Dispositionalism
A Study on Properties

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Table of Contents

Introduction 4
Acknowledgements 10

1. Toward a Property Based Account of Physical Modality 12
1.1 Introduction 12
1.2 Concretism 14
1.3 Dispositionalism 19
1.3.1 Powers and the Identity of Properties 22
1.3.2 The Grounding of Physical Modality 28
1.4 Meta-Ontology 34
1.5 Ontological Profile and Grounding Profile 42
1.6 Conclusion 45

2. Causal Dispositionalism 48
2.1 Introduction 48
2.2 Powerful Causation 50
2.3 The Compositional View 53
2.3.1 Mereological Composition 58
2.3.2 Functional Composition 68
2.4 The Processual View 70
2.4.1 Moderate and Full-Blown Dynamicity 74
2.4.2 Unbreakable Processes? 77
2.5 Conclusion 80

3. Tropes Dispositionalism 81
3.1 Introduction 81
3.2 Tropisms 81
3.3 The Transferability Problem for Power Tropes 92
3.3.1 Pure Tropes Dispositionalism 94
3.3.2 Impure Tropes Dispositionalism 103
3.4 Conclusion 109

4. Immanent Dispositionalism 110
4.1 Introduction 110
4.1.1 Immanentism and Aristotelianism 111
4.2 Immanentisms 113
4.3 The Grounding Problem for Immanent Powers 118
4.3.1 Tractarian Immanent Dispositionalism 120
4.3.2 Combinatorial Immanent Dispositionalism 124

4.4 Conclusion 134

5. Platonic Dispositionalism 136

5.1 Introduction 136
5.2 Platonism 137
5.3 Platonism and the Physical 145
5.3.1 Imagine There's No Heaven 147
5.3.2 When You're a Stranger 156
5.4 Platonic Powers 162
5.5 Two Problems for Platonic Dispositionalism 169
5.5.1 The Problem of Negativity for Platonic Powers 170
5.5.2 The Zero Strategy 173
5.5.3 The Problem of Governing for Platonic Powers 177
5.5.4 As Deep as Governing Needs to Get 181
5.6 Conclusion 187
Final Remarks 188

6. References 193

Introduction

In this thesis I offer a study of a metaphysical theory that has acquired popularity in recent years: dispositionalism. To characterise dispositionalism in general terms is no easy task. Nevertheless, the following is an attempt.

Dispositionalism is a non-reductive and non-Humean theory of modality. While neo-Humeanism takes facts about natural modality to be *posterior* to facts about patterns of properties' instantiations, dispositionalism takes modality to be *prior* to the pattern of instantiation. According to the neo-Humean camp, no modal elements determine how the pattern is constrained: this is a *brute fact*. According to the dispositionalist camp, on the other hand, a pattern of instantiation is determined and explained by the *modal nature* of properties. While the first is a non-modalised view of the world that reduces any modal facts to a non-modal ground, the second objects to this reductive program by offering a modal primitivist view. According to the latter view, modality has its *source* in the *nature* of irreducibly modal properties.

While negative definitions are typically looked upon suspiciously, and perhaps even regarded as uninformative, this is not the case with our present concern. Our negative definition contains the core of the dispositionalist project, that which any dispositionalist theory worthy of the name should adhere to.

As with any theory (of possibility), the core of dispositionalism has two aspects: an *ontology* and a *fundamental argument* – or *ideology*.

Dispositionalism is first and foremost a *property-based* theory of modality. The ontology of dispositionalism postulates, *primus inter pares*, that there are modal properties. Dispositionalists call these properties *powers*, mostly because of the role they play in doing what the argument says they should do: accounting for (natural) possibilities. The fundamental argument of dispositionalism is indeed that these powers –properties with modal nature –can metaphysically explain first-order physical regularities.

There are many interesting dispositional endeavours. In some (many) cases dispositionalism is applied outside the domain of the metaphysics of modality: indeed, a countless number of words have been spent on the benefits of applying dispositionalism to certain topics, such as causation, or to certain areas of study, such as the philosophy of science (see Ellis 2002; Mumford & Anjum 2011; Cartwright & Pemberton 2011; Harré & Madden 1975; Austin 2015b; *inter alia*). Other scholars have focused on the adequacy of the view, raising questions of *material* and questions of *formal adequacy* (see Yates 2002; Vetter 2015; *inter alia*).

The former group are concerned with the richness of the content of the theory: whether there are enough modal properties to account for all the possibilities we envisage, for instance, or whether all laws of nature are reducible to modal properties and the connection between them. Both count as questions of *material adequacy*. The latter group are concerned with the expressivity of the language of the theory. Whether we can offer a formally adequate modal logic for powers, or whether we can introduce a dispositionality operator together with the standard one, would both count as questions of *formal adequacy* (see Yates 2012; Vetter 2018*; inter alia*).

The present work is a different sort of enterprise. A sort that might, I freely concede, be less exciting, but is nevertheless perhaps more crucial. It is a work of *meta-metaphysics*, and in it I pursue two goals.

Firstly, I discuss at length what we mean when we say that *powers are properties*. To some extent, therefore, this is a study in the meta-ontology of dispositionalism: a study of all the ontological forms that powers can take. The task involves analysing powers as tropes, immanent universals, and transcendent universals. Each of these theories conceives of properties in a very different fashion: as purely property instances, complexes of instances and ontologically dependent universals, and as complexes of instances and ontologically independent universals, respectively.

Secondly, I examine how to best align the ontology with the fundamental argument, or *ideology*. Dispositionalism attempts to use properties in quite an unorthodox fashion: not as entities that account for resemblance or abstract references, but as entities that account for modal facts. As will

become clear, not every property has the right sort of "grounding profile" to carry out the job powers have to do. As such, not every ontological form can make powers the fundamental entities from which certain (modal) facts derive. While I will not engage with the question of whether or not powers exist, I shall ask whether or not they are fundamental – in the sense of being what grounds so and so. In this respect, the present thesis is a study in the *meta-metaphysics* of dispositionalism.

There are at least three reasons why this is a valuable endeavour. Firstly, little effort has been dedicated to assaying which theory of properties best fits the requirements from the metaphysics. The aim of this work *is to remedy this*.

Secondly, not much attention has been paid to discussing how some very promising tools from the metaphysical toolbox, such as grounding, can bring clarity to the debate between the two canonical formulations of dispositionalism: the *pure powers* view and *powerful qualities* view.

Thirdly, and perhaps most importantly, I shall delve into foundational aspects of the metaphysics: those relevant for evaluating the coherence of the theory and that can be used to contrast it with others. For if no theory of properties, no grounding profile, can do the job of grounding promised by the theory, then either the theory collapses into its opposite, or – worse – reveals itself to be an illusory metaphysics. If dispositionalism is beaten here, if the theory fails on this question, then *the entire campaign goes kaput*.

The scope of the present work is therefore simple: to analyse which theory of properties best fits the desiderata and the requirements from the metaphysics, and to defend the core of dispositionalism. My conclusion is that *dispositionalists must be platonic dispositionalists if they are to be dispositionalists at all*.

If the arguments in this thesis are correct, there is no hope of grounding natural modality by making the pattern of instantiation identical to what should ground this pattern, as we will see is the case with the tropist version of the theory. Nor is there any hope of making the grounding base dependent on the pattern, as with the case of immanent dispositionalism. The only hope is to make the grounding base ontologically prior to the

pattern of instantiations. This, as I will show, can be accomplished by a platonic version of dispositionalism.

Chapter One sets the stage for the main discussion. In it I will introduce and discuss dispositionalism. Then I shall isolate two claims that I identify as the minimal commitments by which dispositionalism can be distinguished from other views, and on whose defensibility lies the success or the failure of the metaphysics, namely:

> (P) (Some) properties are powers.
> (NM) Powers ground natural modality.

I shall discuss two meta-metaphysical considerations aimed at showing that the introduction of modal primitives is *per se* a problematic manoeuvre. I will show how to dissolve these worries and then conclude by introducing Chapter Two

Before turning my attention to the three theories of properties discussed in this dissertation, I will turn to the examination of *Causal dispositionalism* (CD): the view that powers are properties with a causal nature, and that this nature explains causal patterns at the first-order level. A causal dispositionalist will favour a defense of powers' metaphysics based not on considerations regarding the right ontology of properties; rather that causal dispositionalists are united in the belief that powers illuminate questions of causation. It therefore makes sense to examine whether the latter claim really is the case. I will argue that it is not, and that causal dispositionalists fail to provide a satisfactory account of powers-based causation. My conclusion is that recent complains about the current "overpowering" trend (Bird 2016) are justified.

In Chapter Three I shall examine *trope dispositionalism* (TD). While many dispositionalists are agnostic over which theory of properties better fits the requirements of their metaphysics, others are explicit about their ontological commitments. Molnar, Martin, and Heil are among the most vocal advocates of a combination of tropism and dispositionalism (Heil 2003; Martin 1980; Molnar 2003; *inter alia*). I will distinguish between two versions of the ontology: *pure tropism* (PT) and *impure tropism* (IT). Regardless, I will show that the combination of trope ontology – whether (PT) or (IT) – and dispositionalism (D) is neither coherent nor desirable.

We must therefore abandon the project of trope dispositionalism, whether in its (PTD), (ITD), or *powerful qualities* form (PQ).

Within the dispositionalist camp the majority of scholars are content to combine that metaphysics with the ontology of immanent universals. Curiously, however, while it is not uncommon to find dispositionalists flirting with immanent universals, it is hard to find an explicit defence of this move. In fact, virtually all versions of immanent dispositionalism simply assume the combination to be viable.

In Chapter Four I shall examine whether this combination, *immanent dispositionalism* (ID), really is defensible. I shall focus on Armstrongian Immanentism, and – perhaps to the reader's surprise – set aside any analysis of Aristotelian immanentism. After briefly explaining this methodological decision, I will turn my attention to Armstrongian immanentism, differentiating between two further versions of that ontology: *compositional immanentism* (CI) and *tractarian immanentism* (TI). I will conclude, yet again, that the combination of immanentism and dispositionalism is neither coherent nor desirable, and that we must, therefore, abandon the project of immanent dispositionalism whether in its (CID) or (TID) form.

In Chapter Five I shall examine dispositionalism against the only ontological theory left, namely Platonism. I shall argue that the Platonic theory of universals is the right ontology for dispositionalism, as it fits both (P) and (NM). First, I will introduce the ontology of Platonic properties, distinguishing between two versions of it. On the basis of a clear understanding of the ontology, I will then analyse two meta-ontological worries that those with sympathies for metaphysical naturalism might associate with Platonism. I will show that the rebuttal of Platonism on the basis of such worries is unjustified, and then present an account of Platonic dispositionalism (PD) compatible with both (P) and (NM). I will conclude by discussing two problems. The first is not strictly speaking, an objection against platonic dispositionalism, more than it is a consequence of the adoption of platonism per se. The worry is that since the very notion of Platonic properties entails negative truths, Platonic dispositionalism owes us an explanation of what the truth-makers for those truths could be. I discuss Tugby's treatment of the problem (2017), show its limitation, and offer an alternative solution, that

a call the *zero strategy*. The second problem is not strictly speaking an objection against platonic dispositionalism per se, more than it is an objection for dispositionalism in general. This is the *governing problem*. I discuss the problem, and highlight two ways of responding, none of them I deem completely satisfactory. The Platonic victory is a victory almost by exclusion, and it comes with its own limitations. Yet the result it aims at establishing is accomplished. The ontology of Platonic universals is the only coherent ontology for dispositionalism.

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1. Toward a Property Based Account of Physical Modality

1.1 Introduction

The postulation of possible worlds is among the most remarkable developments in metaphysics during the last century. The view that possible worlds are global alternatives to the way our world actually is has come to be known as *concretism*. Such worlds are, according to this view, concrete entities like our own, and they can be used to wholly analyse modality in terms of non-modal facts.

In recent decades the monopoly of the possible worlds approach has been contested, both in its extreme and moderate forms. Rivals started to emerge, offering novel metaphysical theories of modality. Among these views is *modal primitivism*, which denies that modality should be accounted for in terms of non-modal facts. The modal primitivist view under scrutiny in the present work is the doctrine known as dispositionalism.

Dispositionalism does not start with how the world *could* be as a whole, but rather focuses on the relevant parts of the actual world that ground certain possibilities. What is, then, the metaphysical ground that dispositionalism offers up as an alternative? The answer is surprisingly orthodox: properties.

The work dispositionalists ask of properties is, however, far from orthodox. Properties are asked to not (only) ground facts about resemblance, or to account for our semantic expressions – as the orthodoxy might suggest – but also to ground facts about natural, or *physical*, modality. Those who advocate the view maintain that actuality

and possibility are somehow indissolubly connected, and that this connection holds in virtue of the modal nature of properties. In turn, it is because properties have modal nature that the four-dimensional pattern of instantiation can be explained.

Since we have independent reasons to accept the existence of properties apart from any modal considerations, there is a good chance that properties might also be of use in the latter domain.

While the rest of this thesis is a quest for theoretical and explanatory consistency, this first chapter is dedicated to clarifying which metaphysical claims dispositionalism, as a property-based theory of possibility, has to defend, and why.

In section 1.2 I shall assay the metaphysics of concretism. The reason for discussing concretism in relation with dispositionalism will be clear enough to anyone even slightly familiar with the debate. While dispositionalists and concretists tend to disagree about many aspects of their respective theories, they are, at least on paper, united against neo-Humeanism.

Our discussion, however, is important for reasons that go beyond the present state of this debate. In fact, from the dispositionalist perspective concretism offers a clear view of the opposite side of the (modal) spectrum. At present I will only briefly mention why this is the case, as the details will be provided throughout the remainder of this chapter.

According to concretism modal facts are grounded in facts about actual concrete complexes, i.e., worlds. Modality therefore rests solely on *non-modal* grounds. This reductive theory allows for an analysis of modality that is free from modal primitives, which is the major theoretical advantage over working with a possible worlds theory. The metaphysical working base is a systematisation of a certain modal (Humean) intuitions, or pre-theoretical judgements, about the world and the use of a particular (nominalistic) conception of properties.

On the other hand – for reasons that will become clear in a later section – dispositionalism claims that modal facts rest on *modal* grounds. Dispositionalism is thereby a non-reductive theory of modality according

to which the pattern of instantiation is not a brute fact but can instead be explained in terms of modal elements and some relevant metaphysical features they exhibit.

Bearing this account of concretism in mind will, in conjunction with a clear picture of dispositionalism, be helpful in identifying the less fundamental claims that distinguish the former view from the latter. In fact, the scope of this dissertation is not to defend dispositionalism on *all* points, but rather only on its core, foundational requirements.

In 1.3 I will introduce and discuss dispositionalism. In 1.3.1 and 1.3.2 I will isolate two claims that I take to be the minimal base by which dispositionalism can be distinguished from other views, and on whose defensibility lies the success or failure of the metaphysics: namely, that (P) (some) properties are powers, and (NM) properties ground natural modality. In 1.4 I shall address meta-metaphysical considerations regarding the acceptability of modal primitives in relation to ontology and ideology. Finally, in 1.5 I shall set the stage for the following discussion.

1.2 Concretism

Concretism – or extreme modal realism (see Stalnaker 1976: 67; Melia 2003: 99) – is the theory that possibilities, the ways things could have been, are concrete possible worlds, or ways the world could have been as a whole. Concretism rests on the belief that the possible worlds model theory is related to concrete modal facts, and, therefore, that modality is not an irreducible aspect of reality.

Concretism is a possibilist view: it allows for the existence of entities other than those actually existing, but denies, however, that possibilities are parts of the actual world. They are instead "alternatives" to the actual world (see Lewis 1986a: 1; Divers 2002: 63). There is no space for unrealised possibilities in the metaphysical picture (Lewis 1968: 114; Lewis 1973a: 87): Lewis' strategy is to explain possibilities by simply adding more actuality to the picture in the form of concrete worlds (Lewis 1986a: 82-83). Thus, according to concretism, modality has a non-modal ground in worlds.

Each world is a maximal, unprivileged, isolated sum (Lewis 1986a: 69-70). That each world is a sum means that its nature is purely mereological, just as a pile of sand is nothing more than the sum of each grain. We might say that a world resembles a pile of sand more than it resembles a sandwich, which has to be arranged appropriately. There are, in other words, modal constraints that determine what must and must not be the case for something to be a sandwich. Order matters. But this can't be true of a world, for otherwise facts about modality would constrain the nature of worlds. For concretism it is the other way around: worlds are the metaphysical ground of modality, as they are prior to modal facts and that in virtue of which these facts are either true or false.

That each world is isolated means that there is no spatiotemporal connection or overlapping between worlds. Maximality guarantees that there are no "holes" in the space-time lattice that connects every inhabitant: in Lewis' words, a world is a "very inclusive thing" (1986a: 1). A hole would be a place, so to speak, that, in virtue of not being connected by external relations with other places cannot be reached from any location. Since each world is isolated, this place will not be part of the world, and so concretism should deny any contingent, non-spatiotemporal entity.

