such that *not-p* (Vetter 2015: 203).

Unfortunately, DNec (and therefore sidestepping) is riddled with difficulties, as it stands. I will mention two (but they boil down to one and the same, really). First, it has the embarrassing consequence of allowing that there are possibilities that are not grounded in powers, thus undermining the other core thesis of Dispositionalism, namely:

**DPoss**: ‘possibly  $p$ ’ is true iff there is some power whose manifestation, if manifested, would make ‘ $p$ ’ true.

To see how this is the case, we just need to consider axiom (D)  $\Box p \rightarrow \Diamond p$ . Vetter maintains that the logic of potentiality grounds a modal logic as strong as T, which she takes to be the minimal model for alethic modality. We can obtain (D) from (T) very straightforwardly:

- 1)  $\Box p \rightarrow \neg p$  (T)
- 2)  $p \rightarrow \Diamond p$  (T)
- 3)  $\Box p \rightarrow \Diamond p$  (1,2)

This allows us to derive that something is possible even if there are no powers whose manifestation would make it true, simply in virtue of the fact that there is no power to the contrary, thus violating DPos: if  $p$  is necessarily true holds because no power is directed at the truthmaker for either  $p$  or not  $p$ , then by (D) it follows that  $p$  is also possible — and yet no power points to it, *ex hypothesis*. This would mean that we have to weaken DPos to a simple conditional:

**Weak DPos:** ‘possibly  $p$ ’ is true *if* there is some power whose manifestation, if manifested, would make ‘ $p$ ’ true.

I take it to be an undesirable result, although I do not think it is fatal.

The second problem that the sidestepping strategy encounters is more serious, and has been pointed out by David Yates (2015): we can derive contradictions from DNec. I have already briefly discussed his argument in §6, but it is worth coming back to it. Yates starts by assuming that i) the propositions of mathematics are necessary and ii) that no powers are directed at the truthmakers of mathematical propositions nor at the truthmakers for their negations. Thus, Yates concludes that there is no power whose manifestation would make  $\neg(2+2=4)$  true. Given DNec, we can then conclude that necessarily,  $2+2=4$ . This is exactly how sidestepping was supposed to work, after all. Unfortunately, from the

same line of reasoning it also follows that there is no power such that  $2+2=4$ . Hence, by parity of reasoning, we can derive that necessarily,  $\neg(2+2=4)$ . Given T, we can then derive the contradiction  $\neg(2+2=4) \ \& \ (2+2=4)$ .

The argument obviously generalises to every use of DNec to sidestep the incompatibility of Tendency and necessity. Thus, according to Yates, a dispositionalist theory of modality which includes DNec is formally inadequate. He suggests to invoke a weakened, disjunctive version of it which allows something *other than powers* to ground necessities.

Vetter's reply (Vetter 2018) is simply to reject Yates' assumption that potentialities cannot be directed to mathematical (as well as logical) truths. Potentialities are not to be identified with causal powers, and they are abundant: there is a plenitude of them. So, mathematical truths are not cases in which there is no power either way. She then argues that such plenitude is not *ad hoc* and can be justified.<sup>190</sup> But even if we grant that there is a plenitude of non-causal potentialities, we must abandon the sidestepping strategy. DNec was invoked in an attempt to ground necessities while granting *not only that there are no surefire powers* (and hence Naive Dispositionalist Necessity is not viable), but also that preventable powers *for p* are incompatible with *p*'s necessity — that is, that tendential powers could co-exist with necessities. The whole point of sidestepping was to grant that some truths might be necessary even if there is no power whatsoever directed at their truthmaker. But once we adopt a plenitude of powers, this strategy collapses: for every truth *p*, there is a power directed at its truthmaker. If INDE holds of that power, then it will rule out that *p* is necessary, because the very fact that a power points to its truthmaker entails that it also may fail to bring that truthmaker about.

In short, sidestepping faces a dilemma: either it is consistent with INDE but entails that Dispositionalism is formally inadequate, or saves Dispositionalism but is inconsistent with INDE. The dispositionalist must therefore adopt the first strategy, and reject INDE.

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<sup>190</sup> I will return to some of her arguments in the next section.

As we have seen, however, we cannot simply reject IND $\diamond$  completely, for it is still a core principle for all friends of powers.

That is to say, Dispositionalists have two goals, if they aim to reject INDE, ground necessities, and at the same time grant that a more circumscribed version of Independence is an important principle for powers:

- I) Show that **Independence** is not constitutive of powers, and thus that Tendency does not essentially hold of all powers.
- II) Restrict the scope of **Independence** in a principled manner, so that it does all the work it is supposed to do and nothing more that would compromise Dispositionalism.

I will start by attempting to formulate a theory that meets the second *desideratum*, and only then take a closer look at the dialectic between the defender of INDE and her foil.

#### 10.4 Simple Degree Theory

The most articulate attempt to meet the second desideratum is due to Vetter (2015; 2018). I cannot help but feel that Vetter's treatment of the issue is pulled in slightly different directions and that she is somewhat ambiguous between different solutions. So, I will present first an oversimplified toy-version of her theory in this section, and then offer an improved version of that in the next. I suspect that the improved version that I will end up presenting is what she really had in mind to begin with, but since it is not wholly clear, it makes sense to present it as a separate proposal.

Vetter's starting point is ‘the simple observation that dispositions come in degrees. A champagne glass is more fragile than a tumbler, some people are more irascible, sociable, or loquacious than others, and a rubber band is more elastic than a cotton cloth’ (Vetter

2018: 7). Indeed, she suggests that the degree of a power is among its identity conditions: a token power P is the entity that it is in part because it has the degree it has.<sup>191</sup>

Vetter's idea is that **Independence** is grounded in the *degree* of powers, rather than in their essence simply *qua* powers. Powers can fail to manifest not because they are powers, but because they are powers *of a certain degree*. So, **Independence** is essential only to some powers, and holds not in virtue of their being powers *simpliciter*, but in virtue of being powers of a certain degree. In particular, she thinks that there is such a thing as the maximal degree of a power, and suggests that the scope of IND $\diamond$  should be restricted to powers with non-maximal degree only. For convenience, I will refer to powers with a maximal degree as *maximal powers* and all the others as *non-maximal powers*. In short:

**Simple Degree: Independence** is grounded in a power's *degree*, and holds only for non-maximal powers.

*Prima facie*, the account meets the second goal: it offers a principled explanation of the restriction of **Independence**'s scope to some powers only. I think that the proposal of grounding Independence upon the degrees of powers is very promising. Before turning to considering whether it is preferable to INDE, however, we need to flesh out the proposal a bit more.

There are two main reasons for thinking that powers come in degrees. The first (Wasserman & Manley 2007, Vetter 2011a; 2015; 2018) is that we make frequent use of comparative statements about the dispositional properties of objects and the relative strength of causal powers. This is to say that there is evidence that our *disposition ascriptions*

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<sup>191</sup> A central feature of her account is that potentialities are the contextually-insensitive metaphysical background for disposition-ascriptions. The power to break and 'fragile' behave like height and 'tall'. In order to have comparative dispositional ascriptions ( $x$  is more fragile than  $y$ ) there need to be a context-independent ordering: context then determines the cut-off points for the predicate. So token powers are akin to determinates, and the type power to a determinable. It is essential to each determinate that it has the value that it has. The point is more evident if we think of determinates as points on a quality space: the identity of a token point is given by its position on the relevant space.

are gradable: sentences such as ‘ $x$  is more fragile than  $y$ ’, ‘the gravitational attraction between  $x$  and  $y$  is stronger than the attraction between  $x$  and  $z$ ’, are common and indispensable, both in our theorising and our everyday interaction with the world. If we are realist about powers, we think that dispositional ascriptions are grounded in them, and so it is most natural to think that such comparative statements are true in virtue of powers being themselves ordered in the relevant way. Attributing a degree of relative strength to powers also allows us to better understand complex causal interactions: it makes it possible, for instance, to treat powers as vectors<sup>192</sup> and think of their interactions in terms of composition of vectors, as proposed by Mumford & Anjum (2011: §2). For instance, we can explain why electron  $x$  would move away from electron  $y$  despite the presence of gravitational attraction between the two massy objects simply by representing the two forces as two diverging vectors, and establishing that the resultant force causes them to repel each other because the gravitational attraction between  $x$  and  $y$  is weaker than the electromagnetic repulsion between them.

The second reason to think that powers come in degrees is that it allows us to offer a simple threshold theory of the context-sensitivity of disposition ascription. Disposition ascriptions such as ‘ $x$  is fragile’ are notoriously context-sensitive: we would not predicate ‘is fragile’ of a plank of wood in a china shop, but would probably do so if we were trying to build a tank.<sup>193</sup> Orthodoxy has it that context-dependence is a linguistic matter, not a metaphysical one: we can have context-sensitive terms or judgements, but not context-sensitive properties; this means, firstly, that we ought to be careful before assuming that there is a one-to-one correspondence between our everyday dispositional terms (such as fragility) and *bona fide* dispositional properties, and secondly that it is our semantic theory

<sup>192</sup> Note that I am not saying that the vector model proposed by Mumford & Anjum is the only or best way to understand every interaction between powers: I am happy to remain neutral on this point for the time being. For objections against the universal applicability of the vectorial composition model, see Bird (2016). I am merely pointing out that it is a useful model at least in certain cases, and it presupposes that powers come in degrees.

<sup>193</sup> We can make sense of this if we think that we ordinarily use disposition ascriptions to predicate ‘easy possibilities’ (Williamson 2000, Peacocke 1999, Sosa 2002). The context-sensitivity of our disposition ascriptions is also, I suspect, one of the main reasons why the philosophical community has been so obsessed with the idea that there is a very intimate link between powers and counterfactuals.

that should account for the phenomenon. Semantics deals with context-sensitivity by focusing on the shift of truth-values, but in order for the shift to be possible, Vetter maintains that ‘we need to provide a *metaphysical background*, a context-insensitive metaphysics from which, by the right semantic mechanisms, the semantic values of the context-sensitive expressions get selected’ (Vetter 2015: 80).

Of course, the semantic mechanisms might vary a great deal; however, dispositions seem to be amenable to a very basic and intuitive treatment. The idea, very roughly sketched, goes like this: start with an ordered series as your background. By ordered series here I mean simply a collection of entities among which an asymmetric and transitive relation  $R$  holds (say, major than, proper part of, or left of). Then, maintain that the context-sensitive predicate  $F$  can truly be predicated of an object  $x$  if and only if  $x$  is located beside a certain arbitrary threshold  $t$  in the series. At this point, one can simply maintain that the location of the threshold is determined by context and varies with the context of utterance or evaluation, or that only a portion of the ordering is to be taken into consideration in a given context by means of restricted quantification.

Take, for instance, the predicate ‘fast’. The ordered series in the background is that of the speed of a body, measured, say, in miles per hour. Impose an arbitrary threshold for ‘fast’: say, it has to be above the middle point of the series. Then, depending on the conversational background, select the privileged portion of the series that you are going to consider. Depending on the relative position of the subject and the threshold, one can now say whether  $x$  is fast or not in that particular context. This treatment of context sensitivity requires there to be a context-insensitive ordered series—the metaphysical background. Compare the case of ‘is tall’ and height. The most natural thought here is that it is the degrees of a power that allow us to order them appropriately: there is a rigid, invariant ordering relation between them, due to their degree.

I find both reasons to think that powers come in degrees to be convincing. However, some questions about this account linger. The first concerns the ability of Simple Degree to ground a restricted version of Independence:

**Finiteness** How can we warrant that there is something such as a *maximal* power? Why cannot we think that degrees come in an infinite series?

Note that nothing in either of the two reasons presented to accept the existence of degrees of powers suggests that we need to think that there is such a thing as a maximal degree. After all, there is no such thing as a maximal height, nor anything that suggests that there is a ‘longest vector’. That is to say, no argument to the effect that powers are graded entails that there must be a maximal degree: is there a ‘maximal force’ in physics?<sup>194</sup> If we think that the degree of a power is just a primitive fact about that power, which we can represent by associating the power with a real number  $n$ , then there is no reason to think that there is such a thing as an upper bound.

This is not an objection *per se* to the Simple Degree, but rather an explanatory challenge: the dispositionalist who wants to ground **Independence** upon the degree of powers, rather than their nature, and in turn ground necessary truth upon maximal powers, has to offer a reason to think that the degrees of a powers have an upper bound.

Vetter (2015: 89; see also 2018) offers an argument<sup>195</sup> to the effect that there are maximal potentialities — that there is an upper bound to the degree of powers. She first introduces the two following principles:

- a) Comparative regularities, such as  $y$ 's being F more often than  $x$  despite both being in roughly the same circumstances, provide good though defeasible evidence for comparative disposition ascriptions such as:  $y$  is more disposed to F than  $x$  is.
- b) If  $x$  is disposed to F and  $y$  is more disposed to F than  $x$  is, then  $y$  is disposed to F.

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<sup>194</sup> Of course, we do think that some vectors representing certain physical forces happen to be capped at certain values (namely, the speed of light). But there is no reason to think that force, in general must be similarly capped, and obviously nothing in the mathematical apparatus used to represent that suggest anything like it.

<sup>195</sup> I discuss another one, based on her semantics for gradable disposition ascriptions, in the next section.

Vetter then invites us to think about the limiting case of a pattern of behaviour:

The limiting case of colour is monochromaticity... Similarly, the limiting case of a pattern of behaviour... is uniformity of behaviour: being F all the times... a) and b) together push us towards accepting permanently exercised dispositions and according them a degree that is rather high, and higher than most non-permanently exercised dispositions... Might we just stop here ad take *permanent* exercise to be the maximal degree of a disposition? Not quite. For permanence does not get to the modal character of dispositions: a disposition might be permanently exercised for contingent reasons. Rather, we need to extend the argument for permanently exercised dispositions to a stronger case: the case of a disposition that *has to* be permanently exercised (Vetter 2015: 89-90).

*Prima facie* both principles seem reasonable. However, the argument is not rock-solid. A first problem for Vetter's analogy is represented by one-off powers, like mortality. Assume that the manifestation of mortality is dying. In a sense, it is a maximal power: necessarily, every mortal entity dies. If we think that one can only die once, it does not make sense to say that  $x$  is more mortal than  $y$  iff  $x$  dies in more situations than  $y$ . Should we think that mortality is a maximal power, then? But surely, in that case it is false to say that  $x$  permanently exercises her power to die: there are a lot of situation in which  $x$  has the maximal power to die, and yet she is not dying (leaving aside stoic-esque ideas to the effect that one is constantly dying). Assume that, on the other hand, dying is not a one-off power: one can die (and be resurrected, presumably) a number of times. Would a person  $x$  who could die infinitely many times (and be resurrected each time), once for every possible situation, count as *more mortal* than somebody,  $y$ , who only dies once, and stays dead? That seems counterintuitive: it seems to me that, on the contrary,  $x$  is in a sense immortal (compare: cases of reincarnation). And yet  $x$  exercises her power to die in many more situations than  $y$  does. So, Vetter's line of reasoning does not translate perfectly to every case.

A more serious problem with the argument is that this does not establish that *in fact there are* such powers, nor that there could be. Just because I can *imagine* a necessarily

permanently manifested potentiality, it does not mean that it is possible that it exists, unless we adopt some form of rationalistic epistemology of modality, to the effect that conceivability (imaginability, etc) entails possibility (Chalmers 1996; 2002; 2010, Yablo 1993; 2002). Aside from the well-known problems that beset the theory in general (van Inwagen 1998, Vaidya 2017, Vaidya & Wallner 2019), there remains the fact that Dispositionalism does not sit very well with a rationalistic epistemology of modality (Williams 2019: 118); it is much more natural to pair it with a thoroughly empiricist, *a posteriori* theory (somewhere along the lines of Nanay 2010; 2011, Mumford & Anjum 2011, Strohminger 2015, Vetter 2018).

Dispositionalism maintains that the modal space is determined by what powers *happen* to be instantiated: the initial distributions of powers dictates what is possible. It is not easy to see why a conceivability theory would work against this backdrop (as opposed to, say, Lewisian Plenitude). Furthermore, more has to be said about the kind of mental operation<sup>196</sup> that I am carrying on when raising the degree of a potentiality, *i.e.* taking the pattern of behaviour to its limit case: what kind of conceivability are we talking about? For instance, I can imagine that I am an inch taller than I actually am, and obviously repeat the operation *ad infinitum*. But obviously at some (possibly indeterminate) point, I will imagine something impossible: we can safely say that it is metaphysically impossible for a man to be infinitely tall. It is surely true that were I 200 miles tall I would be taller than if I had been only 199 miles tall, but this does not mean that either scenario is possible. I do not want to dispute that, normally, necessarily permanently manifesting dispositions would have a higher degree than occasionally manifesting dispositions. What I want to dispute is the fact that *there are* or there could be such potentialities. So, I think that the question remains: why we should think that there is an upper bound to the degree of a power? Again, this is not an argument against Simple Degree *per se* — it just points out that it raises a question that is hard to answer.

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<sup>196</sup> A number of philosophers (Lowe 2008; 2012, Hale 2013, and especially Vaidya & Wallner 2018 ) even insist that conceivability needs to be *constrained* by our knowledge of essences in order to give us any information concerning possibility. This would invalidate Vetter's argument, making it question-begging.

## 10.5 Simple Degree and Necessity

Simple Degree concerns the grounding of Independence. According to the theory, powers have intrinsic and primitive degrees, there is an upper bound of degrees (maximal powers) and **Independence** does not hold for maximal powers. However, the reason why we wanted to restrict  $\text{IND}^\diamond$  in the first place was that we wanted to allow for certain powers to be grounds for necessary truths. The arguments presented in §§10.2-3 showed that an independent power is incompatible with the necessity of the propositions its manifestations are truthmakers for. From this, it follows that, if necessary truths are to be grounded by powers, they need to be grounded upon non-independent powers. According to Simple Degree, these are the maximal powers. Thus, adopting Simple Degree entails the following:

**Necessity to Maximal:** If  $p$  is necessary, then it is made true by the manifestation of a maximal power.

This leaves open, however, whether being made true by the manifestation of a maximal power is also a sufficient condition for being necessarily true. That is, Simple Degree alone is silent on whether being necessary can be defined or is at least co-extensional with being made true by the manifestation of a maximal power; in other words, it is neutral on whether the following holds:

**Necessity Equals Maximal :** It is necessary for  $x$  to  $\varphi$  iff (and because)  $x$  has a maximal potentiality  $P$  to  $\varphi$ .

There are some reasons to suspect that **Necessity Equals Maximal** is not in good standing. In short, the problem with it is that, if we take having maximal degree to be an intrinsic feature of powers, then the fact that  $P \rightarrow M \Vdash p$  is maximal leaves open, on the face

of it, the possibility for there being another power  $P^* \rightarrow M^* \Vdash \neg p$ . Were this further power to exist, then clearly it would be possible for  $\neg p$  to obtain, and hence  $p$  could not be necessary; therefore, the existence of a maximal power would not be a sufficient condition for  $p$  being necessary. The problem is that it seems natural to think that the degrees of powers, as described so far, are *intrinsic* features of a power: whether a power has degree 0.5 or 0.6 should be only about how *it* is, regardless of the circumstances. But, in that case, it is not wholly clear how having a high degree is connected with the existence, and the degree, of another distinct power (*i.e.* the opposite power). By saying that a power's degree is intrinsic,<sup>197</sup> I want to stress the fact that powers are *local* matters of fact—they concern a certain portion of reality. So, it might well be that if  $x$  is maximally disposed to  $p$ , then it is absolutely not disposed to *not-p*. But this should not, intuitively, concern whether some *other* entity has a power to a certain degree: it seems reasonable to maintain that the fact that  $x$  has power  $P$  to degree  $n$  is independent from that fact that  $y$  has power  $P^*$  to degree  $m$ .

It is important to stress that this difficulty faced by **Necessity Equals Maximal** are not an indictment of Simple Degree: Simple Degree is a theory about **Independence**, and does not entail **Necessity Equals Maximal** — so, if the latter turned out to be problematic, it would not mean that Simple Degree is compromised. The proponent of Simple Degree simply has to offer a different, less simplistic account of the link between being a maximal power and grounding necessary truths. The most natural amendment to **Necessity Equals Maximal** that avoids the problem is the following:

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<sup>197</sup> Naturally, it is very hard to offer a satisfactory elucidation of the notion of intrinsicness in an Anti-Humean framework—and, especially, in a powers ontology. All of the most common accounts are hard to transfer to powers ontology, for they were tailored for a Humean mosaic (see for instance Francescotti 1999, Lewis 1986b, Marshall forthcoming). This is most clearly the case when it comes to the famous account offered by Lewis and Langton (1998), according to which a property  $F$  is intrinsic iff it meets the following four criteria: i) Possibly, there exists a lonely  $F$ , ii) Possibly, there exists a lonely non- $F$ , iii) Possibly, there exists an accompanied (*i.e.* not lonely)  $F$ , iv) Possibly, there exists an accompanied non- $F$ . The Lewis-Langton account cannot work because, on the non-Humean picture, no property can be lonely: there are necessary connections among distinct entities.