Finally, each world is unprivileged because the question of which world is actual is a purely indexical affair (Lewis 1986a: 92-93; Lewis 1970: 184-187; Lewis 1973a: 86). There are no substantial disputes over which world is the actual one in just the same way as there are no disputes over which location in space is really *here*, or which location in time is really *now* (*see also* Divers 2002: 44).

According to concretism, there are enough worlds to cover all possibilities. Lewis is committed to a principle of plenitude according to which "every way that a world could be is a way some world is" (Lewis 1986a: 86). But this plenitude requires an additional principle. Here I shall quote Lewis at length:

> To which end (*for a principle of plenitude*) I suggest that we look to the Humean denial of necessary connections between distinct existences. To express the plenitude of possible worlds, I require a principle of recombination according to which patching together parts of different possible worlds yields another possible

> world. Roughly speaking, the principle is that anything can coexist with anything else, at least provided they occupy distinct spatiotemporal positions. Likewise, anything can fail to coexist with anything else. Thus, if there could be a dragon, and there could be a unicorn, but there couldn't be a dragon and a unicorn side by side, that would be an unacceptable gap in logical space, a failure of plenitude. And if there could be a talking head contiguous to the rest of a living human body, but there couldn't be a talking head separate from the rest of a human body, that too would be a failure of plenitude. (Lewis 1986a: 87)

If no necessary connections between distinct existents are allowed, two distinct existents can coexist, or fail to coexist, in conjunction with any other existents. In order to obtain concrete worlds for any way the actual world might be, we have to take every counterpart from every world and combine them with other worldly individuals (*see also* Lewis 1986a: 92). They will then form another (possible) world insofar they fit the lattice of external spatiotemporal relations.[1] Given this principle, Lewis has a powerful tool to describe the many different ways in which space-time can be occupied – if, that is, we are able to provide a satisfactory account of space-time's size and shape (Lewis 1986a: 89).

There are no metaphysically *heavy loaded* entities in this picture. The basic, fundamental furniture of the world is pretty austere, comprised only of particulars and relations. Yet the only connections allowed between existents are external (Lewis 1986a: 62). Given that concretism aims to describe our natural, concrete world, those relations are, more specifically, spatial and temporal.

One might then ask whether these particulars are bare, the answer to which is no: they are rather *propertied* particulars. Each existent has property instances that qualitatively characterise it, hence why an existent is always *particular*. But what sort of entities are properties? According to concretism, properties are *classes* of particulars (see Lewis 1983; Lewis 1986c; *inter alia*).[2] Since particulars are distinct, properties are

[1] See (Borghini 2016: ch.4) for an analysis of the viability of applying the recombination principle to possible worlds.

[2] The marriage between class nominalism and the metaphysics of concretism has been fruitful for both parties. An argument against the former is the well-known problem of coextensive classes. According to that type of nominalism properties are classes. Suppose to have a world w1 containing four white (w) and sticky (s) mochi (a kind of japanese sweet). In the terminology of possible world theory, we could say that there is a single world w, and its subset domain d(w1) such that its elements are the particulars [ws, ws, ws, ws]. Having only one class, a class nominalist would have to say that there is really just one property. But being white and being sticky are

not the type of things that particulars share and in virtue of which we can ground facts about their resemblance. Nor they are constituent parts. It is rather the particular that is part, or member, of the property (Lewis 1983: 345).

The property of *being a horse* is the class of all the particular horses that fit the spatiotemporal lattice, and it is partly present – that is, it has an instance – wherever there is a horse. This is the minimal base concretism uses to describe the fundamental furniture of the world as a whole. Since the world just is this vast spatiotemporal lattice of separate particulars, concretism is a particularist ontology.

Given concretism's particularist ontology and its denial of modal connections in the world, facts about worlds are *prior* to facts about modality. It is the distribution of the "local matter of facts" that fixes facts about modality. Let us see why.

According to concretism, what is possibly, but not actually, true is expressed as the existence of other concrete particulars, or *possibilia*. Accordingly, truth conditions of modal statements need to be reducible to non-modal conditions. What is possibly true in w^* is a function of what is actually true in some w^1. In each of these w^N there are things that resemble an individual more than any other individuals in their own world. These are one's *counterparts*, individuals to which we are similar in a relevant way, someone "you could have been had the world been otherwise" (Lewis 1968: 115). Similarity, or *counterparthood*, is introduced to analyse the meaning of modal sentences that are about these individuals (see Lewis 1986a: 8,21,255; Lewis 1973a: 91-95; *inter alia*).

Individuals are unique and – in contrast to standard possible-world semantics – their identity cannot transcend their relative domain *d*: they are *world-bounded*. The identification of counterpart individuals among worlds is based on qualitative similarity, not strict identity: having propertied particulars here suffices for the relation of similarity. Since

clearly distinct, and it is here that concretism comes to the rescue. According to concretism properties are "made of" particulars and they range all over possible worlds. Therefore if we admit concrete worlds other than the actual, we can secure that the class of white particulars and the class of sticky particulars will not be co-extensive, and so they will be different properties (see Lewis 1986a: 51). Furthermore, properties play a decisive role in accounting for similarity – I shall address this aspect of the marriage in a moment.

properties are classes of possible and actual particulars – the kind of entities that, in contrast to particulars, can span across worlds – we can use them to fix the identity of individuals.[3] In short, given a world *w**, the relation of similarity holds between an actual individual and its counterpart.

Which otherworldly individuals are to be regarded as counterparts is determined by the (natural) properties that the two share (Lewis 1986a: 60). The meaning of modal sentences expresses exactly facts about their similarities, but, since similarity depends on facts about property distribution, facts about the latter come prior to facts about similarity.[4]

Although similarity is introduced as a primitive relation, it works only in virtue of properties fixing the identity of those intra-world entities standing in a similarity relation.[5] Therefore, if modality is analysed in terms of comparative similarity, then modality rests on an entirely non-modal ground.

In summary, if modal facts are grounded in facts about actual concrete complexes – i.e. worlds – modality is entirely understood in terms of *possibilia*. Modality now rests solely on non-modal grounds and, accordingly, the only viable theory of modality is a reductive theory. The reductive theory proposed by concretism allows for an analysis of modality free from modal primitives: this, in general, is the major ideological advantage of working with possible worlds. The metaphysical working base is a systematisation of a certain modal (Humean) intuitions, or pre-theoretical judgements, about the world and the use of a certain (nominalistic) conception of properties. Independence allows for recombination of possibilities, so that the modal space is complete enough to match every way the actual particulars might be combined with an actual way some concrete thing is.

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[3] In "Redefining Intrinsic" Lewis advances the view that properties can be considered *regions* of the similarity-space of actual and possible things (see Lewis 2001: 385).

[4] Which properties are relevant to the similarity is fixed by the sentence under consideration. Similarity is flexible enough to make the context an important element to understand modal statement. So, for instance, while in the aforementioned case we select a set of properties that makes me relevantly similar to a counterpart at w^1, there might be another counterpart b that is more similar to a in respect to another set of properties.

[5] For a discussion of similarity as a primitive relation see Lewis (1973b: 163; 1986a: 65; 1968: 115).

1.3 Dispositionalism

The focus of the present discussion is the view known as dispositionalism. Dispositionalism has developed in recent decades mostly largely to the work of Stephen Mumford (2004), Jennifer McKitrick (2010), Alexander Bird (2007), John Heil (2003), Anna Marmodoro (2014), Brian Ellis (2002), Barbara Vetter (2015), *inter alia*. That said, other important scholars have also offered recent contributions to the debate (see Schrenk 2010; Contessa 2010; Borghini & Williams 2008; Ingthorsson 2002, 2015; Cartwright 2017; Williams 2010; Tugby 2012, 2016; Handfield 2009).

In the contemporary debates dispositionalism is referred to under different labels: *dispositional essentialism* (Yates 2013; Ellis & Lierse 1994; Vetter 2012; *inter alia*), *causal structuralism* (Hawthorne 2001), *causal essentialism* (see Wang 2016; Segal 2014), *powers' metaphysics* (see Molnar 2003; Harre & Madden 1975; Martin & Heil 1999; Mumford 2004; Martin 2008; Heil 2003; Marmodoro 2010; Shoemaker 1998), *powerism* (see Koons & Pickavance 2015), *potentialism* (see Wang 2015), and finally *neo-Aristotelianism* (see Jacobs 2007).

As the last of these labels suggests, it is by no means a purely contemporary view – on the contrary, it is deeply rooted in the works of Leibniz, Locke, Newton, and of course Aristotle.[6]

The revival of dispositionalism in recent years is somewhat in continuity with its earlier instantiations. The contemporary version of the theory similarly operates at the intersection of metaphysics and philosophy of science, stemming from the importance given to dispositions in current science (see Chakravartty 2013; Mumford & Anjum 2011; Cartwright & Pemberton 2011; *inter alia)*.[7]

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[6] The most exhaustive and recent treatment of the Aristotelian account of powers is Anna Marmodoro's (Marmodoro 2007, 2010a, 2010b). The *locus classicus* for the Aristotelian treatment of powers is 1046a10 of the *Metaphysics* and Book III of the *Physics*. Other contributions to this research area include Charlton (1987), Witt (2008), Stein (2012), Tahko (2012), Hartmann, Tremblay, and Peterson (2016). Regarding Leibniz's notion of powers as the "disposition to act" see (Leibniz ed.1996: 110; ed.1989: 252; Gaber 2009: 244). A discussion of powers and forces can also be found in Newton (2004: 41). For Locke's treatment of powers see (1979: 234).

[7] Some notable applications of dispositionalism to the sciences – in particular the social and

Dispositionalism has been the object of serious attention for almost twenty years now, and the debate is rich and varied. However, on closer inspection the discussions had amongst dispositionalists are rather confusing. More precisely, it is difficult to find even minimal elements of agreement within the dispositionalist camp, and at the same time it is not uncommon to find same scholars radically changing their views.

There are a variety of issues and questions that define what we call "dispositionalism". Some philosophers are concerned with whether dispositionalists should be dualists or monists or, more generally, whether we can reduce dispositional properties to categorical properties (Ellis 2001 Martin & Heil 1999; Martin 2008). Others, meanwhile, view dispositionalism as a thesis about the *nature* of properties, and within this debate two views can be distinguished: *compatibilism* and *incompatibilism* about the nature of properties.

The incompatibilists generally argue that if dispositionalism is true then all properties are *powers*; they deny that the nature of properties includes qualitative aspects. As far as I am aware, Mumford (2004), Bird (2007), and Vetter (2015) belong to this group.

Within this camp we must further distinguish between *modal incompatibilists* and *causal incompatibilists*. Bird, and perhaps Vetter, are incompatibilists of the modal kind, claiming that powers are modally fixed properties. As such, powers are properties whose modal role is the same in all possible worlds (Bird 2007; *inter alia*). I myself inclined to hold this view, as did Mumford, at one point (2004), although he is now a strong *causal incompatibilist* (2011). Mumford is not alone in this: on paper, at least, many contemporary dispositionalists are *causal* dispositionalists, holding the view – which dates back to Shoemaker (1980) – that properties have a causal identity.

Incompatibilists therefore hold in common the view that powers are properties *and* that they have a causal nature.[8] Note, however, that the

biological sciences – can be found in Triviño de la Rosa (2016), Austin (2015; 2017), Elder-Vass (2011), Bhaskar (2008), and Kerry et al. (2014).

[8] An alternative way to present the same debate is in terms of those that take causation to be fundamental (the causal incompatibilists), and those who do not (modal incompatibilists).

camp is again divided in two by another consideration: there are those who argue that properties *are* pure powers, and those who argue that properties can be *reduced* to pure powers. To the informed reader the phrase "properties are clusters of powers" should ring a bell: early on in the dispositionalism revival some, such as Mumford *inter alia* (1998), argued as much. This view, which we might call *reductive incompatibilism*, takes the category of properties to be reducible to the more basic category of *powers*: the identity of a property merely supervenes on the identity of the powers cluster. As far as I know no modal incompatibilists have ever held this view.

As indicated, incompatibilists are contrasted with *compatibilists*. The latter hold the view that powers are properties that possess a qualitative *and* dispositional nature. Many of the most notable dispositionalists belong to this group: Heil and Martin, *inter alia*. According to these figures properties are *powerful qualities,* whose identity is fixed by a *dual-nature*. Within this camp we must again distinguish two views: *descriptive* compatibilism and *rational* compatibilism.

Rational compatibilism is the view that the distinction between qualitative and dispositionalism is a distinction *of reason*, not a *real* distinction. Thus, they claim that the nature of a power is numerically one, although conceivably dual (Heil 2003; *inter alia*). This is the traditional claim associated with the *powerful quality* view, whose advocates try to bridge the dualist and monist parties in the dispositionalist debate.

Descriptive compatibilism, on the other hand, is the view that properties are reducible to powers and so there is not, in fact, any *dual nature* of which to speak. However, given that the identity of properties supervenes on the cluster of powers, a property can be amenable of dual-descriptions. This view is rooted in Mumford (1998) and can be plausibly held in conjunction with any position willing to reduce properties to powers.

The goal of this dissertation is not to argue for or against any of these views, nor even to discuss each of them. I will only engage with *some* of them and when the discussion requires it. My aim is instead to focus on a minimal working definition of dispositionalism and find out on which ontological ground it can be defended.

Dispositionalism is, in this guise, no less ambitious than concretism: it promises to provide a unified account of modality, causation, and laws of nature. But dispositionalism is a modal primitivist view. Its goal is not to provide an analysis of the modal in terms of the non-modal, but an account of modality in terms of a primitive modal element. More precisely, dispositionalism grounds modal facts in one element of its ontology: properties.

Pace *descriptive* compatibilism and *reductive* incompatibilism, dispositionalism is first and foremost a *property-based* theory of modality. Not possible worlds, but properties are the entities by means of which modality is taken to be explicable. Modality is analysed in terms of metaphysically necessary modal connections among properties that *fix* what can or cannot obtain in the world. The metaphysics of dispositionalism, then, have two important requirements: one, (P), that concerns how we should think about properties, and (NM), concerning how we should explain natural modality. We may present both as follows:

(P) (Some) properties are powers.[9]
(NM) Powers ground natural modality.

This is the minimal, conjunctive fundamental claim of dispositionalism. Properties exist and (at least some) are powers, (P), and modality has its source in the nature of irreducibly modal properties: these *constrain* patterns of instantiation, grounding modality in the world (NM).

I shall assay both requirements one by one in the following sections.

1.3.1 Powers and the Identity of Properties

What are powers? As Borghini neatly puts it, "first and foremost they are properties" (2016: 165). As I will present in a moment, dispositionalists

[9] Here I do not intend to exclude pandispositionalism, the view that all properties are powers, from the analysis; instead, I mean it to be encompassing as possible. As it stands, a more moderate stance, that properties are either powers or non-powers, is more apt to achieve the scope of the work. I am in debt to Barbara Vetter for pointing this out to me in private conversation.

argue that at least some properties are not categorical, they are not always active, rather they are such that do not manifest themselves constantly (Mumford 1998: 67-90). Whereas dispositionalism must be view in opposition to the claim that all properties are categorical, it must not be equated, at least not without arguments, with the claim that all properties are powers – the view known as pandispositionalism. Dispositionalists do not need to go that far in order to establish their anti-humean conviction. The requirement (P) is supposed to pay respect to fact. And, as it stands, my understanding is that a more moderate formulation of the view, that properties are either powers or non-powers, is more apt to achieve the scope of the present chapter, as well of the dissertation.

While simple to distinguish it in words, the dispositional account of properties that (P) must convey is somehow complex to develop. The scope of this section is to describe what do properties look like from a dispositionalist point of view. Dispositionalism offers a peculiar picture of both the identity and ontological constitution of properties. Let us start with the latter.

According to dispositionalism powers are properties that have a *nature*, or essence, that is *irreducibly dispositional*. One property's nature has implications for what other natures can exist, as part of the nature of a property is the existence of another property, numerically different from the former (Mumford 2004: ch.10; Bird 2007: 100; *inter alia*). Adopting the dispositional terminology, we shall call this relation a *power-manifestation*.

Dispositionalism holds that a property is a power or *potency* that has potentiality, the capacity to *manifest*. Fragility, for instance, is the power to break: the reason that is possible that a broken vase obtains is that there exists a power to break, which the vase possesses. This power is *essentially dispositional* because it is essential for the identity of the power to have a "characteristic manifestation" (Bird 2007: 196), which is another property, the yielding of which is seen as flowing from the essence of the power.

The non-humean idea advanced here is that a power and its modal profile cannot come apart; the properties "being fragile" and "being broken" are connected in such a way that the latter is the potentiality of the former, its manifestation. This relation of power-manifestation specifies how facts about manifestations are entailed by powers. The modalities of worldly

particulars, and the modal truths, are thus presented as resting on substantial facts about the essences or natures (of properties), not on possible worlds. The former, not the latter, cuts nature at its joint.