**Necessity Equals Maximal + No Opposing Powers:** It is necessary for  $x$  to  $\varphi$  iff and because  $x$  has a maximal potentiality  $P$  to  $\varphi$  & there is no other entity  $y$  that has a power  $P^*$  to be such that  $x$  does not  $\varphi$ .

Granted the existence of plenitudinous powers, this principle seems perfectly able to avoid the objection briefly sketched above and offer a perfectly adequate theory of necessity. However, one is left with the feeling that the second clause has been inserted by hand, as it were, to avoid the putative shortcomings of **Necessity Equals Maximal**. Ideally, a theory that connects being a maximal power and the categorical absence of opposing powers more intimately would seem more elegant and parsimonious. Can we do that by adopting Simple Degree?

Vetter (2015) at times seems to suggest that we can — indeed, she seems to suggest that being a maximal power according to Simple Degree entails that there are no opposing powers, and thus that Necessity Equals Maximal entails **Necessity Equals Maximal + No Opposing Powers**. She seems committed to the following theses:

- I) An entity's degree of power to  $\varphi$  is inversely proportional to its power to not- $\varphi$ . So, if  $x$  has the power to  $\varphi$  at maximal degree, then it has a power to not- $\varphi$  to the minimal degree, which is 0. Having the a power to  $\psi$  to degree 0 amounts to not having the power at all
- II) If  $x$  does not have a power to  $\varphi$ , then nothing else has a power to be such that  $x$  is  $\varphi$ .

The first principle is rooted in the way in which Vetter cashes out degrees of powers in possible worlds semantics. Vetter (2015: §3; Vetter 2018) cashes out the ordering source of Kratzerian semantics for gradable predicates as the *modal force* of the property, that is, the kind of quantifier that ranges over the relevant modal base (the relevant domain of possible worlds). Keeping the modal base fixed, ordering powers according to their degree is equivalent to ordering the scope of the associated quantifier. The minimal degree of a

power will then correspond to the existential quantifier: something is minimally breakable if there is at least one world at which it breaks, while the maximal degree corresponds to the universal quantifier—something is maximally breakable if it is broken at every world (more precisely: at every situation). Thus, the degree of a contextually *invariant* series of gradable predicates would be understood as the ratio of possible worlds<sup>198</sup> at which that power is manifested:  $x$  is more fragile than  $y$  if  $x$  is broken at more worlds than  $y$  is—thus,  $x$ 's fragility has higher degree than  $y$ 's fragility if it manifests more often. We could understand, then, the contextual sensitivity of dispositional terms as a function that associates our vague dispositional predicate ('fragile') with a precisified modal strength.

Vetter is a realist about powers and a hardcore actualist, and thus cannot take this possible-world theoretic model as anything but a heuristic tool. However, she notes that potentialities and their degrees 'should share certain structural features with the semantics' (Vetter 2015: 85). I find it plausible that she (perhaps implicitly) associates the degrees of real potentialities with the intension of the contextually invariant predicates—those with a precisified modal force: so, in short, with the set of worlds or circumstances in which the power is manifested.

This would explain why she both thinks that i) there is a maximal degree of powers and ii) why  $x$ 's power to  $\varphi$  is inversely proportional to its power to not- $\varphi$ , and thus why entities having a maximal power to  $\varphi$  lack any opposing power to not- $\varphi$ . Since a power's having maximal degree is equated with it being actualised at every situation, at every possible world, maximal potentialities line up very nicely with the Leibnizian biconditional:  $p$  is necessary iff  $p$  at every possible world.<sup>199</sup> And if something is the case at every situation, then of course there is no opposing power, because the anti-extension is just empty (unless we are in a paraconsistent logic where extension & anti-extension can

<sup>198</sup> As Vetter correctly notes, since there are repeatable dispositions, we should include cases or situations, rather than maximal worlds, in our domain.

<sup>199</sup> Even more interestingly, adopting cases or situations instead of possible worlds makes the proposal very close to an influential interpretation of Aristotle's theory of necessity, proposed by Hintikka (1985), according to which necessary events are sempiternal and continuous: it is necessary that  $p$  only if for every time  $t$ ,  $p$  at  $t$ .

overlap). But note that, of course, in the possible world-theoretic model, the degree of a power is definitely not an intrinsic feature of a localised matter of fact: it has to do with how all the possible worlds are.

However, it is not clear to me whether Vetter's association of the degree of a power with modal strength is correct. I have both a general worry about the overall approach, and a more specific and technical issue with it. The general worry is how much of the structure of reality a hardcore actualist should read off possible world semantics — surely, if the dispositionalist is to admit that possible worlds are a useful heuristic tool (and it would be absurd for them to deny it), then representations of modality via possible worlds talk must map onto some significant aspect of the primitive phenomenon. However, it is hard to know where to draw the line: how much can we read off from this representation? Surely not everything, since, according to the dispositionalist, there are no possible worlds, accessibility relations, and the like! Before these general issues are explored more in detail, I would suggest caution in reading off a principle such as I) from the behaviour of quantifiers in PW talk.

This general worry can find its expression in a more specific difficulty. Simple Degree, as I have presented it, treats powers as quantities: this means, among other things, that it should be possible to calculate the *ratio* between two powers, e.g. determine whether a power is twice as strong as another, etc: ‘if  $a$  and  $b$  are any magnitudes of the same quantity, then  $a:b = r$ , (where  $r$  is a real number)’ (Michell 1999: 59). This is a stronger feature than just requiring powers to be arranged on a weak linear order, which, strictly speaking, is all we would need to meet the requirement of accounting for comparative judgements of dispositions. To illustrate the difference, consider this example: the Scoville scale arranges the spiciness of chillies in a linear order. This allows us to say that a Carolina Reaper is spicier than an Orange Habanero. However, the scale does not allow us to say that the former is twice or three times spicier than the latter. Spiciness is not a quantity, on a non-permissive understanding of what it is to be a quantity (Wolff 2020). Note that treating degrees of powers as quantities, as opposed to merely weakly ordered properties, is crucial

if we are to represent interactions of powers with vectors, as suggested by Mumford & Anjum 2011): the fact that Simple Degree allows to easily do that is a strong point in its favour.

Now the trouble with Vetter's possible-world semantics for degrees of powers is this: if a power's degree were equivalent to the number of possible worlds (or better, situations) at which its manifestations obtain, then we could establish the ratio between two powers by dividing one's set of manifested-situations with another, as follows:  $P_a : P^*b = S : S^*$ , where  $S = \{w \mid M \text{ obtains at } w\}$ . The problem is that, for every two powers  $P$  and  $P^*$ , there are infinitely many worlds where  $P$  manifests, and infinitely many worlds where  $P^*$  manifests — so, no ratio can be established for any power, and no power can therefore be associated with a degree (the point is touched upon by both Vetter 2015 and Manley & Wasserman 2008, but not resolved). This difficulty suggests that associating degrees of powers with worlds where the power is manifested might not be that smooth or natural, and we should at least be careful in associating possible worlds talk with powers. If this is the case, then also the reasons that Vetter presents to argue for I) are weakened.

As for point II), that if  $x$  does not have a power to  $\varphi$ , then nothing else has a power to be such that  $x$  is  $\varphi$ , I think that Vetter's justification would run as follows: assuming I), we know that if  $x$  has a maximal power to  $\varphi$  then it does not have a power to not  $\varphi$ . Now, we need to show that nothing else has the power to be such that  $x$  is not- $\varphi$ . We can do that by assuming that the power  $P^*$  to be such that *not-* $\varphi$   $x$  is an extrinsic power for anything that is not  $x$  itself. Now, extrinsic potentialities are grounded upon joint potentialities (Vetter 2015: §4). But nothing can have a joint potentiality with  $x$  to the effect that *not-*F $x$ , for  $x$  has no potentiality whatsoever to be such that it is not F. Therefore, there cannot be any extrinsic potentiality to that effect either. Thus, **No Opposing Powers** follows from **Maximal**.

This argument is elegant and compelling. However, it might be open to certain counterexamples — or, at least, it might entail unwelcome consequences. The key passage is that if  $x$  has no potentiality to  $\varphi$ , then it cannot have any joint potentiality to  $\varphi$ . The

principle seems intuitively attractive; however, it is far from self-evident, and indeed it might generate some troubles if accepted in an unqualified form. If we interpret it as stating that for every  $x$  and  $y$ ,  $x$  and  $y$  have the joint potentiality to  $\varphi$  if and only if both  $x$  and  $y$ , individually, have the potentiality to  $\varphi$ , then the principle seems to be false: I do not have the potentiality to sing a duet of *Last Nite*, but Alex and I do. If signing a duet of *Last Nite* with Alex can be analysed in terms of me signing certain portions of a song, and Alex signing other portions, then the issue is not substantial. If, however, there are irreducibly plural properties — that is, properties that cannot be analysed in individual bits, then the view is in trouble (compare with Oliver and Smiley 2013 arguments for irreducibly collective predicates).

More charitably, we can take the defender of II) to assume something like this:

**Contribute:** For every  $x$  and  $y$ ,  $x$  and  $y$  have a joint potentiality to  $\varphi$  if and only if  $x$  and  $y$  individually considered have the potentiality to contribute to  $\varphi$ .

However, also this weaker principle is not without problems, and I am not sure that Vetter herself could accept it: she admits extrinsic potentialities to self-identities of mathematical truths, where in no way one of the participants is *contributing* anything to the obtaining of the manifestation. Similarly, it would rule out cases of collective powers that are not reducible to distributive powers.<sup>200</sup> Furthermore, we need to be careful in offering a characterisation of ‘contribution’ that allows for *strong emergent manifestations*. A plausible way to think of emergent manifestations of joint powers is that no contributor, taken individually, has the power to bring about the emergent phenomenon, which obviously cannot be reduced to the *sum of contributions* by the entities that brought it about. Emergence

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<sup>200</sup> See Oliver & Smiley (2013) for examples of collective properties that are not reducible to distributive properties. Similar points with regard to collective grounds not reduced to distributive grounds can be found in Dasgupta (2014) and Litland (2016). For instance, Dasgupta argues that haecceitistic facts are wholly grounded by qualitative facts, collectively, but that no subset of qualitative facts grounds a subset of haecceitistic facts, nor we can say that some subset of qualitative facts partially grounds the haecceitistic facts (similarly for distances in a relationalist view of space-time).

is an intricate matter, and I do not intend to dwell on this point much; however, it seems an unhappy consequence if we were to deny the possibility of strong emergence on the basis of our theory of modality.

These arguments have limited ambitions and are far from being knock-down: it might still be the case that **No Other Powers** follows from **Maximal**. Secondly, and more importantly, even if **No Other Powers** is not entailed by Simple Degree's **Maximal**, it might still be perfectly OK to add it by hand in the account of necessities — for all I have said, **Necessity Equals Maximal + No Opposing Powers** might still be a perfectly good account of necessity stemming from a Simple Degree account of **Independence**.

However, when we add the feeling that **No Opposing Powers** has been added somehow forcibly to the explanatory challenge expressed by Finiteness, I think that one would be justified in seeking an alternative account of how degrees of powers ground both **Independence** and necessity. That is to say, I think that although Simple Degree is a good theory of restricted Independence, and **Necessity Equals Maximal + No Opposing Powers** is a good Dispositionalist theory of necessity, there might be a more elegant and satisfactory view in the vicinity. In the next section, I present my attempt at formulating such a view.

## 10.6 Two-Tiered Degree

I think that the Simple Degree account is on the right track, and only needs minor tweaks.

Here's a simple proposal to improve it.

Assign a primitive degree  $n$  to each and every power, independently from anything else, so as to preserve the idea that degrees are a local and intrinsic matter. So far, this is just as Simple Degree. The key difference is that we will not directly ground Independence, nor necessity, in the degree of powers; rather, we establish a global framework, which includes *all* the intrinsically graded powers. We then group together all the powers that have the same manifestation, and all the powers that have the opposite manifestation on the other side. By this I mean that we group on one side all the powers whose  $M$  is such as to make true that  $p$ , and on the other side all the powers whose  $M^*$  is such to make true that *not-p*; we ignore those that are neutral with regard to the truth of  $p$ .<sup>201</sup>

We then perform a simple addition (think of it as a scalar addition) within the two groups, thus obtaining the *total degree* towards  $M$  and *not-M*. Call these values  $\alpha$  and  $\beta$ , respectively. We can then establish the following principle:

**(TT) IND $^\diamond$**  holds iff and because  $\alpha - \beta \neq 0$ .

This is to say that whether Independence holds of a certain power is not a local matter that only concerns that very power. Rather, it is determined by the global composition of powers of the same relevant kind. It means that we have no longer any use for the notion of a maximal power in establishing **Independence**. We do not need to postulate that there is an upper-bound to the numeric value associated with each power: we can simply assign a numeric value to each power, and then check whether there is an opposition. If there is no

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<sup>201</sup> This obviously presupposes that we can make good sense of truthmakers for negative truths—which is far from clear. However, the assumption seems to be baked in the overall semantics of Dispositionalism which I have adopted without much discussion, so I will not raise the point here. It is obviously a very contentious, and potentially very problematic point for Dispositionalism.

opposition,<sup>202</sup> **Independence** fails. If, on the other hand, there is some opposing power, that is, if the resulting value is different from  $\alpha$ , then **Independence** holds. Since the former case is extremely more likely (as the universe is a rather big place!) the fact that **Independence** holds for the majority of powers is easily explained. There needs not be a greatest degree for there to be failures of **Independence** and necessary truths—so, we can avoid offering an explanation of the disanalogy between the degree of a power and height, for the simple fact that *there is no disanalogy*. This means that we need not worry about how much structure we can read off our possible worlds talk, and understand degrees of powers as proportions of possible worlds. Framing the discussion in these terms has the advantage of explaining how a *local* matter of fact, viz. a power's degree, can entail anything about the existence of separate and independent powers. **Independence**, as well as necessity, is a global affair. According to Two-Tiered, **Independence** and necessity are directly grounded in the *global composition* of primitive, intrinsic degrees of powers.

Two Tiered allows us also to explain naturally and, I think, more elegantly than **Necessity Equals Maximal + No Opposing Powers** the relationship between failures of **Independence** and necessity. The bridging principle can be formulated as follows:

(TTNec) It is the case that necessarily  $p$  iff  $\alpha - \beta = \alpha$ .

The powers that satisfy TTNec naturally violate TT, and thus are not independent. Thus, the link between violations of **Independence** and necessity does not need any additional further principle: **No Opposing Powers** is backed into what it means to be non-independent.

A benefit of this model is that it allows us to capture some of the temptations and perceived desirable features of the approaches previously discussed. For instance, we can

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<sup>202</sup> As will become clear soon, if we allow for a series of degrees without an upper bound, we do need to pose some restrictions on how we sum those powers, for we want to avoid paradoxes of infinities. But limiting the ‘range’ of the vectorial composition of powers might be an easier task: we can perhaps avail ourselves of the limits posed on causal action posed by special & general relativity.

capture the temptation of adopting the sidestepping strategy as a limit case of this account. All we need is to admit that  $\Box p$  iff  $\alpha - \beta = \alpha$  even if  $\alpha=0$ . I think that we should accept a more restrictive theory, according to which ‘Necessarily  $p$ ’ is true only if  $\alpha>0$ : there is something profoundly counterintuitive in the idea that  $p$  can be necessary if there is no power either for it or against it, and indeed, if we allow  $\alpha=0$ , then it becomes easy to see how we can generate the contradictions that we mentioned in the section above:  $\alpha - \beta = \alpha$  is true if  $\alpha=0$  iff  $\beta=0$ , and therefore  $\alpha - \beta = \alpha \Box \beta - \alpha = \beta$ . But it is still helpful to be able to express the sidestepping strategy in a perspicuous and rigorous way.

Note that there are two ways in which  $\alpha - \beta$  can be equal to  $\alpha$ . One is if  $\alpha \neq 0$  and  $\beta = 0$ , that is to say, if there is no power such that it can bring about an  $M^*$  that makes not- $p$  true. The other way in which the result might follow is if both have infinite value (of the same cardinality). This raises a difficulty. In case  $\alpha$  is infinite and  $\beta$  is finite or is an infinite of the same or smaller cardinality than  $\alpha$  (if  $\alpha = \omega_1$  and  $\beta = \omega_1$ ,  $\alpha - \beta = \alpha$ , and similarly if  $\alpha = \omega_2$  and  $\beta = \omega_1$ , etc), the result of the subtraction would be equal to  $\alpha$ .

Thus, if there is a power of infinite degree, and the sum of every power is only of finite degree, then nothing can stop the former power from manifesting. This lines up nicely with a certain pre-theoretical idea of necessity that we have: necessity as an *irresistible* force, that we develop by projecting experienced cases of overpowering (*e.g.* the pull of a strong wind) and simply imagine its magnitude to be augmented infinitely, but obviously creates problems to the theory. Furthermore, if we concede that both  $\alpha$  and  $\beta$  were infinities of the same cardinality, the usual paradoxes of infinity would infect our theory of modality:  $\alpha - \beta = \alpha$  would make  $\Box p$  true, but at the same time  $\beta - \alpha = \beta$  would make  $\Box \neg p$  true, resulting in Yates’ formal adequacy objection.

This suggests that anybody involved in the Dispositionalist project has a clear-cut task ahead: she must prove that sums of powers cannot result in infinite magnitudes. I take this to have interesting programmatic consequences for future research within the dispositionalist camp. Unfortunately, since my focus in the present dissertation is to provide a metaphysical foundation to Dispositionalism, rather than carrying out the project directly,

and that doing so would take up too much space, I will not undertake the task here. I will just note that the most obvious route to deny the existence of infinite sums of powers, namely considerations from the causal nature of powers interaction plus the limited scope of causation imposed by Special Relativity due to the finite extent of the light cone, will not do the trick; although it might be plausible to think that we can compose vectorially only powers that are within one's light-cone, this restriction would re-introduce to Two-Tiered the intrinsicness problems of Simple Degree: we would have no assurance that there be no opposing powers outside the light cone. But if necessity is monotonic, then we cannot allow for this possibility; it cannot be a local affair, however large that locality is. It must be global.

I want to bring attention to a last positive aspect of the Two Tiered account. It allows us to draw a distinction between two different versions of **Independence**. Call these ‘Extrinsic’ and ‘Intrinsic Independence’, respectively.

**Intrinsic Independence:** all powers have a *finite* degree, and no sum/composition of powers has infinite value, either.

**Extrinsic Independence:** not only is **Intrinsic Independence** true and hence there are no powers of infinite degree, but also the world is such that for every power towards M there is at least one power towards not-M.

The former principle would nicely capture the idea that every power, intrinsically considered, does not pass the antecedent strengthening test, and therefore does not guarantee its manifestation to occur: it is not all-overpowering. I think that this version of **Independence** captures quite nicely Mumford and Anjum’s intuitions—and in general the idea that all powers are, theoretically and in themselves, defeatable. I think that **Extrinsic Independence** alone is sufficient to justify the pull that many feel toward INDE: there is a sense in which **Independence** *is* constitutive of what it is to be a power, if we assume that

no individual or sum of powers have an infinite degree: in a sense ‘when a causal process is interfered with...it may prevent causation from ever occurring. But, even if it did not, it could have done’ (Mumford & Anjum 2011:53).

This latter thesis, on the other hand, seems to be on shakier grounds. It concerns the global distribution of powers. This would be the thesis required by Mumford and Anjum to argue that dispositionality is constitutively tendential, in the sense that if a proposition is made true by an entity that is the manifestation of a power, then it is necessarily contingent. First of all, it appears to be an empirical fact presented as an *a priori* truth. Secondly, no argument along the lines of Antecedent Strengthening can be made in its favour: for it states that *it is the case* that for every POT[M] there is some POT[*not*-M], and not that this is merely possible.

I take Vetter, as well as any other dispositionalist who wants to ground necessity, to be denying **Extrinsic Independence**, when she admits necessities in the world, while Mumford and Anjum’s argument (including the antecedent strengthening test) are primarily concerned about denying the possibility of **Intrinsic Independence**. Nothing about powers in themselves should make us feel inclined towards **Extrinsic Independence** or its negation: it is up to the non-Humean mosaic, as it were—the initial global distribution of properties. So, it is an *a posteriori* fact: epistemically contingent, and epistemically possible. I see no reason why we should accept **Extrinsic Independence** *a priori*. Of course, this does not amount to refuting the idea that **Independence** is essential to powers *qua* powers yet—arguments against it are yet to come, and Mumford and Anjum might be committed to the essentiality thesis independently. However, I think that the distinction allows us to capture the intuition behind Mumford and Anjum’s heavyweight **Independence** principle without having to incur in its pernicious consequences for Dispositionalism: we could admit that **Intrinsic Independence** holds of all powers, but **Extrinsic Independence** holds only of some — those for which it fails can ground necessities. In one sense, we can say that **Independence** holds of all powers, but this does not threaten Dispositionalism. Whether the other, stronger sense of **Independence** holds, and of which powers, is also an

empirical question. This should be a very good piece of news for the epistemology of modality of Dispositionalism: as we discover the universe around us, we find out whether certain propositions are necessary or not — more specifically, it makes it relatively easy to discover that propositions believed to be necessary turned out to be contingent, which seems to reflect nicely the scientific practice.