A manifestation is not a *part*, mereologically understood, of a power; however, it is still such that it is *essentially* included in the power. Let us assume that a property *a* essentially includes another property *b* on the grounds that *b* is a manifestation of *a*. A dispositionalist might understand the connection between two properties as an essential inclusion:

> (IP) if *a* essentially includes *b, then a* metaphysically necessitates *b*.[10]

Let us call this the *inclusion principle.* The principle implies that, given certain facts about the (dispositional) essence of properties, it is not metaphysically possible for a property *a* to exist without the property *b* existing; the two properties must co-exist. In the parlance of concretism, this is simply to say that in all possible worlds where *a* exists, *b* exists. But clearly dispositionalists do not take this parlance to be explicative in any sense, as Vetter nicely puts it:

> Possible worlds…may be a useful formal device in modal logic (as well as in other formal contexts), but they have little to do with the metaphysics of modality. Instead of accounting for possible worlds, then, these theorists [dispositionalists] seek to provide an account of modality directly; their shared aim is to identify, within the actual world, the grounds, source or truthmaker of modal truths. (2011: 72)

Essentially dispositional properties provide this non-categorical ground for modality, and this ground is ultimately a primitive one. In fact, no further explanation of why two identified properties are connected the way dispositionalists say they are; the modal connections between properties are held by the theory to be a primitive fact. The fundamental claim of dispositionalism – i.e., that properties have modal natures, or are modal essences – can be interpreted as an adoption of these kind of primitive entailments between properties.

Let us now turn to the identity of properties.

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[10] For a similar definition see Barker (2013: 5).

According to dispositionalism properties are not qualities: qualities are properties whose identity simply consists in their being self-identical and numerically different from other properties. The thesis that properties are qualities is known as *quidditism* (Black 2000).

Quidditism takes properties to be ontologically basic: they have no nature, let alone a dispositional nature, apart from being *thisnesses*, primitive categorical essences of objects.[11] As such, and in contrast to the metaphysical structure of universals, they do not enjoy any kind of unity, meaning that a property's role has no special relation to its identity. Properties are instead role occupiers, the role they occupy varying across different worlds.

Quidditism sits well with concretism. Since the identity of properties, according to quidditism, resides in their self-identity and numerical difference from other properties, they do not ground similarities or dissimilarities among things that possess them. At most they ground facts about their numerical differences. In fact, in the nominalistic framework in which concretism operates, properties are just classes, and when two particulars are similar it is not because they share one element in common, but rather because they are two numerically distinct members of the same class.

A second reason why quidditism neatly aligns with concretism is that it plays an important role in the latter's understanding of modality. According to Lewis (2008), a (complete and true) theory T about which nomological roles are realized in the world contain n-tuple of properties that realize these roles. This is the *actual* realization of T. Yet, we can have another world that is just like our world in respect to the realization of the nomic role, but nonetheless different in which properties counts as realizers. This is a *possible* realization of T. Does it also count as a possibility different from what the *actual* T realizes? Lewis' response is affirmative, and for the following reason:

[11] The original formulation of quiddities as a "featureless thing" that gives unique individuality to a substance can be found in Duns Scotus (see Cover 1999: 22). A similar definition can also be found in Boethius' *Librium de Interpretatione Editio Secunda*. More contemporary formulation of thisnesses can be found in Chisholm (1976: 29), Diekemper (2015), Adams (1986), and Ingram (2016: 2-5).

> Possibility is governed by a combinatorial principle (see Lewis 1986a, sec. 1.8; Armstrong 1989). We can take apart the distinct elements of a possibility and rearrange them… We can replace an element of one possibility with an element of another. When we do, since there is no necessary connection between distinct existences, the result will itself be a possibility… Combinatorialism tells us that possibility is preserved under permutations of items—at least if they are items from the same category. If it is possible that –A–B–C–, and if A, B, and C, are, say, all-or-nothing monadic properties, then it is also possible that –C–A–B–. The actual realization of T is a possible realization; we permute items within more-than-one-membered categories; and what we get is also a possible realization of T. But is it different from the one we had before? Quidditism is the premise that tells us that the permutation is indeed a different possibility (see Black 2000). Two different possibilities can differ just by a permutation of fundamental properties. They do not differ in whether T is realized, or in what we observe… Quidditism is to properties as haecceitism is to individuals. If we start with a possibility and permute individuals, combinatorialism says that we get a possibility; haecceitism says that it is a different possibility. Haecceitism says that two possibilities can differ just by a permutation of individuals (see Lewis 1986a, sec. 4.4). I accept quidditism. (2008: 208-9)

Quiddities are modally variable properties, that is, certain nomic role realised by property *a* could be realised without being realised by *a*. So, for instance, the nomic role played by the property "mass" could have been played by another property, and so "mass" plays its nomic role *only contingently*. Quidditism guarantees that the first pattern (A-B-C) and the second pattern (C-A-B) really are different possibilities. In fact, according to concretism, properties do not retain any specific role: were the laws of nature different, properties would occupy a different nomic/causal role. This means there can be two possible worlds exactly the same in their causal profile, but with different properties playing the same causal role. Lewis' negative aim is clearly to argue against the dispositionalist view that by knowing the nomic/causal role of a property we will come to know everything about that property. On the contrary, Lewis believes that no amount of knowledge about which roles are occupied will tell us which properties occupy which roles. Lewis builds on Langton's original thesis of epistemic humility and argues that we are irredeemably *ignorant* about the nature and identity of properties (Lewis 2009: 215-216). Quidditism is a valuable companion for the Lewisian version of the humility thesis, since, according to quidditism, there is no nature to be known in the first place.

Dispositionalism, however, denies quidditism (see Bird 2007: 70-81; Mumford 2004: 103-104; Ellis 2010; *inter alia)*. It is a direct consequence of (IP) that properties have their role essentially: if a property plays a role it will *always* play that role, since doing so is what makes a property what it is. [12] Given that the inclusion principle stipulates metaphysically necessary connections among properties, a certain property will play the same role in every possible world. It cannot lose the relation it has with the relative manifestation without losing its very identity. In the same way, it cannot be that, in two different possible worlds, the same property is a different power.

Is an account of a power's essential role all we need to account for its identity? On this question dispositionalists disagree. Many dispositionalists prefer to work with a realist theory of property. According to this view, properties have a peculiar ontological make up: they consist in an instance and its universal character. So, for instance, when we say "X is black", we refer to the property of "being black", which is a compound of the instance of black possessed by X – say, black1 – and the universal blackness, which is the numerically identical constituent in each instance. Generally, this view holds that all there is to a property is its modal nature and that there is no more to the nature of a power than its potentiality. No qualitative residual is admitted. This is the view known as the *pure powers* view (see Mumford 2004; *inter alia*).

Other scholars prefer to conceive of the modal nature of a property as one *aspect* of it. They hold that properties have both a modal *and* a qualitative nature, and these in turn are modes or ways of considering the property. This is known as the *powerful qualities* view (see Martin 1980; Heil 2003; *inter alia*). This theory assumes that properties have aspects that are not ontological constituents: they have, so to speak, a double nature, as the dispositional and the qualitative aspects are inseparable in fact but different only in the abstract.

The difference among the two views is a disagreement over *identity*. The first argues that the identity of a property is entirely determined by its dispositional nature; the latter argues that identity is also determined by the qualitative aspect of the property. Despite this difference,

[12] The idea that the role of a property is what makes a property what it is can be traced back to Shoemaker, who famously defended a causal theory of properties' identities (1980; *inter alia*).

dispositionalists agree that a property's nature, however else it is understood, is primitively modal. [13] Given that properties have dispositional essences, facts about modality are not posterior to non-modal facts about properties – facts about identity included. We do not need to look elsewhere – at laws of nature, for instance – to say what modal role the property actually carries out. This role, and the corresponding manifestation the power is for, is already built into the property. Dispositionalists, then, deny quidditism and (QR): if powers are properties then their realisation must be non-quiddistic.

In summary, if powers are properties then modal facts should not be posterior to non-modal facts about properties: therefore, they cannot be quiddities. And if powers are not quiddities they must have a metaphysical structure, such that a relation of metaphysical inclusion among properties holds in virtue of their nature. This is the first (P) requirement from the metaphysic. Let us now turn to the second.

1.3.2 The Grounding of Physical Modality

With the introduction of a nature that is primitively modal, dispositionalism introduces modal connections in the world that are not explained in terms of non-modal facts. Dispositionalism uses these connections to account for what concretism takes as primitive: first-order concrete worldly patterns, or regularities. In fact, the second (NM) requirement from the metaphysics is that properties ground *natural* (concrete) modality (Mumford 2004: 170; *inter alia*). What the requirement imposes on the theorist is to treat and explain all natural modality as essentially dispositional. Let us see look closely, first, at how the explanatory claim must be understood, and then move on to examine the target of "natural modality".

According to concretism, there is no substantial answer to the question of why there are certain patterns or regularities: the world is just the sum of how things are. The possibility of the world being well-ordered is taken

[13] I shall assay the powerful qualities view in details in Chapter Three.

to be a sort of coincidence. Dispositionalism, by contrast, holds that the – strict, as we shall see – order, or governance, of our world resides entirely in its intrinsic fabric, and that we can offer an explanation for there to be harmonious regular patterns into which all particular events fit. More specifically, a dispositionalist would argue, it is in virtue of the instantiation of primitively modal properties that we can explain why this is so and why certain patterns of instantiation occur. Dispositionalists then makes two distinct claims. The first is that there are particulars, the subjects of these regularities, that bestow properties with modal nature. These are facts of the world, and in this (simple) sense powers grounds how things are. The second is that particulars exhibit regular connections with other particulars or states of affairs in virtue of bestowing properties whose modal nature is connected. Despite on a higher level of generality, these also are facts of the world. In this sense powers ground things being modally connected; they determine facts about regularities. Therefore, according to dispositional essentialism the world is not a *basic*, but a *derivative* entity: in fact, powers ground both the existence of worldly particulars, and their regularities.

The explanatory claim can be thus assimilated to a grounding explanation to the kind Fine notoriously discuss, "a distinctive kind of metaphysical explanation, in which explanans and explanandum are connected, not through some sort of causal mechanism, but through some constitutive form of determination" (1992: 37).

Note that dispositionalists are not always explicit in their endorsement of the notion of grounding, nor am I claiming that they should be. Yet it is this thick sense of determination mentioned above that distinguishes humean from non-humean, and especially dispositionalists, in questions of laws of nature (Beebee 2000: 578; *inter alia*). Moreover, it is in terms of grounding that, I claim, the difference between each view presented in this dissertation can be fully understood.

In section (1.5) I will indeed show the hypothetical adequacy of tropism, immanentism, or platonism for dispositionalism can be examined looking at the grounding profile of properties, understood respectively as tropes, immanent universals, and transcendental universals. Nonetheless, independently from the analytical setting of this work a dispositional explanation of natural modality sits well in the orthodox

theories of grounding (*see* Raven 2013; *inter alia*). In particular, the characteristic metaphysical priority assigned to the ground in respect to what is grounded (Fine 2012) reflects the modal attitudes of dispositionalism of taking some modal facts (those about connected properties) to be prior to facts about their instantiations and their regularities. It is this asymmetry of grounding that is cardinal for dispositionalists to deliver any form of metaphysical explanation of natural modality. As it will be clear in the next chapters, the metaphysical priority aspects of powers will be, in various occasion, an indispensable element of the investigation offered in this dissertation.

Yet according to dispositionalists properties do not only constitute but *constrain* or *govern* the pattern of instantiation. All those general facts are not just true in virtue of the existence of connected powers, but also, they are *brought about,* or they are *produced* by those powers. This bring us to the question of natural modality.

Whereas the locution expressed in (IP) is to be understood as expressing a form of metaphysical modality, the modal nature of properties is supposed to dictate how the modality of the physical must be understood. Thus (NM) is concerned with the theoretical work powers are supposed to do to earn their job: explain the nomological modality. Along this line Swoyer:

> several features of natural laws […] are best explained by the view that laws involve properties, that this involvement takes the form of a genuine relation between properties, and, finally, that the relation is a metaphysically necessary one (1982: 203)

Virtually all dispositionalists tend to follow Swoyer, as well as Ellis (2001), Bird (2007), Fales (2003), and Shoemaker (1980), in accepting some forms of necessitarianism; if law-statements describe powers and their necessary connections, then laws are necessary truth. Let me explain.

Dispositionalists agree with concretists about the existence of regularities. They disagree, however, on what makes these regularities laws. For concretism, regularities are laws if and only if they are axiomatic according to our best theory, and, moreover, we need to look at the entire four-dimensional pattern in order to determine which regularities count as laws. If there are any laws, their job is providing a maximally good

summary of the history of the worlds. Since different laws hold in different worlds, the laws of nature are taken to be contingent. By contrast, according to dispositionalism, laws are regularities that are made true by certain facts about properties, i.e., their modal nature. Given that properties cannot fail to have the relation they have, laws of nature are not contingent but rather *metaphysically necessary* (Bird 2007: 48-50; Ellis 2001: 4; *inter alia*).

It is one thing, however, to explain the laws of nature in terms of powers, and another whether dispositionalism needs laws at all. For while it is true that we can derive laws of nature from the metaphysical relations holding between properties, it is also true that their role would be, at the very least, redundant.

Indeed, since dispositionalism takes modal facts to not be posterior to facts about properties, there is no need for laws that govern properties. If laws played this governing role, then it would be laws rather than properties that were powerful. Given that laws typically play the part of governing the world, it would seem that their role has already been taken by powers. This means that laws of nature are now in danger of being mere epiphenomenal entities, and for the sake of parsimony some scholars prefer to adopt an eliminativist position and deny their existence, consequently denying nomological realism (see Mumford 2004: 13-15).

The governing role of laws is therefore what powers either explain or supplant. Whether dispositionalists should opt for the first or the second option is not something that I will settled in this work, and the analysis offered in this dissertation can proceed independently from this problem. What matters is that what *govern* facts about first-order instantiations are second order facts about properties, those whose general form is mentioned in (IP). The governing role of powers is here analogous to the governing role of laws of nature: indeed, one advantage of dispositionalism is that it offers a foundation for laws of nature (see Bird 2007: 43-48; *inter alia*).

From here, all that dispositionalists need to *build* a world is primitive second order modal connections between properties that grounds facts about regularities and dictate, or govern, facts about their instantiations.

Given (IP), the governing principle for first order facts would be something like the following:

> (1). "Given two properties *a* and *b*, and their instances, if a modal connection holds between *a* and *b*, and if instance *a* occurs, then instance *b* will also occur. "

Or, in the dispositionalists' jargon:

> (1*). "*a* is a power that manifests in *b* being instantiated"

The principle states that a second-order modal connection between two properties determines the first-order connection between the relative instances. This is how dispositionalism seeks to explain the pattern of instantiations. While the *constituting* role of powers make powers, the ground of modality, metaphysically prior in the structure of the world, as seen from the eyes of dispositionalism the *governing role* of powers make them, so to speak, powerful.

In order to explain why a specific manifestation occurs we summon powers, and in order to explain why a certain kind of regularities generally occurs, we turn to powers once again. It is important to stress that a non-humean, dispositional explanation of why the world is laid out in the way it is incorporate both roles. Once again, the grounding framework can accommodate this difference. The metaphysical determination between modally connected powers and facts of the world that are about the regularities is unconditional, and so these facts are *fully grounded* in the formers. On the other hand, the occurrence of instances of general regularities grounded in powers is often view as conditional on circumstances in which the instance of a power is situated, and so second-order facts only *partially* ground such occurrence. Given the right circumstances, these latter together with facts about modally connected powers govern the occurrence of the instance of the manifestation. Once again, however, dispositionalists disagree over what the natural modality grounded on powers consists in (Marmodoro 2016; *inter alia*).

According to the vast majority the modality of powers is that of conditional necessity (Marmodoro 2016; Bird 2007; Ellis 2001; Heil 2001; Molnar 2003; Martin 2001). These scholars adopt the view that we shall later, in Chapter Four, discuss under the name of *conditional governance*.

A small but notable minority denies that dispositionality must be understood in terms of conditional necessity (Mumford & Anjum 2011; *inter alia*). Dispositionality is presented as a primitive kind of modality, in between "pure necessity and pure contingencies".[14] In dispositionalist parlance, a power just has a *tendency* toward its manifestation; what is possible is not what is necessitated, but rather whatever a power exhibits a tendency for.

As such, while the conditional governance view claims that, under the right stimuli, a power *necessarily* manifests, the primitive dispositionalist view claims that even with the right conditions the power only *tends* to produce its manifestation.

Despite this disagreement about the modality of powers, both camps understand powers as properties that can exist unmanifested, that is, *unrealised.* According to dispositionalism, a possibility is understood as a certain potentiality. It is possible, for instance, for a vase break as there is a power allowing it *to* break. In this specific example, that power is fragility.

While for concretists modality is a holistic issue, concerning how the world as a whole could be otherwise, dispositionalism adopt a more local approach by focusing on the relevant part of the world that grounds a possibility (Vetter 2011; *inter alia*). Since, however, dispositionalism holds that a power can be characterised by its manifestation even if the manifestation is not realised, it seems that a possibility holds independently of whether the potentiality is realised or not. For instance, a fragile vase which never *actually* breaks still retains the *possibility* of its breaking, and hence a broken vase still exists as a possibility. Roughly speaking, a manifestation is always a *potential manifestation* (see Bird 2007: 100; Mumford 2004: 192-195; *inter alia*), and the fact that the manifestation-type that is *for* a power-type exists does not entail that, at the token level, the token manifestation is realised.

[14] This view is endorsed by a number of dispositionalists, such as Borghini & Williams (2008), Mumford and Anjum (2011), Molnar (2003), and Ellis (2001). There are, however, critics of this view, most of whom stress that the modality of powers is conditional and that, given certain conditions, the manifestation of a power occurs by necessity (see Marmodoro 2016; inter *alia*).

What dispositionalists would like to capture is the idea that a manifestation, even if unrealised, exists *no less* than the capacity of the particular that bears it. To accommodate this claim, some dispositionalists have suggested that the fundamental distinction under which dispositionalism operates is between *realised* and *unrealised*, or concretised and non-concretised (see Bird 2007: 103). This makes sense insofar as the goal of dispositionalism is to explain the concrete first-order pattern, that is, why certain possibilities are realised.

Now that we have extensively introduced the two requirements, let us take a detour and discuss one common meta-ontological worry associated with the introduction of modal primitivism. It is no secret that primitivism has had a relatively bad press. Yet modal primitivism has recently seen a resurgence thanks to the work of new waves in metaphysics (see Wang 2015; *inter alia*). In the next section I shall offer positive reasons for the adoption of a primitivist metaphysics.

1.4 Meta-Ontology

Why we should embrace any modal primitives, as dispositionalism seems to suggest?

Issues of meta-metaphysics urge, *prima facie*, that we should be careful about adding primitives to our metaphysics, and not only because of parsimony (Lewis 1973: 87; Tallant 2013; *inter alia*). Thus, we must still enquire on why we should accept modal primitives in the first place. In this section I shall address this legitimate worry.

Let us start by comparing concretism with a well-known rival: actualism. Actualism is the view according to which everything that exists exists actually, and that possibilities, in turn, are explained by actual entities (see Bennet 2005; *inter alia*). Those scholars who endorse actualism deny the existence of possibilia: there is only one world that exists, and it is the actual one. Some actualist views are as reductionist as concretism: they reduce the modal to a non-modal, actual ground. One example is Armstrong's theory of modality, according to which modality is explained in terms of the recombination of actually existing properties and particulars (see Armstrong 1986; 1989b; *inter alia)*. Another is Fine's

essentialism, according to which modality can be reduced to facts about the essence of things (see Fine 1994; *inter alia)*.

However, not all actualist views are reductivist. A case in point is dispositionalism (see Bird 2007; Mumford 2004; *inter alia*). Dispositionalism is a non-reductive view of modality, the latter being explained in terms of primitive modal connections between properties. Dispositionalism and concretism therefore occupy opposite sides of the modal spectrum. While the latter seeks to eliminate primitive modality, the former offers a theory of modality based on modal primitives.

Dispositionalism is *not* the only modal primitivist view. Actualism can be combined with modalism that, as is well known, takes all modal truths to be primitively true. For the sake of simplicity, however, I shall here compare concretism, a modal reductionist view, with dispositionalism, a modal primitivist view.

When comparing metaphysical theories there are different dimensions to take into consideration. We might compare theories with respect to their explanatory power (the range of explicable phenomena within its purview), their ontological parsimony (the number of entities, or kind of entities, contained within the theory), or their ideological parsimony (the number of primitives, or kinds of primitives within the theory) (see Cowling 2013: 3900-3906) It is difficult to weigh theories precisely, since views can stand out in terms of one criterion but not in terms of others: this can be seen clearly by looking more closely at concretism.

Lewis famously defended concretism by stressing the balance between the ontological unparsimonious aspect of his theory – namely, the postulation of infinite concrete worlds – and its ideological parsimony – the benefit of eliminating modality (see Lewis 1973a: 87). From the quantitative point of view, the postulation of a plethora of concrete worlds works against the assumption that we should minimise the *number* of entities contained within the theory. On the other hand, if we take qualitative ontological parsimony to be paramount then we are concerned with the number of *kinds* of things postulated. Therefore, if theory A has x number of kinds of things, and theory B has y number of kinds of things, A is more parsimonious than B if and only if $x<y$ (see Cowling 2013: 3891).

Concretism, by posing a plethora of worlds, offends against ontological *quantitative* parsimony, as Lewis himself acknowledges.[15] And yet concretism is *ideologically* parsimonious. By 'ideological parsimony' we here refer to the criterion according to which the theory that entails fewer unanalysed predicates or entities is preferable to a theory that entails a greater such number. And indeed, no new ontological categories are added: "My realism about possible worlds is merely quantitatively. Not qualitatively, unparsimonious. You believe in our actual world already. I ask you to believe in more things of that kind, not in things of some new kind" (Lewis 1973: 87). Assuming for the sake of argument that concretism successfully defends its ambitious thesis, it certainly compensates for its unparsimonious ontology with the parsimony of its ideology.[16]

To some extent I follow Cameron in thinking that whether or not we are ready to take a primitive on board depends on whether we are happy with it (Cameron 2012b: 16-17). But the issue may be subtler that it looks at first. Indeed, given that the absence of modal primitives is seen as an ideological benefit, it is also imperative, when in the business of evaluating the theory, to understand whether their admittance incurs an unacceptable ideological cost. It would seem reasonable to suggest that both issues should be addressed: whether we have reasons of parsimony to accept or to reject modal primitives. I shall start with two remarks on the latter.

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[15] How to correctly evaluate the cost of modal realism is an important and delicate debate. According to Divers (2002) it only offends against quantitative, but not qualitative parsimony. In fact, the theory only postulates individuals and sets – *kind*s of things that we will tend to postulate anyway. According to Melia (2003), the theory is also qualitatively unparsimonious, since it also admits the existent of things of all sorts, that is, things of any possible kind. For the present purpose I shall remain neutral in the dispute, as it will not affect the following discussion. Yet, it is worth mentioning that, if Melia is right and modal realism *is* qualitatively unparsimonious, the theory is threatened also in its ideological parsimony, as noticed some while ago by Cameron (2012a). In fact, with the postulation of all possible kinds comes the introduction of individuals the description of which requires more ideological resources than the one previously fixed.

[16] Here is Lewis on ideology and parsimony: "[a]s the realm of sets is for mathematicians, so logical space is paradise for philosophers. We have only to believe in the vast realm of possibilia, and there we find what we need to advance our endeavours. We find the wherewithal to reduce the diversity of notions we must accept as primitive, and thereby to improve the unity and economy of the theory that is our professional concern" (Lewis 1986: 4). Things are not so straightforward if Nolan (1997) is right in that, all things being equal, we should not only minimize the number of *kinds*, but also the number of *tokens* of a certain kind.

Let us assume, for the sake of argument, that ideological parsimony is indeed a theoretical virtue. In that case we might think that the introduction of modal primitives would make the theory less ideologically parsimonious. But does this necessarily make the theory less desirable? I argue that it does not.

The benefits of parsimony *per se* do not entail that any theory which is less parsimonious is also less acceptable. Armstrong for instance endorses a realist theory of universals and yet makes use of the primitive relation of instantiation (see Armstrong 1978a; 1978b; *inter alia*). For this reason, his metaphysics does not enjoy the benefit – in term of ideological parsimony – that a particularist ontology *a la* Lewis enjoys. And yet, as even Lewis admits, primitive instantiation *is* informative and makes a vital contribution to the theory (Lewis 1983: 354). Hence it is not straightforwardly the case that the *absence* of an ideological benefit is the same as the *presence* of an ideological cost. Let us develop this idea further.

Lewis famously explores the benefit of adding universals to the ontology of concretism, discussing the issue in connection with – among other things – the naturalness of properties (see Lewis 1983). A class view of properties together with an ontology of universals guarantees a clear distinction between natural and non-natural properties, something Lewis sees as crucial for any adequate theory of properties (1983: 357). Without universals, a nominalistic approach cannot help but to take "natural" as a primitive predicate or to take objects' resemblances as primitive. On the other hand, by mixing class nominalism with universals Lewis avoids acceptance of these primitives and is able to instead claim that natural properties are those whose members share a universal (Lewis 1983: 346-347). Adding universals evidently makes Lewis' theory less ideologically parsimonious: indeed, accompanying the postulation of universals is the primitive predicate (or relation) of instantiations. However, the addition of this latter primitive is ideologically less costly than the addition of the former, because the *goal* is to generate an adequate theory of properties and universals provide a clearer, non-primitive, perspective on naturalness. At least in some cases, therefore, the absence of a benefit – here meaning a non-pure nominalistic view of properties – can correspond to an absence, or mitigation, of a cost – namely, a primitive take on naturalness.

Secondly, even if we assume that there is an ideological cost associated with the introduction of modal primitives, there is no reason why the cost cannot be borne ontologically. To see why, contrast concretism with non-reductive actualism.

From the point of view of ideological parsimony, concretism is a more virtuous theory than non-reductive actualism. However, if we evaluate non-reductive actualism according to the terms of ontological parsimony – whether quantitative of qualitative – it is clear that it is a more parsimonious theory. Indeed, non-reductive actualism is eliminativist in respect to possible worlds, and with the elimination of a plethora of worlds and their respective inhabitants, it is safe to say that non-reductive actualism pays its ideological cost with ontological currency.[17]

Let us now turn to the other side of the coin. Is there any reason why we should willingly accept modal primitives? I believe there is: namely that even if we assume that there is an ideological cost associated with the introduction of modal primitives, this does not mean that *no explanatory* benefit accompanies it.

When we think about possibilities we occasionally begin with what we have at our disposal, and then deliberate over what *could*, *should*, or *would* be the case had things been otherwise. At other times we think about how certain possibilities affect what there is – for instance, when we think about possibilities that make a difference to what can or cannot *obtain* in a world. Resuming our earlier example, we might say that it is only because things can break that it is possible to prevent any breakage: hence we design certain materials to resist extreme stress, or perhaps we pack things securely in order to prevent any damage. However, if possibilities are actually existing entities then this fact can never be accounted for. More specifically, if the set of *all* (unrestrictedly) existing things is the set of what there is, and if what there is *actually* is, then possible existents cannot exert any constraints over actuality: they lack modal force. Let us unpack this a bit.

[17] Whether the debt is paid in full is another question and depends on a case by case evaluation of non-reductive actualist views.

Although concretism diverges from Quinean skepticism about modality, they are in agreement in thinking that metaphysical questions are questions about what there is.[18] Quine's methodology is to look at our best theory, formalise it, and look over the range of its quantifiers. Metaphysical inquiry, then, reduces to the quantification of existents. Similarly, Lewis attempts to systematise certain pre-theoretical intuitions about what exists without appealing to mysterious unrealised possibilities.

Accordingly, concretism does not engage with the question of *why* things are the way they are. If we look at the entire spatiotemporal lattice that concretism postulates, we find only a landscape of propertied particulars distributed in a certain way. But why do they have this particular distribution? The answer: it is pure coincidence, a basic, *brute fact* about the world. If we were to ask what accounts for the fact that A regularly occurs with B, the only answer forthcoming is: nothing. The theory simply cannot explain the occurrence of regularities.

Laws of nature are of no help here. Given the best-system analysis of laws endorsed by Lewis, among others, laws are simply propositions – or better, axioms – that are the part of the theory reaching the best balance between simplicity and strength (Lewis 1994: 478-482; *inter alia*). A regularity between A and B is a law if and only if it is an axiom of such (deductive) theory. Of course, it is not in virtue of our best theory that there are certain distributions, but rather the other way around: laws are just the best descriptions permitted by our theoretical efforts. Let us see why, according to this view, modal facts lack modal force.

Suppose that we are playing chess, and the board on which we are playing is the "actual" board. Suppose now that we ask whether it is possible for the knight to move to, say, B7. How do we proceed? According to concretism we take another board with a similar game on-going: if there is a knight in D8 we can say that it is possible, although not actual, for the original knight to move to B7.

According to concretism there is nothing in virtue of which one particular is specially connected with another. Every board is a demodalized unit. Neither properties nor relations are taken to play a role in unifying this

[18] For similar considerations see Sider (2003: 193-194).

world that, ultimately, is merely "loose and separate": each existent is separable from another, so that every particular can coexist and fail to coexist with another particular, be a member and fail to be a member of many classes.

Now, suppose that every time that a knight is in D3 a rook adopts a defensive position at E1. Concretism explains observed regular occurrences, or patterns, of propertied particulars across the lattice by appealing to laws. In this case, it is the rule of rook-defence. However, according to this account laws are not entities that constrain what can or cannot occur across the lattice: they are instead simply axioms that describe the worldly patterns. Despite the fact that rook-defence is a proposition contained in the rulebook of chess, the player is not *forced* to play the move, and so laws are merely universal generalisations that figure in our (best) theory. Although they ground claims about natural entities, they make no real impact on the world, having no modal force since they do not constitute the pattern of instantiation.

One might therefore think that primitive modality can earn its place here, explaining why there are certain concrete patterns. Those who pursue this approach posit a primitive ideological component at the heart of the metaphysical structure of the world. Dispositionalism is such view. It holds that concrete first-order patterns can be explained by taking primitive modal natures. Let us see why this sort of primitive appeals.

Suppose, for instance, that the property of being broken does not count among the trans-world entities that populate concretism's ontology. In other words, in every possible world the property of being broken does not instantiate. We might think of a world *w* populated by things, much like those of this world, that are fragile but cannot break in any way. Note that we are not conceiving of a situation in which something is fragile but *fails* to break. Rather, we have in mind a situation in which there is no possibility for a fragile thing to remain intact. The statement "a vase can be broken" – or, perhaps more accurately, "it is possible that a vase can break" – is therefore necessarily false. This says nothing, however, about the fragility of the vase. Hence, we might ask whether we can even speak of fragile particulars if nothing can break. The former seems intuitively to require that the latter be possible, for if the latter is *not* a possibility then

certain things – fragile things – cannot be realised. Unrealised possibilities do, therefore, make a difference to what is actually the case.

Note that this difference-making aspect is fundamentally constitutive of actuality. If unrealised possibilities make such differences, then actual occurrences are posterior to facts about possibilities. To fully appreciate this point let us go back to chess.

In the previous case there are two reasons why the rook-defence lacks modal force. The first is relatively uninteresting for our discussion: it is simply the fact that the player is not forced to apply every single rule contained in the rulebook. She might decide not to follow certain rules and therefore decide not to play certain moves.[19]

The second reason is more interesting. The rook-defence rule is posterior to facts about its *praxema*, i.e., the units of the game such as, in this case, the rook and the king. It is also a *regulativ*e rule: it *can* affect the units, but only after certain patterns of instantiation of *praxeme* (see Conte 1986). In much the same way, the rules of etiquette govern certain interpersonal situations that nonetheless exist independently from social relations *per se*. Given this independence, failure to comply with the rules of etiquette does *not* entail failure to comply with social relations, as it is clearly possible to have latter independently of the former.

On the other hand, there is another class of rules whose purpose is not simply to regulate but instead to *constitute* patterns. It is a fact of chess, for example, that the pawn can both take and be taken. But "taking a pawn" is a possibility that is dependent on the rule; it is not posterior to facts about its *praxema* (see Conte 1986; 1983). You cannot "take a pawn" without the rules of chess, just as you cannot make a donation to charity without the social facts of property and the ability to make a donation. And in the very same way, you cannot have the property of fragility without things being possibly broken.

The issue is not whether the broken entity should be counted among genuine possibilities, but rather whether the order of metaphysical explanation of modality is correct. If we seek to explain possibility by starting from actuality, we cannot systematise the pre-theoretical

[19] A well-known example of this is the *en passant* rule.

intuition that what-is-possible makes a difference to what-is-actual. This intuition is important insofar as its underlying metaphysical question is not *which* possibilities exist, but *what* the source of their modal force is – how they ground what can or cannot be realized in actuality – and *whether* there is a viable metaphysical explanation for their realisation.

If we want to account for the latter, we should start with possibilities and investigate what actually does or does not occur: we need not take what (actually) exists to be brute, since this is what has to be explained. If possibilities are prior to actuality, which is derivative, we cannot help but incorporate a certain modal primitive into our metaphysics. This sort of modal primitive should help us explain why, given modal dependencies among properties, there are certain patterns of propertied particulars and why possibilities have modal force – in other words, why what is or is not actually the case is derivative from those dependencies. Let us now finally move on and set the stage for the discussion to come.

1.5 Ontological Profile and Grounding Profile

In section 1.3.1 and 1.3.2 I have presented two basic requirements that any theory of possibility should satisfy in order to be counted as dispositionalist:

(P) (Some) properties are powers.
(NM) powers ground natural modality.

If there is a single accusation that can be levelled at the dispositionalist' project it is that, perhaps surprisingly, dispositionalists are not clear about either claim. Indeed, the entirety of the present project is a defence of these fundamental claims.

Dispositionalists are generally uninterested, or at least agnostic, over which theory of properties best fits the metaphysics. They almost universally assume that the modal theory will work, independently of which theory of properties operates underneath. Yet, as I shall show, this oversight cannot be excused. For how the *ontological profile* of properties is understood – whether as tropes, immanent universals, or transcendent

universals – makes a difference to the kind of *grounding profile* belonging to properties. Let me explain.