To recap: I propose that the best anti-essentialist proposal is that **Independence** is not grounded in the essence of powers *qua* powers, but rather depends on the relationship between the global sums of opposite powers. This can be captured by the following unlovely mouthful:

**TT-IND:** For all powers whose manifestation would verify  $p$ , if i) the vectorial sum of degrees of powers for  $p$  is a finite value  $\alpha > 0$ , ii) if the vectorial sum of degrees of opposite powers for *non-p* is a finite value  $\beta > 0$ , then it is possible that P is spatiotemporally located and M is not spatiotemporally located.

I think that this is a plausible theory of for a principled restriction of the scope of **Independence**, compatible with the dispositionalist project of grounding necessities, as well as possibilities, upon powers—that is, it is a plausible alternative to INDE. But having an alternative theory with more desirable results does not mean that it is the right one. Nothing of what I have said so far entails that **Independence** is not to be thought as being grounded by the essence of powers. We need to take a look at the dialectic between the two positions before being reassured that powers are not incompatible with necessity.

## 10.7. Is Independence Essential to Powers?

To recap, we have now two competing theories of **Independence**. On the one hand, we have INDE, according to which **Independence** holds of absolutely all powers because it holds in virtue of the essence of what it is to be a power.

**INDE:** It is true in virtue of the nature of powers that, for every power P, it is possible that P is spatiotemporally located and its manifestation M is not spatiotemporally located.

Accepting INDE entails that powers cannot, *qua* powers,<sup>203</sup> be grounds for the truth of necessary claims—that Dispositionalism is doomed from the get-go, as far as necessity is involved. The modality involved with powers is *sui generis* and always short of necessity.

On the other hand, we have Two-Tiered, according to which **Independence** does not hold unrestrictedly and in virtue of the essence of being a power; rather, it is grounded in the *global* composition of gradable powers: a power of finite degree can fail to bring about its manifestation only if *there is an opposing power*. If there happens to be no opposing power, then any power of finite degree will necessarily bring about its manifestation.

The core of the disagreement concerning Dispositionalism’s possibility of grounding necessities, then, lies in the *source of Independence*: does it hold (when it does) in virtue of the nature of being a power, or on the total composition of *degrees* of powers? It is finally time to tackle this point head-on. I will start examining the main argument that can be offered in support of INDE: Antecedent Strengthening.

The argument comes in a variety of flavours: versions of it have been formulated by Schrenk (2010) and Mumford & Anjum (2011). All versions share a common idea: contrasting the monotonicity of necessity with the non-monotonicity of powers (in some

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<sup>203</sup> It is important to add this claim, for obviously, in a sense, some necessary truths will be grounded in powers even according to Mumford & Anjum. In particular, since essence entails necessity, IND $\diamond$  will turn out to be necessary. And it is obviously in virtue of *the nature of the powers* that such necessity holds. However, this is an essentialist ground, not a dispositionalist one: powers are merely the argument of the essence operator, which does all the modal heavy-lifting. (Giannini & Mumford forthcoming).

sense). I will formulate a toy-version of the Antecedent Strengthening that occurs, *mutatis mutandis*, at the core of every variation of the argument, and attack such toy version. If my refutation of this toy-AS is correct, then all arguments in which it is embedded will crumble, so I will not try to spell them out one by one.<sup>204</sup> We can formulate the Antecedent Strengthening argument as follows:

1. Necessity passes the antecedent strengthening test
2. Therefore, necessity is monotonic
3. Powers do not pass the antecedent strengthening test
4. Therefore, powers are not monotonic
5. Therefore, powers cannot ground any monotonic sentence or proposition
6. Therefore, powers cannot ground necessities

The antecedent strengthening test states that: if A necessitates B, then A,  $\varphi$  for any  $\varphi$ , necessitates B. If we understand necessitation as strict conditional, we can put this more formally:

**AST:**  $\square(A \rightarrow B) \rightarrow \square(A, \varphi \rightarrow B)$

Thus, Mumford and Anjum write:

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<sup>204</sup> Mumford and Anjum embed something akin to this version of the Antecedent Strengthening Argument in a more complex argument:

1. Powers are *causal* powers: they are essentially involved in causal goings-on.
2. Causal processes are essentially preventable.
3. Therefore, powers are essentially preventable.
4. If causal processes are essentially preventable, **Independence** is essential to powers.
5. **Independence** is essential to powers.

The ASA is employed to prove premiss 2., and runs roughly like this:

- I. If A necessitates B, then A,C necessitate B.
- II. Not (If A causes B, then A,C cause B).
- III. Therefore causation ≠ necessitation.

What I say in the main text against ASA will work with this variant too, once we formulate the ‘total cause’ (Mill 1843) with the unrestricted existential quantifier.

suppose [water is H<sub>2</sub>O]. Then there will be various true conditionals for different values of  $\varphi$ : if this is water and Madonna is a man, then it is H<sub>2</sub>O; if this is water and Barack Obama is President, then it is H<sub>2</sub>O... what we thus have is an *antecedent strengthening test of necessity*. We put the claim into conditional form, if we can, and then strengthen the antecedent of that conditional to see if it remains true under various conditions. If the conditional is robust under antecedent strengthening – that is, if it remains true for all strengthenings of its antecedent – then it passes the test and is necessary. If it fails for some strengthenings, we do not have a case of necessity (Mumford & Anjum 2011:57).

The first part of the argument seems clear enough: necessary truths are monotonic. But what does it mean to say that powers are not monotonic? If we adopted Naive Dispositional Necessity, it would mean that there are no surefire powers: that no power, on its own, can guarantee that its manifestation will occur, and therefore that the sentence made true by its manifestation will be necessarily true. So far, so good: Two Tiered is similarly committed to this point, as long as powers of infinite degree are banned. But those who deny INDE are not committed to Naive Dispositional Necessity. According to Two Tiered, necessary truths are grounded in the fact that there is a (finite) power for their truthmaker, and that there is no opposing powers.

Presumably, then, the Antecedent Strengthening argument can be adapted to Two Tiered by thinking that, despite it being the case that *actually* there are no opposing powers (and thus that  $\alpha < 0 \wedge \alpha - \beta = \alpha$ ), the domain of what exists *could have been bigger*, and contain the opposing power. So, it is not the case that, if  $\Box(A \rightarrow B) \rightarrow \Box(A, \varphi \rightarrow B)$  holds when A is the complete description of the actual universe and B is ‘ $\Box p$ ’, because  $\varphi$  might describe an extension of the actual universe which contains an opposing power which falsifies  $\alpha - \beta = \alpha$ . The idea behind the argument is that just because, *as it happens*, there are no powers to non- $p$ , it does not mean that there couldn’t be; but if  $p$  is necessary, we need

to show that there could not be anything undermining it. So, powers cannot really ground necessities.

But this line of reasoning begs the question. In the formulation targeted at Two Tiered, the antecedent, A, is a complete description of the actual world (at least as far as it's relevant for the truth of p). As such, it will involve a universal quantifier. We have to think that the quantifier is *absolutely unrestricted*, or Two Tiered cannot guarantee the failure of **Independence**. So, it ranges over absolutely all there is. When we say that p is necessary because *there is no* opposing power, we obviously have to mean that there is no opposing power in the broadest scope available. Since, according to the minimal metaphysics, unmanifested manifestations do exist, they are part of the domain upon which the quantifier ranges. But, in keeping with DPos, we can assume that at least *possibilities* are dictated by the actual powers, and therefore by all the manifestations. Therefore, strictly speaking, *we cannot* add anything else to run the antecedent strengthening test: there is nothing *extra* that we can add to our antecedent, because it already incorporated *absolutely everything there is*. So, any further truth  $\varphi$  that we add will not be relevant to the truth of p or its negation.

To this, Mumford and Anjum will reply that it is nevertheless *possible* that there is something more, and that is enough to get the argument going: 'all that is required is that it is possible that the effect be prevented by an additive interferer' (Mumford & Anjum 2011: 63).

I do not think that this is a good reply. First of all, note that in order to grant the possibility of that extra entity to exist, we have already had to abandon the Dispositionalist framework and DPos. The possibility that the additive interferer exists is not grounded in any of the actual powers, because otherwise the domain over which our unrestricted quantifier ranged would have already included it, which would thereby make it false that p was necessary to begin with. So, it is not clear whether it is legitimate to appeal to the possibility of that additive interferer *from* the Dispositionalist standpoint: it begs the question against the bit of the theory that was not under scrutiny (namely DPos). It

already assumes that actual powers do not ground all the *possibilities*. Compare the case with the necessity of the laws of nature entailed by dispositional essentialism: we cannot say that laws of nature could be any different, had different entities existed, if what is possible and necessary is dictated by the essences of what there actually is (Ellis 2001, Bird 2007, and Fine 2005).

But assume *per impossible* that we add an extra power (to the effect that *not-p*), so as to falsify the consequent, and that this is not an illegitimate, question-begging move. In that case, the antecedent of our conditional is a contradiction: ‘unrestrictedly there is no power such that *not-p* & there is a power such that *not-p*’. Assuming that we are operating in classical logic, *ex falso quodlibet*: for every proposition B, if A & not-A, then B. But this includes the proposition that necessarily *p*. That is to say, the conditional is vacuously true.

Obviously, the proponent of the antecedent strengthening argument will protest that the conditional has to be *non-vacuously* true. But in that case, since the antecedent is contradictory (the antecedent already stated that unrestrictedly there are no opposing powers and therefore the extra interferer was added *per impossible*), we would have to adopt a non-classical logic to account for non-vacuously true counterpossibles. But this begs the question against Dispositionalism again: it is not clear that Dispositionalism, or in general anybody supporting an ontology of powers, should admit non-vacuously true counterpossibles at all (Vetter 2016). In order for the argument to go through, we need that extra premiss.

Therefore, at best, the Antecedent Strengthening argument is incomplete. At worst, it relies on a premiss that we cannot concede: so far, we have treated powers as only supporting intensional contexts, so that I have operated assuming that if I have a power to  $\varphi$  and  $\varphi \equiv \psi$ , it seems hard to deny that I thereby have a power to  $\psi$ . A metaphysics of powers of this kind will have a hard time grounding the sort of hyperintensional logic required to make sense of non-trivially true counterpossibles, which is most likely to be modelled using impossible worlds (*inter alios*, Jago 2014, Berto & Jago 2019).