Concretism begins with the assumption that the four-dimensional pattern of instantiation is a brute fact and does not claim to offer any metaphysical explanation of that pattern. By contrast, dispositionalism assumes that we can explain the pattern of instantiation by appealing to the (modal) nature of properties governing, or grounding, their instantiations. Facts about the physical first-order level are therefore open to metaphysical explanation.

What the right kind of dispositional explanation of natural modality is has been the subject of much dispute, as we have already seen in 1.3 and 1.3.2. There are, however, certain grounds they all share. All start with the postulation of primitive modal facts, in the form of properties with modal natures (powers). This modal nature is taken to be *irreducible* and *fixed*. Let us look at these requirements one by one and see what they entail for a theory of properties.

First, that the modal nature of properties is *fixed* simply means that properties are not quiddities. That is to say: the modal role of powers is the same in all possible worlds (Bird 2007; *inter alia*). We have discussed this at length, and I will not comment on it any further just yet. However, there is another element we must consider. In addition to the requirement from *fixity* in fact lies the claim, discussed in 1.3.2, that modally fixed properties can exist unmanifested, i.e., independently of their physical realisation. A vase – to use an example dear to dispositionalists – can be said to hold the property of fragility independently of that property being *manifested*, that is, independently of whether or not the vase displays its fragility by breaking. Call these two conditions of the existence of powers, *fixity* and *unmanifestation,* the *ontological profile* of powers.

The ontological profile of powers requires that if powers are properties, and powers can exist unmanifested, then properties should too. Furthermore, if powers are properties, and powers have modally fixed natures, properties must as well.

It should not, for instance, be the case that some theories of properties, for whatever reason, make powers necessarily manifested. Likewise, it

should not turn out that some theories of properties – again, for whatever reason – make powers' modal nature contingent. Roughly speaking, any theory of properties that entails categorical consequences and/or quiddistic consequences is a poor theory of properties for powers. Unfortunately, and, I suspect, disappointingly for dispositionalists, I will later on present many such cases.

Second, that the modal nature is *irreducible* means that first-order modal connections can *only* be explained in terms of the nature of powers. I have already explained why dispositionalism takes facts about modality to be prior to the pattern of instantiation. Indeed, dispositionalism would like modality to *flow essentially* from the nature of properties.

Yet if the modal nature of properties *fails* to be irreducible, it can then be explained in terms of first-order physical facts, and accordingly cannot play the explanatory role it is supposed to. Thus, an explanation counts as dispositionalist explanation only if the relation between the source of modality and its physical realisation is either that of asymmetrical dependence or strict order (Raven 2012; *inter alia*). Any deviation from this path will bring a dispositionalist closer to their opponent's position: that facts about modality are derivative of facts about the physical pattern of instantiations (e.g. similarities). Dispositionalism is (partially) the thesis that powers *ground* natural modality.

Dispositionalists who argue for this essentially claim that if two properties (a) and (b), are powers, and connected by a modal relation R, then R(a,b) must be internal in the Moorean sense, meaning "a and b could not have existed in any possible world without standing in R to each other" (Moore 1922: 291-292). Given that R(a,b) is internal, (a) bears R to (b) necessarily.

The existence of (a), (b), and R(a,b) can be taken to *fully ground* facts about their instances at the first-order level, and their connection. This full ground *metaphysically explains* the existence of those facts of the world concerning its inner regularities. Call this the *grounding profile* of powers.

If powers are properties, then there must be a theory of properties that is compatible with the grounding profile of powers – that is, a theory whose

properties do not include among their conditions of existence facts that violate the grounding requirement.

Perhaps surprisingly, I will argue that this is exactly the position held by many in the dispositionalist camp: Aristotelian, or immanent dispositionalism (ID). I will show, for example, that the grounding profile of immanent universals is incompatible with the grounding profile of powers, and this because the conditions of existence of the former include dependence relations that violate *strict order.*

In conclusion, what the right kind of dispositional explanation of natural modality happens to be is the object of a long-standing dispute. Nevertheless, given that dispositionalism is not (yet) a set of clearly defined arguments, I propose that the best way to examine dispositionalism is to test the tenability of each theory of properties under the requirements from the metaphysics. Only then can we settle disputes over the modal details.

Prima facie, dispositionalists should be clear about the metaphysical analysis of properties they offer. For how modal nature is understood – whether as an aspect of a property (trope theory), or a constituent that ontologically depends on its instantiation (immanent realism), or as independent of its instantiations (transcendental realism) – makes a difference to the kind of governing work powers might exercise. It is my business here to remedy this.

We now know that if a theory is to be dispositionalist it must satisfy both (P) and (NM). It should be a theory whose properties are sufficient, with a compatible ontological and grounding profile.

Armed with a clear research question, I shall quickly summarise this chapter and then begin the investigation.

1.6 Conclusion

In this chapter I presented one notable primitivist approach to modality: dispositionalism. I discussed the fundamentals of dispositionalism and

argued that its success lies in a defence of two core claims: (P) (some) properties are powers, and (NM) properties ground natural modality.

Preliminary considerations suggest that dispositionalism should be clear about the metaphysical analysis of properties it offers. For how the modal nature is built makes a difference to the kind of governing work powers might exercise.

Despite the fact that dispositionalism has increased in popularity in recent years, not much attention has been dedicated to investigating which theory of properties best fits the requirements from the metaphysics. The aim of the present thesis is to remedy this. For if no theory of properties is available to dispositionalism, not only will the entire project demonstrate no evidence of coherence, but it will also lose appeal in the eyes of those who seek an alternative to concretism. The plan of battle is as follows.

In Chapter Three I shall look at tropism, the theory according to which only actual particulars exist and, among these particulars, there is a special kind called tropes. In the chapter I will consider two tropist versions of dispositionalism and evaluate whether the theory of properties offered by moderate nominalism is stable in respect to the fundamental requirements.

In Chapter Four I turn to immanentism, the theory that properties are universals ontologically depending on their instances. I will consider two immanentist versions of dispositionalism and evaluate whether the theory of properties offered by moderate realism fulfils the fundamental requirements.

In Chapter Two I will explore causal dispositionalism further. One of the main motivations for adopting an immanentist version of the theory lies in the naturalistic constraints of the ontology: only causal entities can be safely adopted. I will examine whether powers can explain causation, coming to the conclusion that a causal view of powers should be abandoned.

In Chapter Five I analyse Platonic dispositionalism. I offer a preliminary discussion of Platonism, and then interpret universals as Platonic properties that can be immanent to a spatiotemporal entity without being

themselves spatiotemporal. Finally, I offer a version of dispositionalism based on such universals – the theory of properties offered by traditional realism – that emerges as stable in respect to the fundamental requirements of the metaphysics, and that can be successfully applied to solve the aforementioned modal limits.

2. Causal Dispositionalism

2.1 Introduction

A causal dispositionalist will favour a defense of powers' metaphysics based not on considerations regarding the right ontology of properties; rather that causal dispositionalists are united in the belief that powers illuminate questions of causation.

I said in the introduction that, with the exception of Molnar, Martin, and Heil, dispositionalists are generally uninterested, or at least agnostic, over which theory of properties best fits the metaphysics. Yet the application of powers in questions of metaphysics of causation has led many to favour an ontology of immanent. These scholars typically broaden the theory of dispositionalism to take in *causal dispositionalism* (CD): the view that powers are properties with a causal nature, and that this nature explains causal patterns at the first-order level. The need to critically examine this view is not, strictly speaking, ontological: it is instead rooted – perhaps surprisingly – in an internal disagreement among dispositionalists over what a power *is*.

On the one hand, there are those who (in accordance with the presentation of the view given up to now) take powers to be modally fixed properties. Included in this group are Bird (2007) and Vetter (2015), *inter alia*. These scholars claim, roughly speaking, that the success of dispositionalism is separable from the success of *causal* dispositionalism, because causation is not what powers are fundamentally about.

On the other hand, causal dispositionalists are often unsatisfied by the definition of powers offered above and maintain that "powers ontology has its very roots in Aristotelianism in which nature is *active* or *dynamic*" (Mumford & Anjum 2012: 104). Indeed, they claim instead that powers are essentially causal; that facts about causation, not facts about modality, fix the identity of properties. Friends of this camp would perhaps consider the argument of this dissertation to be a non-starter, because the

discussion of powers in Chapter One overlooked what *they* mean by powers.[20]

Yet I do not think there is any prima facie difficulty in accommodating the desiderata from causal dispositionalism. We can fill the apparent dialectical gap by modifying the requirements discussed in Chapter One, so that they now read:

1. Powers are causes (or causal properties)
2. Powers ground causation.

Chapter Five is, as will become clear, the appropriate context in which to examine the first of these claims. The reason is that upholding it often – if not always – entails a bias against Platonic theories of properties. As Van Ingwagen has noted (2015), this kind of immanentism is rather different to the immanentist theory of properties that will be discussed in Chapter Four. This immanent Aristotelianism – so Van Ingwagen goes on to explain – encompasses every theory of properties that holds them to be the *relata*, or sources, of physical causation, whether these are tropes or immanent universals.

In Chapter Five I will examine whether the argument from causality is really an argument for immanentism and against Platonism, together with other meta-ontological worries that characterise the rejection of Platonic properties.

In this chapter I will focus on (2). The main reason is that much of the current literature attempts to apply the (best-know-so-far power-based) causal theory to domains beyond that of fundamental metaphysics. The scope of this enterprise is not defined by a concern over the correct ontology of properties, but rather the claim that powers illuminate questions of causation, which unifies causal dispositionalists. It therefore makes sense to examine whether this really is the case.

[20] I am deeply grateful to Anna Marmodoro, Stephen Mumford, Rani Lill Anjum, and Ruth Groff for numerous conversations about causal dispositionalism and the current dispute between the two camps. Unfortunately, for reasons already mentioned in the previous chapter, my work on Marmodoro's Causal Dispositionalism has not been included in the present work.

My conclusion is that causal dispositionalism of the kind examined in this chapter fails to provide a satisfactory account of powers-based causation, since it offers no theory that satisfies (2).

Yet the results of this chapter must be taken with a grain of salt. In fact, the criticisms that I will offer in this chapter are *only* directed toward advocates of relationalism about (causal) powers. As discussed in the former chapter, while the first camp thinks that powers are *related* properties, being the manifestation numerically different from the power, there is a second camp, non-relationalism, who holds that take powers to be *pros ti* properties, and the manifestations to be *stages* of those same properties (Marmodoro *forthcoming*; 2007; 2017a; *inter alia*).

None of the criticisms presented here can be extended to non-relationalism about causal powers. Therefore, this chapter does not present any verdict on the *ultimate* fate of Causal Dispositionalism. Although the findings in the chapter are mainly negative, there is hope that progresses can be made by those, like Marmodoro, that advocate for non-relationalism.

2.2 Powerful Causation

Causal dispositionalism is a theory about the grounding of efficient causation. It is the view that powers are, or act as, causes, and *all* cases of causation can be explained entirely in terms of the causal nature of properties (Mumford & Anjum 2011; *inter alia*). Causal dispositionalism distinguishes itself from the regularity and counterfactual views of causation, holding that causation should be understood in terms of causes being essentially connected with, or determining, their effects. This novel and intriguing causal theory extends the explanatory project of Dispositionalism, using its core claim to offer a robust *realist* conception of causation based on powers.

As it should be clear by now, the minimal, basic claim of Dispositionalism is that modality has its source in the nature of irreducibly modal properties and these, in turn, constrain patterns of instantiation, thus grounding natural modality (Mumford 2004: 170; *inter alia*). According to Dispositionalism a property is a power or potency that has, or is

essentially related to, a potentiality – the latter being the former's manifestation. This relation entails that facts about manifestations are dependent upon powers. These facts are *fixed*: if a property *a* realizes the modal role *r*, then it is not possible for *a* to realize any role other than *r*. Given that powers are modally fixed properties, connections hold in all possible worlds; it is, in other words, a metaphysical necessity (see Bird 2007; *inter alia*). Dispositionalism uses these second-order connections between properties to account for first-order concrete worldly patterns. Since modal facts are not posterior to properties, properties determine first-order patterns without any need for additional modal intervention, like the intervention of laws of nature, governing how properties will instantiate.

Causal dispositionalism is probably the best-known attempt to apply this theory outside the boundaries of fundamental metaphysics.

According to Causal dispositionalism causation should be understood on the basis of irreducibly causal properties that, in turn, ground efficient causation in the world. Furthermore, Causal dispositionalism holds powers to be more than modally fixed properties; they are *abilities*, or *capacities*, the exercise of which has the effect of bringing about, or *producing*, a change in the particular that possesses it or in the particular(s) toward which they are exercised (Harré & Madden 1975: 5; Mumford 2004: 168; Mumford & Anjum 2011: 7; Groff 2013).[21] Powers nonetheless have modal force in the sense that they *determine* the occurrence of the effect. This is the simple essence of (almost) any dispositional theory of causation.

Causal powers determine effects, then, but the question of how they do so – how change is afforded – has led to disagreement amongst causal dispositionalists. Explanations fall into two main camps: let us dub the

[21] We should be cautious here. Not every case of causation results in the production of change. Some cases, in fact, tend to maintain changeless states. Exemplary cases are causal equilibria in which causes are exercised but do not produce any change. Instead they simply persist in the state in which we found them (see Williams 2005; *inter alia*). On the basis of similar considerations my preferred view is to say that a cause *determines* an effect. This strikes me as both more 'democratic' and at the same time representative of powers' causation. As I will show later in the paper, the idea of powers as *producers of change* is, for obvious reasons, mostly associated with the Processual trend, which I shall introduce in a moment.

first, the *Compositional* view (CV), and the second, the *Processual* view (PV).

According to (CV) an effect is determined when causes act together or *compose*. Production is thus understood *mechanistically*, in terms of activities of components and resultant effects. According to this view, notably defended by Molnar, Mumford, Anjum, Cartwright, and Pemberton, each power acts as a (partial) cause offering a *causal contribution* – that is, its manifestation – to the formation of the total effect (Molnar 2003; Mumford & Anjum 2011; Cartwright 2007). Given that powers are understood as *parts*, what this account has to explain is how composition occurs and what its rules are (Cartwright & Pemberton 2011: 110). This is the fundamental challenge of the view: to define a mereology for potencies and explain how powers compose.

According to (PV) an effect is determined when causes *unfold* or *propagate*. The core idea is that when powers are exercised, causes literally *turn* into the effect, giving rise to a dynamic causal process. Production is thus understood in terms of *dynamic unfolding* of *causal processes*, rather than in terms of composition. The view under consideration invites us to abandon the idea of causal contributions and to understand an effect as identical with the manifestation of mutual powers. This view has been notably defended by Martin, Ingthorsson, and Groff (Martin 2008; Martin & Heil 1998; Ingthorsson 2002), but it has also been adopted – and, more recently, explicitly defended – by Mumford and Anjum (2011; 2018). What this account has to explain is how propagation occurs and what the dynamicity introduced by powers is exactly.

Many scholars coming from otherwise different perspectives seem to envisage a benefit to postulating real powers as physical causes (see Ellis 2002; Mumford & Anjum 2011; Cartwright & Pemberton 2011; Harré & Madden 1975; Austin 2015b). Virtually all of them are motivated by anti-Humean intuitions about causation. They argue, generally, that explaining causation in terms of regularities or constant conjunction obscures important information about the process of causal change (Pemberton 2011; Chakravartty 2007). Thus, they opt for a realist ontology of causal powers.

The scope of this chapter is to raise problems for both (CV) and (PV). In section (2.3) I shall introduce (CV) and the best systematic account of Causal dispositionalism in support of this trend. Then, I shall present a problem for the account. In section (2.3.1) and (2.3.2) I will offer three attempts to solve the problem and show that none of them succeed: they are either explanatorily or metaphysically inadequate. In section (2.4) shall introduce (PV) and present a problem for the view. Finally, in section (2.4.1) and (2.4.2) I shall examine different attempts to solve the problem and show that none of them succeed. My conclusion is that the ideology of Dispositionalism *alone* is insufficient, or incomplete, to make progress in the investigation of a non-Humean account of causation.

2.3 The Compositional View

Proponents of the compositional view share the intuition that an understanding of causation can be achieved by taking powers as *parts* that get structured, or *compose*, the effect. Many in the causal dispositionalism quarters adhere to, or at least have militated for, (CV). Molnar, Mumford & Anjum, Groff, Williams, McKitrick, have been, in recent decades, among the most remarkable contributors. Two are the models that have been largely discussed in the literature: the *Compositional Manifestation* view (CM), and the *Mutual Manifestation* view (MM).

Proponents of the first view argue that efficient causation should be analysed in terms of three things: *power parts (tokens), manifestations (tokens)* – i.e., their exertion or causal contribution – and their resultant composition, which is to say, the *total effect* (Molnar 2003; Mumford & Anjum 2011; Cartwright 2007). According to this view each power is a complete cause for its manifestation, and each manifestation is a partial cause for the obtaining of the resultant effect (Molnar 2003: 195). The resultant effect, in turn, is the composition of partial causes, i.e., manifestations. Since it is the causal contribution that is the subject of composition, it is misleading to speak about powers producing effects by c*omposing* (in some sense of composition not yet specified); that which composes here are instead the manifestations.

According to the second view, the Mutual Manifestation view notably defended by Martin (2008), an effect produced is *the coming together* of powers, and this coming together *is* their manifestation. Manifestation and effect are therefore identical. Furthermore, powers *contribute nothing whatsoever*: according to Martin there is no stage in which powers compose and then cause an effect; rather, they produce the effect directly. According to this view, powers parts themselves compose (in some sense of composition not yet specified).

Among the two, it is the second view that has attracted more attention.[22] In fact, some of their proponents have advocated the practical benefits of their realist theory of causation for mechanistic explanations in the sciences (Cartwright 2007: Chakravartty 2007; *inter alia*). The motivation of those who adopt this view is that in order to explain how effects are produced we need to postulate fundamental causal powers or capacities (Cartwright & Pemberton 2011; Dupré 2013; Bhaskar 1978; Harré &

22 For a comparative discussion of (CM) and (MM) see (Austin 2015a). According to Austin MM has features that hat ultimately render it unattractive.

Prima facie, since each power manifests differently depending on those it is partnered with, there are a multitude of second-order facts concerning the power-manifestation relation that should be taken into account in order to explain how causes essentially relate to effects. One might be worried that this view entails an underlying ontology that is insufficiently parsimonious, since we need each power, at the second-order level, to be connected with many manifestations. If this is the form of Causal dispositionalism we have in mind, then a revisionary approach to the underlying metaphysics is required, one that unnecessarily muddies the dispositionalist waters. Moreover, since each power has a different manifestation depending on the other powers it is partnered with, we can only know a partial aspect of the active property involved in a causal transaction (Martin 2008: 52). As has been recently pointed out by Austin (2015: 3), one might worry that the analysis of production offered by this view is epistemically limited. This limitation is particularly pressing given that here (MM) is assayed as a Compositional view. Generally speaking, advocates of the Compositional view work in a mechanistic framework in which it is crucial to account for what does what. In order to obtain the necessary causal information that leads from the occurrence of initial conditions to the occurrence of the effect, it is important to offer a complete description of the causal operation. Depending on the mechanistic account under examination, this description must include particulars, their exercises, and how they relate in order to produce the effect. Not knowing which causes contribute to what effects might render (MM) descriptively uninformative. On the other hand, (CM) neither imposes a revisionary approach to the metaphysics, nor raises, at least prima facie, the sort of epistemic worries mentioned above. The view analyses causal production by breaking each effect into component parts, namely, the powers' contributions. Therefore, (CM) might plausibly allow for what (MM) cannot: modelling and analysing causal phenomena in order to determine accurate and complete causal information about causes' interaction and effects. Since Causal dispositionalism is a theory about efficient causation, we can reasonably expect the theory to be at least empirically adequate in its level of explanation.

Madden 1975). When we ascribe a power to a particular we say something about what this particular can do, and when particulars work in concert they form a causal mechanism that leads from the occurrence of X to the occurrence of Y. If these particulars compose a larger particular, an object, presumably we can explain the object's causal behaviour in terms of the causal powers of its components. Put it simply, mechanisms produce effects in virtue of the capacities of their component parts (Machamer, Darden, Craver 2000; Darden 2008). Causal dispositionalism offers a suitable theory that explains the production of Y in terms of the causal properties of the things that figure in the mechanistic chain of events.

While many philosophers of science such as Machamer, Darden, Craver, and Cartwright have focused their efforts on modelling different causal mechanisms and the relation between parts and their activities, Mumford and Anjum have offered the best systematic Compositional account in terms of the compositional manifestation model (CM).

Not only have they offered a comprehensive new approach to Causal dispositionalism in general, but they also developed a strategy to increase the explanatory adequacy of their famous *vector model*.

The core idea is that we can represent causes as *forces* acting together in order to make causation happen, thus mapping the mechanistic ontology of particulars, their activities, and the overall effects they produce. By isolating each causal contribution and examining their intensities and directions, the model allows for calculation of the effect that will tend to be produced.[23]

[23] This strategy to assay causal phenomena is by no means new, and neither is its combination with the theory of Dispositionalism. In fact, Mumford and Anjum's proposal is an updated version of causal calculus model presented by J.S.Mill in his *System of Logic* (1843). Mill himself offers probably the most succinct and clear definition of the vector model: "a balance of tendencies which tend to produce an effect"(Mill 1843: III.x.viii). Mill, working within the empiricist tradition, offer an analysis of causal phenomena which is surprisingly in line with the brand of Causal dispositionalism under discussion: "To accommodate the expression of the law to the real phenomena, we must say, not that the object moves, but that it *tends* to move, in the direction and with the velocity specified...[...]...(the body) tends to move in that manner even when counteracted; it still exerts, in the original direction, the same energy of movement as if its first impulse had been undisturbed, and produces, by that energy, an exactly equivalent quantity of effect. This is true even when the force leaves the body as it found it, in a state of absolute rest" (Mill 1843: III.x.v). In other words, the exercise of causes only tends to produce the effect, the existence of which should be accepted even in the absence of its manifestation. The connection

The model has three central tenets. First, each contribution has its own intensity and direction (Mumford & Anjum 2011: 23-27). Both features can be represented by taking contributions as vectors: the intensity of the contribution corresponds to the length of the vector, its direction to its arrow; taken together, they tell us which outcome the contribution indicates. Second, a set of vector-causes forms a vector-space that represents a dimension of change in the particular involved in the causal phenomenon under consideration. Third, each vector-cause expresses only a tendency toward the outcome. Powers can be involved in the production of many different effects, meaning they are *pleiotropical causes* (2011: 128).[24] The core idea of composition is that we can *group* one cause with various others, and in each instance, it will *compose different effects*. The only requirement that vector causes have to satisfy is that they need to always provide the same contribution to every causal context in which they act. But nothing necessitates, not even conditionally – *pace* Hare, Madden, and Molnar (1975; 2003) – the occurrence of the total effect. Figure 1 is a simple example involving the tendencies toward the production of a particular event.

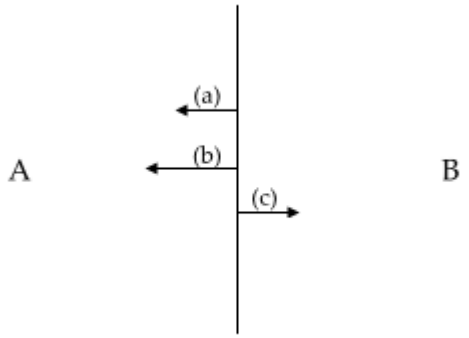


Figure 1 - Multiple powers at work: the mug (b) and the fire (a) are disposed toward A, while the cold draft (c) countervails (a) and (b), and so is disposed toward B.

In the case depicted, the tendencies are toward the production along one particular dimension of change: temperature. Reaching A will produce a

between Dispositionalism on the one hand, and empiricism on the other, is a promising indication that (CM) is up to the task of adding explanatory powers to the underlying metaphysical framework.

[24] Mill discuss this feature of the cause claiming that, "a given effect may really be produced by a certain cause, and yet be perfectly capable of being produced without it." (Mill 1843: III.x.ii).

change toward heat, whereas reaching B would produce a change toward cold. For instance, the fire (b) and hot mug (a) both act so as to warm me, but countervailing causal factors, such as a cold draft blowing through an open window (c), will have the opposite effect. As we can see in Figure 2, there are both positive and negative contributions toward an effect. The resultant R is a *polygenic* sum, produced by the addition or subtraction of each causal contribution (Molnar 2003: 194-198; Mumford & Anjum 2011: 221-224).

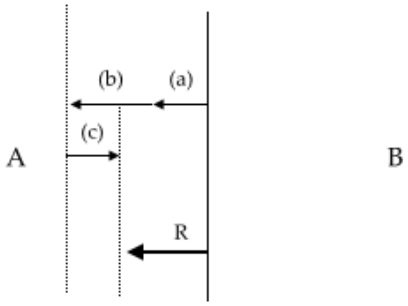


Figure 2 - Multiple powers disposed to and from F. On the right, the resultant vector R of the powers' composition.

The interplay between Causal dispositionalism, of the kind mentioned above, and the philosophy of science has been so fruitful that, to this day, the compositional model of causation reigns over the publication trends. And yet, it is generally overlooked that compositional models of causation, such as the vector models, do not offer any clear rules for composition, and are therefore silent of the fundamental questions of how powerful causes ground efficient causation. This is a sensitive issue that, despite having been brought to attention few years ago quite explicitly by Cartwright and Pemberton, has never been directly articulated. Here I shall quote them at length:

> This account of singular powers and their combination lends support to the autonomy of the special sciences and provides a challenge to reductionism. As we acknowledged above, this account of powers leaves the need for some account of composition. Perhaps component powers come with rules for what will be produced overall when they act in combination in specific arrangements with other successfully exercised powers. But this seems unnecessarily complicated. Consider by analogy: each of us having a rule for calculating what we would do should we get together seems far more efficient than each of us having built in a

> dense set of predetermined out- comes for "all" of the indeterminate situations we might possibly encounter. We leave this as future work. (2011:110)

Not much progress has been made on this front, despite understanding the structure and composition of potentiality is at the other of an account of causation based on powers. My aim for the rest of this chapter is not to build a response to this challenge. I shall rather show where the current orthodoxy fails in respect to this fundamental problem.

2.3.1 Mereological Composition

As mentioned above, the core idea of (CM) is that powers are powerful parts and that causation is the composition of those parts. The proposal of Mumford and Anjum is to conceptualize powers as certain kind of forces that can stand in part-whole relation with the effect. This latter is indeed *brought about* by the coming together of causes. The machinery of how exactly this *coming together* occurs relies fundamentally on what kind of parts powers are.

Let us then start by examining the analogy between vectors and causes.[25] Mumford and Anjum tell us that both causes and vectors have intensity and direction, and on this basis, they assume that causes are vector-causes. But now compare what intensity is for a vector and what it is for a cause. The intensity of the latter is the *strength* with which the cause is exercised, but the intensity of the former is simply its *length*. There is no meaningful, robust sense in which a cause has a length: we might be willing to say that causes have length insofar as this refers to the *duration* of their exercise, but this is not what Mumford and Anjum want to capture. Therefore, the feature in question of that which represents (i.e., the vector) is not the same as the feature of that which is represented (i.e., the cause). Note that this is a relatively minor issue, suggesting only that causes are *not* identical with vectors. But Mumford and Anjum do not argue for this conclusion. Their model is a vector-representation of causes, not a representation of vector-causes.[26]

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[25] For a different critical examination of the analogy between powers and vectors see (Bird 2016).

[26] To understand the distinction, suppose that we are shown a map of Europe and a map of Tolkien's Middle-earth. The map of Europe is both a territorial-representation and a representation of a territory. By contrast, the map of Middle-earth is a territorial-representation but not representation of a territory. The same goes for our representation of causation: Mumford

Let us now look at the direction analogy. It seems at first that both causes and vectors have direction, the latter being a feature shared by both the representative and the represented. Note, however, that while vectors in the model are directed toward an effect, causes, since they are powers, can only be directed toward their manifestations. Even if we grant that what is represented in the model are not powers but their contributions – that is, their manifestations – the underlying metaphysics does not, at least explicitly, support the claim that contributions tend toward the effect. Let us unpack this claim.

If Causal dispositionalism follows the core thesis of Dispositionalism, the essential connection between causes and effects should be explained in terms of the relation between powers and manifestations. But the compositional manifestation model), in contrast to the mutual manifestation one, clearly holds manifestations to be distinct from effects. Powers offer their manifestations as causal contributions, which compose to produce an effect. As such, on the basis of the underlying metaphysics we know how to connect powers to their contributions, but *not* how to connect the contributions to the resultant effect.

In order to rescue (CM) from the aforementioned problem we need to find a suitable explanation for the connection between contributions and effect. This causal gap would have to be filled in a way that satisfied two criteria.

First, the solution should be *metaphysically adequate*. The link between causes and effects should be explained *only* in terms of the causal nature of powers. If something *other* than the causal nature of powers is responsible for the connection between a contribution and an effect, then causation cannot be explained purely in terms of the nature of powers. That is to say: causes alone cannot then *determine* effects; something else in needed. This 'something' would have to be power-like, for if it was not we would have to conclude that the underlying dispositionalist theory

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and Anjum's model represents causes as vectors, and is, therefore, a vector-representation. And yet it is not a representation of vector-causes, since causes are not identical with vectors. Mumford and Anjum's treatment of vector-causes is, in other words, purely analogical, and does not amount to any identity statement between the two. I am grateful to Roman Frigg for having raised this point in discussion.

could not bridge the gaps between different existents, causes, and effects after all.

Second, the solution should be explanatorily adequate. By this I mean that the solution should, first, stick with the "three distinct categories: powers, their contribution or exercising, and the overall result that happens when they exercise" (Cartwright 2017: 5).[27] Second, it should explain how we can distinguish and explain disproportional cases of causation. Many cases of effect's production are non-linear, or *disproportional*, and violate the principle of additive composition (Mumford & Anjum 2011: 87; Cartwright & Pemberton 2011).[28] Thus a suitable explanation for the connection between contributions and effects should also respect explanatory adequacy, explaining both proportional and disproportional cases of causation.

In this section I shall examine three attempts to fill the aforementioned gap and show that all of them ultimately fail.

The first attempt takes contributions to be parts that compose an effect. As to how this occurs, Mumford and Anjum argue that having contributions in place is enough to bring about an effect (2011: 86). They then claim that the connection between effect and contributions is such that given a set of component powers there is only one result that can come about (Mumford & Anjum 2011: 43). Let us call this assumption the *Principle of the Uniqueness of Power Composition* (UPC). The core idea is that production is the result of contributions *plus* a principle, or rule, governing how the effect is constituted. Thus, we need no other causal relation to bridge the gap between contributions and effect, just an adequate account of effect-constitution.

(UPC) has two implications regarding effect-constitution: (a) for a given pattern of vector-causes, no matter their distribution, they will produce the same effect; (b) a pattern of vector-causes suffices to produce said effect. These implications resemble two basic principles of extensional

[27] See Cartwright (2013) for a defence of the category of contributions.

[28] Mumford and Anjum present cases of summation of causes as the exception, rather than the rule. Normal cases of causation are what Mill called disproportional cases, in which "an entirely new set of effects...take the place of, those which arise from the separate agency of the same causes" (Mill 1843: III.vi.iii). These are cases in which the effect is "more than the sum" of its contributions.

mereology: (M1) the Principle of Uniqueness of Sum and (M2) the Principle of Universal Existence of Sum. (a) is similar to (M1):

$$\begin{gathered} if\ U\ is\ a\ sum\ of\ x_1 \dots x_n\ and\ V\ is\ a\ sum\ of\ \ x_1 \dots x_n \\ then \\ U = V \end{gathered}$$

Roughly speaking, if U and V are composed by the same elements, then U must be identical to V. The principle entails extensionality of composition, since for any sum of components they only compose one whole (Varzi 2008: 3). According to (M2):

$$x_1 \dots x_n\ \ compose\ U =_{def}\ \ U\ is\ a\ sum\ of\ x_1 \dots x_n$$

This principle states that to compose a collection is *just to add* to the collection. (Meirav 2004: 41). To speak of an existing whole is to speak of their parts existing. In the parlance of the vector model, this accords with implication (b), i.e., the presence of the contributions is enough for the presence of the effect.

Under (UPC) the production of an effect can only be mereological. However, as Mumford and Anjum also acknowledge, disproportional cases violate addition. The following is a simple case that violates (M2).

Consider an airplane. The airplane can fly as an effect of the contributions of its components. Each of its parts, the engine, the fuel, the wings, and so on, manifest their powers and this manifestation should produce the effect of flying. This is not an additive case since none of the components have the power to fly: the sum total of their contributions cannot automatically produce this effect. But (M2) still entails that if the parts exist the whole should exist as well.

Consider, then, the following scenario. Suppose that instead of an assembled airplane we have its components distributed throughout the hangar. The relevant causes are present since, according to the theory of Dispositionalism, causes can exist unmanifested. But it seems that the set of causes present in these components are insufficient to produce the effect of flying: although causes are in place, the effect is not. It seems, therefore, that there are cases in which causes do not compose an effect simply in virtue of their existing.

Given that (at least some) cases of disproportional causation violate the mereological principle (Mumford & Anjum 2011: 88), this solution compromises explanatory adequacy since it cannot explain non-mereological cases of composition.

The second purported solution is to deny that contributions alone are sufficient to constitute an effect. This strategy takes the distribution or arrangement of vector-causes as a relevant causal factor (Mumford & Anjum 2011: 102): that is to say, it entails the existence of causes *plus* their organisation *plus* a principle accounting for how the effect is produced.[29]

Mumford and Anjum are not alone in arguing for this: Cartwright and Pemberton, for instance, seek to combine causal capacities and a suitable *organisation* or *arrangement* (2011: 101). The purpose of this is strategy is to account for explanatory adequacy. I shall show, however, that the strategy either fails to do so or else succeeds at the expense of metaphysical adequacy. Let us see why.