So, either we vacuously get the right result, or we have to substantially change the metaphysics of powers we have been operating with. But if the way we have to make sense of hyperintensional context (which would allow to account for non-vacuous counterpossibles) requires powers with impossible manifestations, then this is enough to undermine Dispositionalism without any need for the Antecedent Strengthening argument: DPoss would trivially fail if there are ‘dispositions impossible’, to borrow the pun of Jenkins & Nolan (2012). But not only would such a metaphysics of powers undermine Dispositionalism: it would most likely undermine also a number of other projects that powers theorists are interested in, including the foundation of causation, for it would entail that there are powers to do the impossible—that is, a strong violation of the laws of nature, in the sense of Lewis (1981) and Beebee (2003)—probably, not a result that Mumford and Anjum are looking forward.

Either way, it would seem that Antecedent Strengthening argument fails. And, of course, if there is no argument to the effect that powers cannot ground necessity, *a fortiori* there is no basis for the inference to the best explanation to the effect that **Independence** is essential to powers, nor any argument that embeds it will be sound. We have no reason to think that **Independence** is essential to powers *qua* powers.

## 10.8 Avoiding the Standoff

I have argued that the Antecedent Strengthening argument is flawed, or at least question-begging, and thus it does not show that Independence holds in virtue of the nature of powers *qua* powers. But this does not mean that INDE is false, and that Independence is grounded in the degrees of powers, as depicted by Two Tiered. I know of two arguments that try to show that Independence ought to be understood in terms of degrees of powers, both due to Vetter (2015; 2018). However, both arguments are built around the idea that there are maximal powers (I discussed them both in the previous sections: one is §10.4 and one in 10.5). But I have argued that we do not need anything like maximal powers for

grounding **Independence** in degrees, and indeed that we have better alternatives. Why, then, should we believe in one rather than the other theory of degrees?

I think that our best shot for deciding what theory of Independence to adopt, and for ultimately choosing Two Tiered, is that a theory which grounds **Independence** in the degree of powers rather than in their nature *simpliciter* is more theoretically virtuous than a theory accepting INDE and **Tendency**.

Much of what I am about to say crucially depends on whether the theoretical virtues of a theory are truth-conducive: whether the fact that a theory has certain merits (*e.g.* it is simple, elegant, explanatorily potent, etc.) warrants belief in its truth. It is quite a common,<sup>205</sup> although not uncontroversial (see in particular Bueno & Shalkowski forthcoming), methodology for theory choice in contemporary metaphysics. I do not intend to embark on a methodological debate here. I will just note that the idea that theoretical virtues are truth-conducive (or at least that they play the lion's share when it comes to theory choice in metaphysics) is shared by the two factions I am here concerned with; for instance, Mumford and Anjum explicitly state that 'often the best argument for acceptance of a theory is its explanatory utility and power. Accordingly, we will proceed to show how the dispositional modality can explain a range of phenomena in philosophy' (Mumford & Anjum 2018: 23). The principle of theory choice has recently been made quite perspicuous by Williamson (2007; 2016) and can be summed up, roughly, as by the following 'argument from utility':<sup>206</sup>

1. Theory T is more virtuous than theory T\* iff *were T true*, it would explain the phenomena better than T\*, were T\* true.
2. If T is more virtuous than T\*, we should believe that T is true rather than T\*.

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<sup>205</sup> The paradigmatic case is David Lewis: 'It is my view that the price is right, if less spectacularly so than in the mathematical parallel. The benefits are worth their ontological cost. Modal realism is fruitful; that gives us good reason to believe that it is true' (Lewis 1986:4).

<sup>206</sup> Confront: 'We should think it true, because it would do a better job of explaining things were it true' (Williamson 2016: 266).

I want to claim that theories based upon the idea that the source of **Independence** is the composition of the degrees of powers, rather than their essence, are better off *vis-à-vis* their theoretical virtues; if we accept arguments from utility, then this provides us with (defeasible) reasons to accept something like Two-Tiered rather than any theory based on INDE which accept **Tendency**, such as that defended by Mumford and Anjum.

Why think that Two-Tiered (and, in general, other theories rejecting INDE) are theoretically superior to INDE? It is always hard to determine which theory is better off (that is, it is always very hard to evaluate claims like the counterfactual in 1.), but I think it can score some points without being too controversial. First of all, it allows to give Dispositionalism a chance—it allows us to formulate a theory of modality based on actual powers. This is obviously question-begging; the whole point of Mumford and Anjum is that *we should not* be pursuing Dispositionalism, because **Independence** is essential to powers. But note that the circularity is admittedly part of the theory choice strategy based on Argument from Utility: the counterfactual that *if a theory were true it would explain the phenomena* is used to justify the fact that a theory is *in fact* true. Begging the question is ingrained in the methodology, for better or worse.<sup>207</sup> Both those who accept **Tendency** and those who reject it admit the existence of powers in their ontology, and both are confronted with the task of grounding modality. A theory which rejects **Tendency** and therefore gives (at least modest) Dispositionalism a chance is more likely to make powers do more of the theoretical heavy-lifting: it will allow powers to ground modality, among other things, while a theory adopting **Tendency** will have to find something else to act as the source of modality: thus powers would do less explanatory work, and presumably

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<sup>207</sup> This precisely the point that Bueno and Shelkowski (forthcoming) attack when criticising arguments from theoretical utility. They ‘question both the extent to which scientific practice itself relies on such theoretical virtue arguments (beyond providing pragmatic reasons for acceptance of the relevant theories) and whether these virtues legitimately provide grounds for commitment to the existence of the ontology that is thereby postulated’ (Bueno & Schalkowski forthcoming). In particular, they claim that the counterfactual premiss of the argument ‘is an expression of hope, rather than an articulation of a plausible basis for thinking a theory true. That it would do a better job is thought to justify that it does a better job. That it does a better job is thought to justify embracing it as true. A conclusion that a theory is true, however, cannot be warranted on the basis of a premise regarding its potential to do or to be something or other’ (*ibid.*).

something else entirely would have to be admitted in one's ontology (not necessarily so: perhaps the same ontology plus another hardcore actualist theory of modality, like Essentialism, would be enough). The point is not very strong, but it's something.

Secondly, Dispositionalism allows us to 'save the phenomena' of our pre-theoretical intuitions better than INDE. That is to say, Two Tiered, by distinguishing between **Intrinsic Independence** and **Extrinsic Independence** and accepting the former, allows us to both preserve the intuition that all powers are, in some sense, liable to being overpowered or contrasted, which lies at the heart of the Antecedent Strengthening argument, as well as the rejection of Causal Necessitarianism, without having to sacrifice our pre-theoretical intuitions that some propositions are necessary, even if we think that the world is a powerful place (indeed, even if we think that *all properties* are powers). *Ceteris paribus*, we should keep the more conservative theory with regards to our overall network of beliefs. Of course, we could also offer an error theory to the effect that we are systematically mistaken in thinking that there is such a thing as natural (or causal) necessity, but as a rule of thumb, *ceteris paribus* error theories are a cost: they are the last resource, to be adopted only if we have a knock-down argument that rules out those beliefs, or we cannot find a way to offer a theory which grounds them. We sometimes speak as if there is natural necessity. No knockdown argument has been offered against this claim, therefore a theory which allow the truth of our beliefs is preferable to one which posits that we are systematically wrong. Again, this claim is *very* defeasible and can be disputed.

Finally, an epistemic point. Adopting Two Tiered allows us to modify some of our judgements and beliefs concerning what is necessary: it invites a fallibilist epistemology of modality, at least as far as necessity is concerned. Whether  $\Box p$  is true or not will depend by what properties are out there in the world: we might start by observing that some power P is invariably followed by its manifestation M and hypothesise that there are no opposing powers and therefore the sentences made true by M are necessary — only to detect, in our empirical investigations, that there are opposing powers, somewhere. This allows us to revise our knowledge of what is necessary based on our empirical findings — something

that seems to fit better with our scientific practices and the history of science than the idea that we can know what is necessary once and for all *a priori*: namely, none. Note also that Two Tiered is more permissive — it does not rule out that, in fact, **Extrinsic Independence** is true and therefore so is Universal IND $\diamond$ : after all, we might find out that, as it happens, it is really the case that for every power there exists an opposing one. But it also allows that this is not the case, and there are genuine natural necessities. This neutrality is to be preferred, *ceteris paribus*, I think: neutrality as to the particular modal truths should be a virtue of a theory of the foundation of modality.

Admittedly, these considerations are far from being overwhelming: after all, it would seem that the flexibility of the minimal metaphysics of powers bites us back here, allowing us to accommodate a thesis such as **Tendency** which conflicts with the original aim for which the minimal metaphysics was developed, namely to ground Dispositionalism. However, these arguments from theoretical utility do contribute to creating some space for rational theory choice when it comes to INDE and **Tendency**: there are pros and cons to be weighted. If the methodology has any merit, then there is hope of making some progress. Indeed, if the circularity at the root of arguments from theoretical virtues is acceptable, Dispositionalism itself would be the best reason to think that INDE is false. If we buy into the idea that theoretical virtues are truth-conducive, we have thereby some defeasible reason to reject INDE and give Dispositionalism a chance.

Suggesting that the question concerning the source of **Independence** in the context of the minimal metaphysics should be settled by looking at the theoretical virtues of the two proposals, the main one concerns the ability to support Dispositionalism, a curious dialectical inversion has taken place: for the majority of the thesis, I have developed a metaphysical base that should ground, but also constrain and shape the Dispositionalist theory of modality. Here, on the other hand, it is the viability and independent merits of Dispositionalism that end up shaping the metaphysics underneath: the more attractive and valuable Dispositionalism as a theory of the foundations of modality is, the more reasons

we have to adopt the metaphysical picture that supports it, and thus think that Independence is grounded in the degrees of powers.

This sort of dialectic upturning is not surprising, considering the two *desiderata* that I have set out for the minimal metaphysics of powers at the beginning of the dissertation: on the one hand, to give Dispositionalism a shot; on the other hand, to be in a position to interact meaningfully with other brands of powers ontologies and their applications. The compatibility and overlap with these other theories is obviously shaped and constrained by their merits: how much out of our way we should go in order to preserve the necessary overlap needed to maintain a unitary framework among powers-based theories depends on what riches the various theories offer. Thus, in absence of straightforward entailments or links, the way in which we should expand the minimal metaphysics of powers will be dictated by what enterprises and applications are worth pursuing and their success.

## Concluding Remarks

The goal of this dissertation was to develop a metaphysics of powers that satisfies two *desiderata*: on the one hand, it had to provide a good basis for Dispositionalism; on the other hand, it had to be suitable to support other applications of powers to metaphysical problems, or be relevantly similar to metaphysics of powers that are being used to pursue these other projects, in order to create a unified, common framework for Anti-Humeans of all stripes.