In accordance with this new attempt, the implications of (UPC) should be revised in the following way: (a1) a given pattern of vector-causes *and* their organisation they will produce the same effect; (b1) a given pattern of vector-causes *and* their organisation suffices to produce said effect. Let us call the revised principle (UPC*). If successful, we should be able to mitigate the theoretical damage without rejecting the principle outright. Unfortunately, Mumford and Anjum do not pursue this solution at length, and so we shall have to do so on their behalf.

Let us offer an example that is amenable to both mechanistic and vectorial principles, requiring a set of component parts, a certain arrangement, and causal powers instantiated by said parts.[30]

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[29] Bhaskar, Harré, and Madden should perhaps be considered the *loci classici* of this approach. Indeed, the notion of generative mechanisms, "whose structure and components... produce a sequence of events" (1975: 130) has been highly influential on the subsequent discussion of powers. However, I shall not include generative mechanisms under the Compositional view, given that they usually link mechanisms with activities. If I understand Bhaskar, Harré, and Madden correctly, they do not commit to any substantial idea of mechanism, classically understood (Machamer, Darden, Carver 2000) – they instead use "mechanism" only metaphorically, without committing to the idea that effects are composed of causes.

[30] We should not worry too much about whether this example actually *is* an instance of a physical mechanism, since we only have to fulfill the formal ontology of a mechanism: namely, parts,

Suppose we have three physical components, (a)(b)(c). Each is sharp enough to have the causal power of piercing: they have the following token-powers (P_A, P_B, P_C). With the components in place we can conceive of two wholes – U and V, say – with the same components but distinct in terms of arrangement.

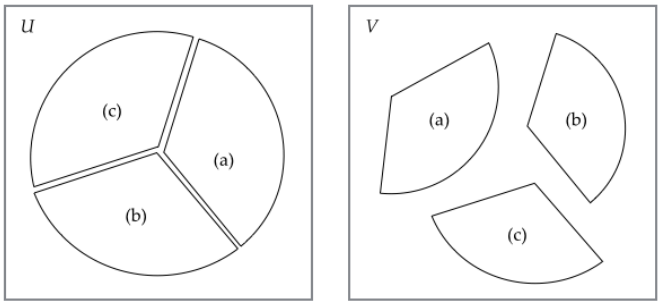


Figure 3 - Two wholes sharing the same components.

The parts composing the two wholes share the same powers, so both in U and V component vectors are disposed to the same outcome. According to (M1), then, we might expect that:

$$\begin{gathered} if\ U\ is\ a\ sum\ of\ (a)(b)(c)\ and\ V\ is\ a\ sum\ of\ (a)(b)(c) \\ then \\ U = V \end{gathered}$$

Suppose (M1) holds for U and V. According to (UPC), adding the same vector-causes should entail that the resultant vector R is identical in both instances. And yet this is evidently not the case: as we can see in Figure 4, despite U and V having the same component powers disposed to piercing, the resultant vectors only act in this this way in V, pointing in the very opposite direction in U. Put formally: (x) if $R_U \neq R_V$, then $U \neq V$. As a consequence (M1) does not hold: U and V have the same geometrical parts with the same powers, hence there is no difference in powers alone that makes the case that $R_U \neq R_V$.

activities, and arrangement.

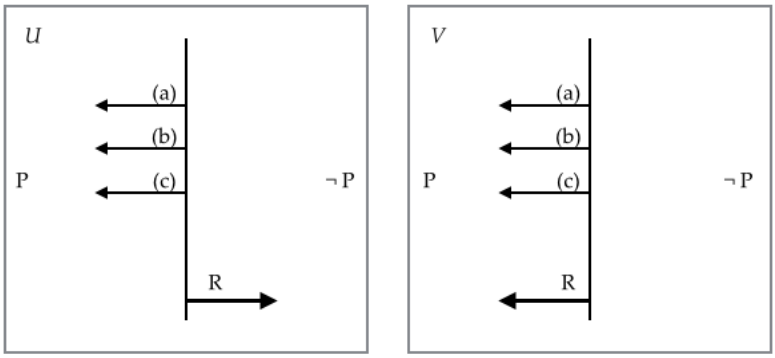


Figure 4 - Vector models of U and V, in which components are disposed to pierce.

According to (M2):

$$(a)(b)(c)\ compose\ U =_{def}\ U\ is\ a\ sum\ of\ (a)(b)(c)$$

and yet the totality of powers in U is not disposed in the same way as its components. Moreover, U differs from V by virtue of the fact that the former instantiates another power, namely, the ability to roll on flat surfaces. This power is clearly not proportional to the sum of the contributions, and despite the fact that both U and V are assemblages of the same component powers, V does not dispose toward rolling, as shown in Figure 7. The effect, then, cannot be equivalent to the sum of its contributions: (y) if $\mathrm{R}_U \neq \mathrm{R}_V$, then $SUM_{(\mathrm{A,B,C})} \neq A_{(\mathrm{A,B,C})}$.

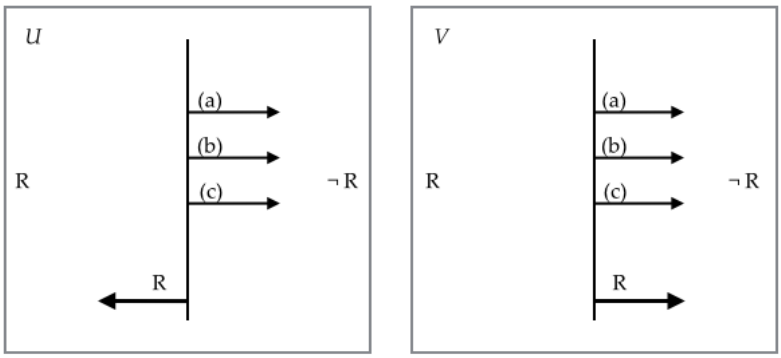


Figure 5- Vector models of U and V: in the latter components arranged in a whole are not disposed to roll, while in the former whole they do.

It should be clear from the example that *arrangement* or *organisation* of causes has some causal influence in the production of the effect. As

indicated by Cartwright and Pemberton, the arrangement provides the context in which powers exercise and dictate what effect is produced (2011: 94-96).

Note that this solution is also consistent with Mumford and Anjum's approach, and that (UPC*) is clearly not violated. It is in fact no longer true that there is no difference in powers that makes $R_U \neq R_V$ true.[31]

The two wholes differ in their components, since their organisation should be counted as such – while U has a certain physical arrangement, V has another, different from U. This results in a causal difference that is grounded in the causal effect of the organisation, in such a way that while the resultant vector R_U disposes toward $\neg P$, R_V disposes toward P. Similarly, it is the organisation of the components in V that grounds the emergent effect of rolling, which cannot exist prior to (a)(b)(c) being organised in the relevant way. This might look like a viable solution, but I do not believe it is. Let us see why.

If an arrangement has the causal effect it appears to, and if causation is explained in terms of the exercising of powers, then it should follow that arrangement or organisation is also a power. But is it?

First, if organisation is indeed a power then it is a cause that does not feature in the model as a vector. In violation of one of the model's tenents, therefore, some causes cannot be represented as vector-causes. In the example given the arrangement of (a)(b)(c) changes the spatial relations of the components, but this change is invisible if we look at the causal macro-phenomenon through the lens of the vector model. Since the phenomenon cannot be represented appropriately it is doubtful whether the model is explanatorily adequate with respect to disproportional cases. And again, given that these cases are the norm, it would seem that explanatory adequacy is not accounted for by this solution.[32]

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[31] I am grateful to Jennifer McKitrick for bringing this to my attention in private conversation.

[32] It could be argued that organisation is a component power but an abstract one, present in addition to concrete powers involved in the causal phenomenon (see Mumford 1998: 202). This would explain why we cannot represent organization as vector-cause. However, it is doubtful, or at least unwarranted, that such abstract powers can have (or act as) an efficient cause. To see why, note that if we take organisation as a power we are essentially claiming that organisation belongs to the same thing it organises, i.e., its proper parts. This power is a certain agency, or ability to ϕ. More specifically, its effect is to unify "separate effects in to united action" (Mill 1843: III.vi.ii).

Second, that which distinguishes proportional and disproportional cases is that in the former the resultant is an addition of contributions, whilst in the latter it is the arrangement or organisation of contributions. But if organisation is a power, what is its manifestation? To be sure, contributions that are organised in a certain way. Since the compositional manifestation model is triadic, however – consisting of powers, manifestations, and resultant – we should conclude that the manifestation of the organisation just *is* the resultant itself. Crucially, this is not compositional model anymore, rather the mutual manifestation one. Why, moreover, do we need to represent all the other vector causes if organisation as a power suffices to provide the resultant? Looked at in this way it is not even clear whether is (CM) that is still under consideration.

Finally, what if organisation is not a power? If so, then firstly it is doubtful that it could be accommodated by the (UPC) principle, since this is offered as a principle for powers' composition.[33] And secondly, if organisation is not a power then it is fairly clear that metaphysical adequacy cannot be satisfied: if organisation is a structural fact, then given that according to this strategy it *must* have a causal effect, the effect is produced by the nature of powers *plus* some quiddistic fact regarding their organisation. But, as we already know, powers alone must allegedly do this.[34]

However, since organisation is one power among others, its ability to unify will be nothing more than a separate effect. This effect, in turn, will have to be unified in united action, and so on, *ad infinitum*. Unification acts on efficient causes, but it is not clear how can it be an efficient cause like any other. It seems that here we are simply solving one mystery – how to fill a gap in efficiency – by invoking another: the efficient gap being filled by something abstract doing the work. Moreover, this solution is not available to causal dispositionalists who endorse a certain view about properties as powers, namely Immanentists and Tropists. The worry, then, is that this solution is not metaphysically adequate either.

[33] It is worth noting that Mumford and Anjum are not the only scholars that have problems with providing a valid principle for powers' compositions. Indeed, Cartwright and Pemberton write "On the account of causal powers that we draw from science, each power has a single canonical contribution and rules of composition of various sorts apply...[...]...As we acknowledged above, this account of powers leaves the need for some account of composition. Perhaps component powers come with rules for what will be produced overall when they act in combination in specific arrangements with other successfully exercised powers. But this seems unnecessarily complicated. We leave this as future work"(2011: 110). No further solutions to the problem have been offered, and it is doubtful that one is forthcoming.

[34] Surprisingly enough, Cartwright and Pemberton seem to constantly overlook this problem, as they repeatedly claim that it is the arrangement that determines the exercise of powers and which

Once we see that Compositional strategies of this kind are unsatisfactory we might be tempted by the view that contributions are *not* part of the effects after all. Mumford and Anjum argue as much at one point, claiming that a resultant effect and its component causes should not really be thought of as completely distinct entities. They are rather "the same thing in […] disguise" (Mumford & Anjum 2011: 42). This attempt upholds metaphysical adequacy, since the connection of cause and effect is given by the connection between powers and manifestations. However, there is an immediate concern with this strategy. On this reading contributions – that is, manifestations – and effect are identical, and so this is not compositional model, rather the mutual manifestation one.

The second problem with this strategy is as follows. As Mumford and Anjum themselves acknowledge, the majority of cases of causation are disproportional. But if contributions and resultants are the same thing in different guises, then they must be proportional. If this is the case, then explanatory adequacy is not fulfilled by this solution. Mumford and Anjum can object, as indeed they do, that there may just be no explanation for why composition is disproportional: perhaps it is in the primitive nature of powers to produce puzzling effects (2011: 100). This line of defence is troubling, however. For if the normal case of causation cannot be explained, then it is not clear why we should think that their model can explain causation at all. Nor it is clear why we would need to explain linear cases with vector-causes since if powers are supposed to produce disproportional effects in virtue of their nature, then they should do so also in proportional cases.

To sum up, none of the three strategies examined are adequate. Either they are explanatorily inadequate, or else they are metaphysically inadequate. The first strategy contradicts explanatory adequacy since it fails to explain cases of disproportionality by means of vector-causes plus a principle for composition. The second strategy, which is an attempt to rescue the second from the alleged problem, fails as well in both respects. It fails to satisfy explanatory adequacy given that the organisation of causes cannot be explained in terms of a vector-cause, and it fails to satisfy metaphysical adequacy given that effects are no longer explained *only* in

effects they will produce in a given circumstance (2011: 110).

terms of the nature of powers. Finally, the last strategy either collapses the compositional model (CM) into the mutual manifestation (MM) or else offers a non-adequate explanation of composition.

2.3.2 Functional Composition

The third and final attempt consists in arguing that production should be understood in strictly functional terms. While in additive cases composition is accounted for by linear functions, in non-additive cases the composition is accounted for by non-linear functions. Evidently functions explain composition, then – but what are functions, exactly?

Whatever functions turn out to be, to be metaphysically adequate our account will have to connect functions and powers in a way that satisfies metaphysical adequacy. For instance, we might think of functions as certain higher-order laws holding for determinables. And yet it will brings us too far from causal dispositionalism. If the production of effects occurs in virtue of the nature of powers *plus* a law, then causation is not explained *solely* by the nature of powers, and so the alleged solution fails to satisfy metaphysical adequacy.

There are alternatives, however. We might understand functions as roles realised by powers. The idea that powers have a functional role that dictates how they are exercised when in conjunction with other powers is not new (Shoemaker 1981; Whittle 2008).[35] There is, however, no such thing as a 'functional dispositionalism' available, nor, as far as I know, a functional theory of composition, this approach having been neglected by mechanistic philosophers of science. Our goal here, however, is not to provide such a theory, since all we need to do is focus on the satisfaction of metaphysical adequacy.

What, then, would an acceptable functional profile for powers look like? First, functional facts should not be posterior to facts about powers and their nature. If, according to Causal dispositionalism, powers have a

[35] Whereas Whittle – and, before her, Shoemaker – attempts to offer a complete theory of causal powers as functional role occupiers, Mumford (1998), Mumford and Anjum (2011), and Ellis (2001) only hint at the possibility of this connection.

causal nature that is irreducible, then according to functional dispositionalism they would have a functional nature which was also irreducible.[36] Second, if functions are roles, the realisation of which explains the production of an effect, then facts about functional realisation – like facts about causal and modal realization – should be *fixed.* Put simply, in order to satisfy metaphysical adequacy powers should be essentially functional: if they realise a function they should not do so contingently. Although, according to the metaphysics, the link of powers is only with their manifestations, if functions are linked with powers only contingently then it is not clear what distinguish a power theory from a non-power theory of causation.

Let us assume, then, that functions fill the gap between causes and effects by virtue of the functional role powers realise essentially. To see why this solution is problematic, we can examine a disproportional case discussed by Mumford and Anjum: the overdose case from chocolate. In this example one chocolate bar disposes toward an increase in pleasure. Eating too many chocolate bars, however, can actually produce a resultant effect that disposes *away* from pleasure (Mumford & Anjum 2011: 89). For instance, after two chocolate bars the resultant effect disposes linearly toward pleasure, while after five the resultant disposes in the opposite direction.

Note that here the vector-space is composed by identical contributions, each given by a chocolate bar. Given that the two scenarios involve the same contribution-type, if we assume the mereological idempotence of composition (Cotnoir 2013; *inter alia*) then they should both lead to the same resultant. Given that this is not the outcome, the case violates mereological idempotence and is disproportional.

If our sought-for solution has to account for explanatory adequacy then we should be able to explain this example by appealing to functional realisation. In the first scenario, with two chocolate bars, the resultant is linear and, given that resultant is brought about functionally, the corresponding function should be linear also. On the other hand, in the second scenario, with five chocolate bars, we are forced to say that the function that brings about the effect is non-linear. Although the two

[36] It should be clear that this view owes us an account of the relation between functional and causal nature, namely, whether one is reducible to another or, if they are distinct, how they are related.

scenarios are different because they involve numerically different powers-tokens, the function they realise is of the same type. But if the causal contributions are of the same type, then the function that powers realise should be the same as well; therefore, the functions that the powers realise cannot explain why in one case the resultant is proportional, and why in the other it is not. As such, it seems that the alleged functionalist solution does not satisfy explanatory adequacy. If, however, in order to satisfy explanatory adequacy, we assume that at a certain point powers realise a different function, then metaphysical adequacy is violated, since facts about functional realisation would not then be fixed. In short, powers realise different types of functions, and therefore realise their functions only contingently.

In the three cases examined above the connection between causes and effects cannot be explained in terms of the exercising of powers composing the latter. All the cases attempt to provide a solution to the explanatory gap by appealing to some sort of mechanistic-style explanation. The vector-representation of causation invites us to understand the production of an effect in terms of causal parts composing, or arranging, into the effect. The functional view, by contrast, suggests that the production of an effect can also be understood mechanistically, taking causal parts as inputs and the effect as an output. While none of these solutions are adequate, it would be premature to conclude that Causal dispositionalism as such does not achieve its aims: this section only provides evidence that (CM) is ultimately no better than (MM). This failure points to the need for an account of composition that connects causes and effect in a robust way, for without such account we cannot move beyond the idea of constant conjunctions.

2.4 The Processual View

Just like advocates of Compositionalism, proponents of the Processual view explain efficient causation through causal powers' determining effects. And, again like Compositionalists, they have recourse to the relation of powers-manifestions only. Unlike Compositionalists, however, they explicitly equate effects with the notion of change.