I have started by presenting two core principles that minimally characterise any theory that purports to be a theory of powers: that powers are directed towards their manifestation (**Directedness**) and that some powers might fail to bring their manifestation about (**Independence**). These two are, *prima facie*, in tension: the metaphysics of powers is threatened by an argument to the effect that its core principles are inconsistent. Trying to dispel this argument allowed us to gain a better understanding of the implications and commitments of powers ontologies. I have argued that **Directedness**, and in particular the idea that powers depend for their identity upon their manifestations, commits us to the existence of unmanifested manifestation. This means that even if the directedness relation is akin to Physical Intentionality, if we adopt a powers ontology we will be committed to a whole lot of entities: in fact, if we accept Dispositionalism, we are committed to *all* the possible entities. It turns out that Dispositionalism has a very generous ontology, despite being a hardcore actualist theory.

This leaves us with the task of figuring out what these entities are: in particular, it is unclear how unmanifested manifestations should be understood. After considering a number of alternatives in chapters 2-5, either aimed at dissolving the tension (Marmodoro's theory, processes ontologies) or providing an answer to it (non-actual entities, uninstantiated universals), I have concluded in chapter 6 that the best way to characterise the difference between manifested and unmanifested manifestations is in terms of spatiotemporal location and its essentiality. Taking these as factors, I have introduced the

following fourfold scheme which, I suggest, should be taken as the minimal framework for powers ontologies in general:

	Essentially	Spatiotemporally located
Concrete	X	✓
Abstract	✓	X
Logical Existence	X	X
Spacetime points	✓	✓

The scheme is at the core of my proposed minimal metaphysics of powers, and allows us to elucidate what it means for a power to bring its manifestation about (that it, what it means to become manifested): simply to acquire a spatiotemporal location. On this basis, it becomes possible to be fairly liberal when it comes to the ontological categories that manifestations of powers can belong to (§7): anything that is not essentially located in space and time can play that role, including particulars (akin to Williamson's Mere Logical Existents), tropes, or states of affairs. This has important consequences for Dispositionalism: first of all, it allows the theory to account for *de re* truths about merely possible individuals: the rich ontological resources of the minimal metaphysics thus help Dispositionalism to overcome the expressive shortcomings pointed out by Jessica Leech (2017).

Furthermore, the minimal metaphysics proved to be very apt at accommodating a number of further theses that characterise more 'radical' theories of powers. In particular, in chapter 8 I showed how the minimal metaphysics can without any difficulty be strengthened by the addition of **Productivity** and **Dynamism**. Radicalising powers also yielded a number of elucidations about the minimal theory itself (§8). Attempting to incorporate **Productivity**, I have introduced and characterised a notion of dependence from power to manifestation, distinct from the metaphysical dependence from

manifestation to power. Powers are caught in a complex network of dependency relations. Among other things, this means that they do not fit nicely with linearly hierarchical pictures of the world: if dependences track fundamentality, in a powers ontology there is nothing that is absolutely fundamental—nothing is perfectly ungrounded or independent.

Examining how to implement **Productivity** and **Dynamism** to the minimal metaphysics in relation to time also allowed us to tackle a problem for all powers ontologies, namely whether powers are compatible with any of the existing theories of time—idea that has recently been put in doubt (Donati 2018; Backmann 2018). In §8 I argued that the minimal theory is compatible with Eternalism. This is good news for Dispositionalism, insofar as it makes it easier to provide a semantics for cross-temporal modal truths, dated possibility claims, and account for the debate over the direction of powers,

If anything, the minimal metaphysics of powers has proven to be even too flexible: even if it does not entail **Tendency**—the thesis that powers embody a *sui generis* kind of modality always short of necessity—in chapter 10 it emerged that it is compatible with it. This shows that the powers metaphysics here developed is not tailored specifically and uniquely for Dispositionalism, and it can act as the minimal common ground for all friends of powers—chapters 8 and 10 showed that the way to best develop and enrich the minimal framework is very much up for grabs, and will depend also on the requirements and success of its applications to philosophical problems.

Not all consequences of the minimal metaphysics are favourable for Dispositionalism, however. Adopting **Two-Tiered** makes it considerably hard to generate a theory of modality that *cleanly* preserves the duality of the modal operators. It should be quite easy to see why this is the case: according to **Two-Tiered**, in order to ground  $\Box p$  it is not enough to make sure that there is no power whose manifestation would verify  $\neg p$ : we also need to make sure that there is a power whose manifestation would verify  $p$ —we need to rule out cases in which both  $\alpha$  and  $\beta$  are equal to zero, as showed by Yates's (2015) argument. This point echoes Yates' proposal for ‘weak dispositionalism’, to a certain degree: the time theory of modality offered by Dispositionalism will involve conjunctions or

disjunctions — DNec, as it is, is not enough. Dispositionalists will need something along the lines of

**DNec+:** ‘Necessarily  $p$ ’ is true iff and because i) there is no power whose manifestation, if manifested, would make ‘not- $p$ ’ true *and* ii) there is a power whose manifestation, if manifested, would make ‘ $p$ ’ true.

But this is not all: there are more conjunctions and disjunctions on the horizons in Dispositionalism’s complete theory of modality, if we have to adopt something along the lines of DNec+: it is far from clear that powers can ground all necessary truths there are. As I have argued in §6.5 and §8, the minimal metaphysics that I developed makes it hard to see how there could be powers directed at abstract entities, because to become manifested is cashed out in terms of acquiring a spatiotemporal location, in the Minimal metaphysics that I develop, which clearly is not fitting for abstracta. This means that, unless the dispositionalist manages to show that all truths can be grounded upon concrete entities, she will have to limit the scope of her theory to natural modality only.

A second troubling consequence for Dispositionalism is that non-modal essences play a central role in my understanding of powers. If we accept that essence entails necessary truths, we have to conclude that some modal truths are generated by essences—in other words, that Dispositionalism is irremediably intertwined with a *prima facie* rival theory of the source of modality, Essentialism.

These two consequences are closely related. However, while each one is problematic on its own, taken together they might indicate a possible way forward. There are, I think, encouraging signs for a fruitful interaction between powers and essences. In §9 I exploited the fact that a primitive essence operator is part and parcel of the ideology of the minimal metaphysics for suggesting a solution to some troubling consequences that stem from the conjunction of the inflated ontology of powers metaphysics, Dispositionalism, and

Truthmaking. In order to avoid that Dispositionalism collapses into Megaric Actuality (the thesis that everything that is possibly true is also true), I argued that we have to restrict the scope of the truthmaking principle to spatiotemporally located entities only, which in turn raises the question of the truth value of sentences concerning abstract objects. I have suggested that we should adopt a form of truthmaking pluralism which takes the essence operator to be a kind of truth-maker operator, so that truths (be they modal or not) about abstract objects can hold in virtue of the essences of *abstracta*. This is a tentative suggestion, that would need to be worked out in much more detail—it is one of the main lines of future work that I intend to pursue.

In general, it seems to me that the most urgent and interesting direction of future research related to powers ontologies and Neo-Aristotelian metaphysics concerns the relation between essences and powers. Essence and powers are the two core notions that spearheaded the Neo-Aristotelian renaissance in metaphysics<sup>208</sup> and yet they have been largely treated independently—when they have been both employed (like in the case of Ellis’ Dispositional Essentialism) the consequences of their interactions have not been explored in enough detail. I think that Neo-Aristotelians, if they hope to present a viable and challenging alternative paradigm to the Neo-Humean mosaic, should look to bridge this gap. I hope that the picture I have presented here represents a first step in this direction; although I stop short of the thick of things, the minimal metaphysics shows that, if you buy powers, you have to take essences home, too. We cannot offer a satisfactory metaphysics of powers without appealing to essences. This is not a bad thing—it has beneficial effects for powers metaphysics: the appeal to essences allowed us, for instance, to dispel the mystery surrounding the status of unmanifested manifestations. I have not argued directly that the converse holds, and that if you buy essences, you should also buy powers, mainly because I have not attempted to convince anybody that the world is brimming with potentialities and powers are preferable to categorial properties. However, insofar as theory choice in metaphysics is a holistic, systematic matter, by offering what I

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<sup>208</sup> Honourable mention to Mereological Hylomorphism: see Fine (1999), Koslicki (2008; 2018).

hope is an attractive theory of powers, I have contributed to the idea that we should all believe in powers. I believe that accepting powers brings benefits also to the Essentialist: for example, in Giannini & Mumford (forthcoming) I suggest that appealing to powers allows essentialists to establish a middle ground between constitutive and consequential essence, and thus capture the Aristotelian notion of *propria*, which could be of use in offering formal explanations.

I think that the results of this thesis offer some reasons to think that we should try to do the same when it comes to our theory of modality, and attempt to integrate Dispositionalism and Essentialism. I suspect that neither Dispositionalism nor Essentialism (Wildman forthcoming) as they currently are have all the resources to ground absolute or metaphysical modality, but a hybrid theory might yield an adequate theory of modality for the hardcore actualist. Obviously, how to develop such a hybrid theory is far from being a trivial matter, and indeed the road to it long and full of challenges: Dispositionalism and Essentialism as they currently are do not overlap seamlessly. Nevertheless, I think that the task is an exciting one, and that it should occupy both dispositionalists and essentialists in the immediate future. At least, it is the task that I intend to devote myself to for future work.

In this dissertation, I initially aimed to develop the minimal metaphysics of powers to give Dispositionalism its best shot (while remaining in contact with other theories that make use of powers), and this ended up throwing essences in the mix. In doing so, I did both more and less than what I originally aimed to do. Less, because the minimal metaphysics is not a perfect ground for Dispositionalism as the latter is currently formulated: it undermines the prospects of grounding metaphysical, absolute modality.

However, if the metaphysics I have presented here is independently attractive, perhaps I have also done more: perhaps the mismatches between the minimal metaphysics and Ambitious Dispositionalism were indications of possible shortcomings of Dispositionalism, and the role that essences play in the *metaphysics* suggest a direction for further development for the *theory of modality*. Hopefully, the minimal metaphysics presented

here will contribute to it, by providing a solid metaphysical ground upon which to build such hybrid theory of modality.<sup>209</sup> But even if the project of an integrated theory of modality were to turn out not to be feasible, the minimal metaphysics of powers presented here could still act as a common ground for a theory of the source of *natural* modality and all others theories that employ powers. This would still be an important step: it is time that Neo-Aristotelians and powers theorists make sure that they are on the same page when they talk to each other, and ground all their anti-Human projects upon a unitary metaphysics.

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<sup>209</sup> I think it is an encouraging sign that both are best served by adopting a necessitist ontology, which my minimal metaphysics is (for Essentialism, see Teitel forthcoming. For Dispositionalism, apart from the arguments in this thesis, see Kimpton-Nye forthcoming).

## Appendix: Abbreviations and Principles

**Abstract:**  $a$  is abstract iff it is essentially non-located. Formally:  $\neg Located(a) \wedge \square_a \neg Located(a)$

**AST:**  $\square(A \rightarrow B) \rightarrow \square(A, \varphi \rightarrow B)$

**Aristotelian Universals:** A universal  $F$  exists iff there is some particular  $x$  such that  $x$  instantiates  $F$ .

**BAD:**  $\diamond p \rightarrow p$

**Concrete:**  $a$  is a concrete entity iff it is non-essentially located. Formally:  $Located(a) \wedge \neg \square_a Located(a)$

**Contribute:** For every  $x$  and  $y$ ,  $x$  and  $y$  have a joint potentiality to  $p$  if and only if  $x$  and  $y$  individually considered have the potentiality to *contribute* to  $p$ .

**Co-Location:**  $M$  is actualised at  $t_2 =_{\text{df}}$  there is some  $xx$  such that  $xx$  are not co-located with  $M$  at  $t_1$  and  $xx$  are co-located with  $M$  at  $t_2$ .

**DNec:** ‘necessarily  $p$ ’ is true iff and because there is no power whose manifestation, if manifested, would make ‘not- $p$ ’ true.

**DNec+:** ‘Necessarily  $p$ ’ is true iff and because i) there is no power whose manifestation, if manifested, would make ‘not- $p$ ’ true and ii) there is a power whose manifestation, if manifested, would make ‘ $p$ ’ true.

**DPoss:** ‘possibly  $p$ ’ is true iff and because there is some power whose manifestation, if manifested, would make ‘ $p$ ’ true.

**DYN:**  $P$  dynamically brings about  $M$  iff there is an uninterrupted process  $\varphi$ -ing essential to  $P$  that has  $M$  as its natural endpoint.

**DUAL:**  $\square p \square \neg \diamond \neg p$

**Fine Sentence:** Fine Sentence. It is essential to {Socrates} that it has Socrates as a member, but it is not essential to Socrates that he is a member of {Socrates}

**Fundamental:** If  $x$  depends upon  $y$ , then  $y$  is more fundamental than  $x$ .

**General Dependence:**  $x$  depends for  $F$  upon  $y$

**GENERALITY:** Our disposition-ascriptions are ordinarily indeterminate under various respects.

**HOMOEOMEROUS:** If it is true that  $O$  was  $\varphi$ -ing between  $t_1$  and  $t_2$  then  $O$  was  $\varphi$ -ing during any subinterval between  $t_1$  and  $t_2$ .

**Identity-Existence:** If  $x$  depends for its identity upon  $y$ , then, necessarily,  $x$  exists only if  $y$  exists.

**IND $^\diamond$ :** For some power  $P$  such that  $P \rightarrow M$ , it is possible that  $P$  is spatiotemporally located and  $M$  is not spatiotemporally located.

**IND-A:** For some power  $P$  such that  $P \rightarrow M$ ,  $P$  is spatiotemporally located and  $M$  is not spatiotemporally located.

**INDE:** It is true in virtue of the nature of powers that it is possible, for every power  $P$ , that  $P$  obtains and its manifestation,  $M$ , does not (is not manifested).

**IND-Process:** The manifestation  $M$  of a power  $P$  is a certain process,  $\Phi$ -ing. The power can exist without there ever be any  $\Phi$ -ing.

**IND-Telos:** The manifestation  $M$  of a power  $P$  is a certain process,  $\Phi$ -ing, which has a certain *telos*  $T$ . The power can exist and produce the process of  $\Phi$ -ing, which however might not be completed, and thus without  $T$  occurring.

**INTERRUPT:** The manifestation of powers can be interrupted, interfered or tampered with before it reaches its *telos*.

**MD:** The power  $P$  depends for its identity upon the identity of its (merely potential) manifestation  $M$ :  $P$  is what it is in virtue of  $M$ 's being what it is.

**MD\*:** ID( $P$ ) depends upon/because/holds in virtue of ID( $M$ )

**Location Dependence:** [Located( $M$ )] depends upon [Located( $P$ )] or, alternatively, [Concrete( $M$ )] depends upon [Concrete( $P$ )].

**MLE:** Mere Logical Existence.  $a$  is a mere logical existent iff  $\neg \text{Located}(a) \wedge \neg \square_a \neg \text{Located}(a)$

**Naive Dispositional Necessity:** ‘Necessarily  $p$ ’ is true iff there is some power P such that its manifestation M would make  $p$  true and P necessitates that M is spatiotemporally located.

**Non Modal:** An entity is actualised (namely, concrete or abstract) *iff* it has powers as well as categorical properties, and is merely logically existent *iff* it only has powers.

**One Existence:** Existence is univocal—to exist is *not* said in many ways.

**One Quantifier:** Existence is captured by the unrestricted existential quantifier (of our most natural language).

**One Commitment:** We are ontologically committed to everything in the domain of the unrestricted existential quantifier.

**Operational MD:** ‘ID $x$ ’ because ‘ID $y$ ’

**P@T:**  $x$  is part of  $y$  at  $t$  iff  $x$  and  $y$  each exist at  $t$ , and  $x$ ’s instantaneous temporal part at  $t$  is part of  $y$ ’s instantaneous temporal part at  $t$ .

**Productive Dependence:**  $x$  depends for its being spatiotemporal located/for its being concrete upon  $y$

**PPI:** Every universal must be at least potentially instantiated: there is a property universal of being F only if there is some particular thing which is F, is potentially F, or is potentially such that something is F

**PRECISION:** The metaphysics of manifestations must be fine-grained enough to differentiate between manifestations that are the result of distinct powers.

**Process Bearer Identity:** The identity of an individual process  $\varphi$ -ing depends on the identity of the substances involved in  $\varphi$ -ing.

**Process Identity:** the identity of a process depends upon its telos

**Process Production:**  $P$  productively brings about  $M$  iff there is an uninterrupted process  $\varphi$  essential to  $P$  that has [Located( $M$ )] or [Concrete( $M$ )] as its natural endpoint.

**Weak Production:**  $P$  produces  $M$  at  $t =_{\text{df}} M$  productively depends upon  $P$  and  $M$  is actualised at  $t$ .

**Production-Existence:** If  $x$  depends for its being located upon  $y$ , then necessarily,  $x$  exists only if  $y$  exists

**PToken:** The type/token distinction applies to processes. There are individual processes.

**PType:** Processes come only in types. There are no token processes, no individual processes.

**Platonic Universals:** A universal  $F$  is an abstract entity which exists necessarily at all times, independently of being instantiated.

**RA:** An object  $a$  changing from being  $F$  to being  $G$   $\equiv_{df}$  There is a time  $t$  such that  $a$  is  $F$  at  $t$  and there is a time  $t'$  such that  $t < t'$  and  $a$  is  $G$  at  $t'$ .

**RAD:** An object  $a$  changing from being  $F$  to being  $G$  iff there is a time  $t$  such that  $a$  is  $F$  at  $t$  and there is a time  $t'$  such that  $t < t'$  and  $a$  is  $G$  at  $t'$ .

**RAE:** An object  $a$  changing from being  $F$  to being  $G$  iff and (fully) in virtue of there is a time  $t$  such that  $a$  is  $F$  at  $t$  and there is a time  $t'$  such that  $t < t'$  and  $a$  is  $G$  at  $t'$ .

**RAD+:** An object  $a$  changing from being disposed toward  $F$  to being more disposed toward  $F$  iff  $\langle (nPa \rightarrow F) \text{ at } t, (n+1Pa \rightarrow F) \text{ at } t' \rangle$ .

**RAD++:** An object  $a$  changing from being disposed toward  $F$  to being more disposed toward  $F$  iff  $\langle (nPa \rightarrow F) \text{ at } t, (n+1Pa \rightarrow F) \text{ at } t' \rangle$  & there is (the right kind of) process  $\varphi$  such that there is  $\varphi$ -ing between  $t$  and  $t'$ .

**Relational MD:**  $R([IDx], [IDy])$

**Time-Independence:** An individual power (token) might exist unmanifested for some time, but it has to manifest at some other (later?) time

**Scheme:** Manifestations of powers must not be essentially non-located; Manifestations of independent powers must not be essentially located.

**Shomoeomerous:** if it is true that  $O$  was  $\varphi$ -ing between  $t_1$  and  $t_2$  then  $O$  was  $\varphi$ -ing during any

interval between  $t_1$  and  $t_3$  that has  $t_1$  and  $t_2$  as subintervals.

**Simple Degree: Independence** is grounded in a power's *degree*, and holds only for non-maximal powers.

**TM:**  $A \rightarrow \exists x \square (\exists y x = y \rightarrow A)$

**TM\***:  $A \rightarrow \exists x \square ((\exists y x=y \wedge Fx) \rightarrow A)$

**TMV**:  $A \rightarrow (\exists x \square ((\exists y x=y \wedge \text{Located}(x)) \rightarrow A)) \vee \square_x A$

**TMP**: Too Much Possibility.

**TM-SpatioTemporal**:  $A \rightarrow \exists x \square ((\exists y x=y \wedge \text{Located}(x)) \rightarrow A)$

**TM-SpatioTemporal\***:  $A \rightarrow \exists x \square ((\exists_L y x=y \rightarrow A)$

**Token-Independence**: A token power P of kind O might exist and be forever unmanifested, but some other power of kind O has to be manifested at some time.

**Trope Predication**:  $Fa$  iff i) a is located at R, and ii) F is located at R.

**TT: Independence** holds iff  $\alpha - \beta \neq \alpha$

**TT-IND**: For all powers whose manifestation would verify  $p$ , if i) the vectorial sum of degrees of powers for  $p$  is a finite value  $\alpha > 0$ , ii) if the vectorial sum of degrees of opposite powers for  $\text{non-}p$  is a finite value  $\beta > 0$ , then it is possible that P is spatiotemporally located and M is not spatiotemporally located.

**TTNec: Independence** does not hold and it is the case that necessarily  $p$  iff  $\alpha - \beta = \alpha$

**Type-Independence**: There could be a kind of powers that never manifest. 'There is type-independence iff a disposition trope of kind O can exist without a manifestation of any trope of kind P existing' (Molnar 2003: 82).

**Universal IND $\diamond$** : For every power P such that  $P \rightarrow M$ , it is possible that P is spatiotemporally located and M is not spatiotemporally located.

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