According to the Processual view powers are better understood as *producers of change,* and the particulars that inhabit the world as *dynamic* entities, having within themselves a principle of change (see Mumford 2009a; Groff 2013; Marmodoro 2014; *inter alia*).[37] Causation is not a relation between cause and effect, but rather a *dynamic process* (Mumford & Anjum 2011: 119). Change is that of the cause turning into the effect (Martin 2008: ch. 5). Advocates of (PV) explain the dynamicity of the causal process in terms of two features of powerful causation: (S) simultaneity, and (C) continuity. Let us examine each in turn.

Let us start with simultaneity. Suppose we drop an ice cube in a glass of coke to cool it down. The ice has the power to cool down the drink since it is colder than the coke; the coke has the power to melt the cubes since it is warmer than the ice. Proponents of (PV) understand this case of causation as a case of two particulars interacting in virtue of their powers (Ingthorsson 2002; *inter alia*).[38] The effect is the cold coke, which is the manifestation of these powers interacting. Proponents of (PV) reject the temporal priority principle that characterises a Humean explanation of causal phenomena; instead, they maintain that causation occurs at the very moment in which causes interact, and that the theory according to which change occurs *at a later stage* cannot capture causation.[39] Causation occurs when two (or more) causal partners get in contact, and this partnering *is* the effect. Thus, when the cubes start cooling down the coke the effect is obtained immediately; cause and effect are *simultaneous* (Ingthorsson 2002: 12; Mumford & Anjum 2011: Ch. 5).

Let us now look at continuity. When the cube starts to cool down the coke, it is required that it will do so for a certain amount of time in order to cool down the drink completely. Even though causation occurs when causes

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[37] According to Ellis (2002: 68) powers are producers of change because they are dynamic universals.

[38] We can also understand this interaction in terms of bidirectional causation. Given A the cause, and B the effect, bidirectional causation holds when A is both an independent causal variable that explains B, and a dependent variable that B explains. *Vice versa,* B is a dependent variable that A explains, and an independent variable that explains A.

[39] Clearly, it seems that not *all* cases of causation are simultaneous. How proponents of (PV) deal with such cases differs from scholar to scholar. Ingthorsson, for instance, claims that we only have the *experience* of asymmetry, which is purely subjective (2002: 110). Mumford and Anjum, instead, suggest that we can accommodate asymmetrical cases by looking at the Processual nature of causation. I shall say more about the continuity criteria that characterise the dispositionalist sense of *process* in a moment.

interact, the effect takes time to develop, as many causes need to exercise continuously. For instance, a poison needs to be poisonous not only when it is first injected, but also during its entire diffusion into the body: it is this continual potency that leads to the relevant effect. Processualists, indeed, argue that the interaction of powers is "the process in which the effect is produced "(Ingthorsson 2002: 23). Causation is process-like "in that one property (being solid) is replaced gradually by another (being dissolved)" (Mumford & Anjum 2011: 124). The cause somehow "perishes" while it moves from the start to the end of the sequence; causation is an unfolding process where there is gradually "less and less of the producing and more and more of the produced" (Mumford & Anjum 2018).

But what it is meant here by 'process'? *Prima facie*, processes are time-extended entities. But clearly this is not enough to distinguish a powerful theory of causation from a Humean theory of causation, as even Humeans can talk about causal processes as successions of stages in which one property appears at the beginning and another at the end.[40] Processualists would have to say something more, and typically do, arguing that what distinguishes their view from its rivals is that stages of the process are internally connected. The continuity is guaranteed by each stage being the causal product of the stage that precedes it (Ellis 2001; 2002; Mumford 2009b; Williams 2017).[41]

It follows from simultaneity and continuity that if powers are producers of change, causation is a simultaneous *and* continuous process (Mumford & Anjum 2011: 125; 2018). This process is dynamic because, stages are internally connected – continuity– *and* there is no part of the process that does not involve change –simultaneity. Therefore, there is both *individual* and *collective* dynamicity. Call this *full-blown* dynamicity.

While it might seem from the example provided above that (PV) vindicates causation as an element in our ordinary experience, it is also true that, like Compositionalists, Processualists are also lent support by recent trends in the philosophy of science.

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[40] For a process-like picture of causation that combines Humeanism and Dispositionalism, see (Handfield 2008).

[41] Notice that Harré and Madden seem to implicitly refer to a notion of dynamicity of this sort when they discuss generative mechanisms (1975: 131).

Many important cases of causation, like cyclical production or production of equilibrium, do not sit well with the temporal priority view (Bechtel & Abrahamsen 2011; *inter alia*). Cases in which a particular maintains a stable configuration throughout the simultaneous action of causes militates against the Humean claim that "no causes are simultaneous with their effect". And it is not just temporal priority that poses a problem: many other cases of causation in the physical realm seem to suggest that the very notion of causation cannot be entirely understood in terms of events. Stability, or causal equilibrium, are in fact cases in which, given that causation occurs, nothing really happens.[42] For instance, a magnet sticks to the fridge, exercising its magnetic power together with the power of the fridge to stick the magnet – and plausibly both act "against" the causal action of gravity. A situation that *prima facie* looks static in fact involves the reciprocal and simultaneous interaction of many causal factor. These cases of causation, however, suggest that not all causal interactions are associated with an event. We can only explain such cases by postulating that real generative causes do the job (Bhaskar 1975; *inter alia*).

Not all scholars that sympathise with (PV) share a common perspective: for instance, some welcome simultaneity and subsequent explanations of stability, while others reject the underlying mechanistic ontology. Mechanistic ontology understands dynamicity in terms of the activity of particulars, and certain Processualists are happy to understand dynamic behaviour in terms of three-dimensional objects at different times. Others, however, staunchly opposed to the mechanistic camp, claim that particulars are just abstractions from more fundamental processes and that dynamicity cannot reduce to a sequence of stage in time (Nicholson & Duprè 2018).

Indeed, in recent times (PV) has been particularly attractive for philosophers of biology with Processual inclinations (Duprè 2013; *inter alia*). What is pressing for scholars belonging to this camp is the explanation of stability *plus* an account of continual change.[43] According

[42] Bhaskar notoriously refers to these cases as transfactual cases of causation (1975: chp. 1-2)

[43] Ellis seems to anticipate this recent trend when he argues that mechanistic ontologies are not compatible with the dynamic view presented by (PV) (2002: 60-63). I am grateful to John Dupré, Dani Nicholson, and Flavia Fabris for useful discussions on Processualism in the philosophy of biology.

to this school of thought, processes are fundamental irreducible entities, and stages or parts can exist only derivatively as abstractions from the process. Given that the combination between (PV) and process theories in philosophy of science (biology in particular) is still in its infancy, or so I claim, I shall not discuss it further. I shall instead turn to a problem for the account of dynamicity suggested by (PV).

2.4.1 Moderate and Full-Blown Dynamicity

Let us start by noting why (PV) is *prima facie* distinct from the alternative discussed above. According to (CV) causation is production, and production is understood in terms of composition. Thus, we have a stage in which powers exercise, then another in which their contributions compose, and eventually another in which the effect is determined. Change, according to this picture, corresponds to the effect being determined (i.e., the last stage). Since there is no effect in the stage in which contributions compose, before the last stage there is no change. Therefore, continuity fails.

Secondly, the (CV) approach requires the priority of composition over the production of the effect: production *is* composition. Therefore, as the compositional manifestation model suggests, an effect is not simultaneous with the causes, but occurs always after partial causes are suitably composed. But as simultaneity requires no such compositional stage in order to produce the effect, (CV) also fails simultaneity.

The reason why (CV) fails both (S) and (C) is that (CV) holds a compositional manifestation model of causation. By contrast, (PV) requires effect and manifestation to be identical; that is, it requires a mutual manifestation model. Notice that Processualists do not succumb to the filling problem that affected the Compositional camp. This is because, according to the Processual view, the relation between causes and effects is not a relation after all, and so there is no gap here between causes and effects. However, there is a similar problem affecting Processualists but not Compositionalists. Let us see what this is.

In order to have *full-blown* dynamicity (PV) requires that simultaneity (S) and continuity (C) be satisfied together. To see why this should be the case, let us try to uphold one criterion while rejecting the other.

First, we might try to uphold (S) and reject (C). This first attempt can explain how, at *t*1, a cause starts to transform into the effect; namely because two (or more) causes manifest together. Powers and manifestation, therefore, share the same temporal stage and we have an initial degree of change. Hopefully, given that powers and manifestations will *always* share the same temporal stage, no portion of the process will be found that does not in itself involve change. But in order to have *continuous* change we have to establish the connection between *t1* and the later stage *t2.* Since the manifestation is not located in a successive stage of the sequence, no internal connection between *t1* and *t2* can be guaranteed. Moreover, given that powers and manifestations will *always* share the same temporal stage, no portion of the process will be internally connected with one another. Stages are then only contingently related, if related at all.

Second, we might try to uphold (C) and reject (S). This second attempt can explain how causes at *t1* can be productive of another stage at *t2*; namely because the manifestation occurs at *t2*, after the powers. Hopefully, given that powers and manifestation will be *always* present at subsequent stages, all stages of the process will turn out be internally connected. But given that at *t1* there is no manifestation, there can be no effect, hence there is at least one stage in which change cannot be found. On this account, manifestations will always occur only after the power, meaning that in no stage of the process we will find anything that is changing: each stage is *static*, since no change can be found in it.

If I am right, the first scenario presents a static process with dynamic parts: we therefore have *individual* but not *collective* dynamicity. The second scenario presents a dynamic process with static parts: then we have collective but not individual dynamicity. Therefore, in order to get *full-blown* dynamicity, we should satisfy simultaneity and continuity conjointly. I shall show, however, that this cannot be done.

According to (S) an effect is simultaneous with the cause. Thus, when we put an ice cube in the coke at time *t1*, then the effect is already there. Note,

however, that (C) implies that the effect cannot be at this same stage: this is because the cause must develop, that is, needs to *perish* and be replaced with the effect. Were the effect present from the start, causation would not to be time-extended in any sense: it would be simultaneous *and* instantaneous, which is not (PV). Nor does it help to say that the *total effect* is what we find at the end (Mumford & Anjum 2011: 122-123), for that would imply that the amount of the effect we find at *t1* is just a *partial* effect. The mutual manifestation model, however, does not allow for this as the effect is equated with the manifestation. In order to talk about partial effects, we would need to shift from that to compositional manifestation model, but, as we have already seen, this model is not compatible with (PV). Therefore, we must conclude that if causation is simultaneous it *cannot be* also continuous.

According to (C) the process starts with the cause and transforms it into the effect. At the end, there is no more of the cause, and at the beginning there is no effect yet. When we put an ice cube in the coke at time *t1* it continuously produces the effect until the end, the moment at which it "perishes", leaving the effect alone. Note, however, that (S) implies that the effect is already at the start of the process: this is because the causes need to manifest from the start in order to give rise to a process. Were the effect present after the beginning, causation would not be simultaneous in any sense. It would be continuous, to be sure, *but not* simultaneous, and if we are correct in our analysis this is not (PV). (Nor, for reasons given above, does it help to say that there is a tiny amount of the effect present at the beginning.) Therefore, we must conclude that if causation is continuous it *cannot be* also simultaneous.

To sum up, we can hold continuity or simultaneity but not both at the same time, which is what we would require for *full-blown* dynamicity. This looks very much like a stalemate for (PV).

Recently Williams has suggested that *full-blown* dynamicity should indeed be abandoned in favor of a more modest account. He now offers a "domino model", arguing that dynamicity understood as a causal connection of successive stages is "change enough" (2017: 156). Williams is probably right, but there is a theoretical price to pay for this move: process philosophers of biology will no longer find (PV) attractive, as

their Processual objects of study are nothing like a domino sequence, but rather an *unbreakable* sequence.

The issue here is that the very same solution that stands to save the theory might limit the scope of its application. In the next section I shall see whether there is any way to square this circle, keeping process philosophers of biology onside at the same time as offering a way out of the problem presented.

2.4.2 Unbreakable Processes?

In the above argument we assumed that continuity is a matter of stages essentially following one another, thereby composing a process. The causal process is something we get from this sequence of stages, adequately explained. Yet not all causal dispositionalists are ready to accept the assumption.

Some, like Ellis, Harré and Madden, and more recently Williams, subscribe to the assumption, while others, like Mumford and Groff, strongly disagree. [44] Mumford argues that "the process should not be broken down into static instantaneous parts. If one tried to understand the process in that way, one would lose something of its dynamic and developing nature" (2009: 28). Likewise, according to Groff processes are "irreducibly active displays of dispositional properties" (2013: 214). They can in no way be understood as a sequence of stages, which would simply explain dynamicity away. Let us call this view the *unbreakable process* view.

More recently Mumford and Anjum have argued that this is the specific sense in which a theory of causation is dynamic: the process should not be thought of as having parts, but rather as an indivisible unity in constant flow (2018). According to this approach the process *is* the

[44] Ellis is committed to the view that processes are composed of initial and final instantaneous stages, *plus* the acausal transmission that connects these "causal kind" events with "effectual kind" events (2002: 48; 2001: 52-53). Harré and Madden deny the independence of events or stages, presenting a theory of causation according to which causal powers are productive of successive state of affairs (1975: 4-7). Recently Williams has defended a similar view according to which "powers can be the mechanism by which persistence occurs" (2017: 145).

manifestation of the powers, and this manifestation is a continuous flow of change. On this view, given that the manifestation is not composed of stages, the process itself is an "indivisible unity", and stages can be formed only by abstracting from the process.

Take, as an example, the process of baking a cake. We need certain ingredients, each of which when combined with the others initiates a process whereby causes gradually blend together. Once the cake is baked it is no longer possible to distinguish either the components or the powers: they gradually change into the effect in a continuous, unbreakable way.

This account well serves those philosophers of science with Processual inclinations that we mentioned before. But is this account also metaphysically adequate? I think not, for the following reasons.

A first problem pertains to the relation between causes and the irreducible continuity of processes. Mumford, Anjum, and Groff are worried that processes *a la* Williams would reduce dynamicity to an assemblage of ordered static parts. This implies that they would have to take processes as fundamental and irreducible, but clearly, they do not want to deny that causes are part of a process: for if causes are not part of the process, it is not clear in which sense the process is causal.[45] And they cannot take causes to be parts located somewhere in the process either, given that this would amount to a decomposition of the process into parts or stages. Therefore, causes can only exist derivatively: they are partial aspects, or abstracted stages, of the more fundamental processes.

However, there is now a problem. We have said that a process is the effect of causes. Yet if the existence of the causes is derivative of the existence of the effect, in what sense do causes "produce" the effect? If the sense of production implied here is "bringing into existence" then it seems that powers cannot produce any effect according to this view. This is because their existence depends on the prior existence of the effect.

A second problem is the relation between the irreducible continuity of a process and the occurrence of an effect. It seems safe to assume that a

[45] The view that causes are not part of causal processes can be found in Ellis who in fact, argues that processes can be acausal (2002: 48).

process, although indivisible, has a start and an end. But, with the claim to indivisibility, we cannot understand "beginning" and "end" as stages, since there are no such things according to this view. Clearly, if the process does not reach an end then according to this theory the cause never completely transforms into the effect. So, either the process can have an "end", coming about through interruption or exhaustion of the cause, or it cannot. If it cannot, then causes can never in principle transform into effects; if it can, then a process clearly has at least one stage, namely its end. Since, in order for the view to be metaphysically acceptable, we are seeking to establish that causes turn into effects, we should reject the idea that processes cannot be broken down into stages. And, as a result, we should reject this view altogether.

A final problem is the conception of dynamicity supposed by this view. Given that there are no real stages, we cannot understand dynamicity either in terms of internal connections or constant production of each stage. How, then, should we understand the dynamicity of this unbreakable continuant? We are told only that we should adopt an "ordinary understanding of the term dynamicity" (Groff 2013: 209). No doubt it cannot mean non-static, for otherwise there would be no putative differences between their view and, say, Williams'. Perhaps, then, we can try to understand dynamicity as *movement*: but clearly this interpretation can only work for some processes and not others. The causal process of a plant growing is one kind of common sense movement: here we have an edge that slowly, but steadily, increases in volume and height. But it is not clear what moves in, for instance, the case of the magnet sticking to the fridge. In short, the worry is that when a process involves the persistence of a cause, rather than its change, it becomes difficult to identify dynamicity and movement. Beyond this definition, however, we are given no clue as to what the dynamicity of these processes might consist in.

If the *unbreakable* processes view is unsatisfactory, therefore, not much can be done to save full-blown dynamicity purely on the basis of dispositionalist principles. The only plausible course of action is to expand the metaphysics to include some facts about time, in order to understand the dynamicity of causation. However, it is outside the scope of this dissertation to discuss which temporal ontology better fits the requirements of the metaphysics.

2.5 Conclusion

If my analysis is correct, the compositional view and the processual view share a similar problem: they do not offer a metaphysically adequate explanation of how causes determine their effects.

While the former lacks an explanation of how causes are composable, the latter seems to entail that causes are untransformable. Regarding composition, we cannot establish the gap that exists between contributions and effect: dispositionalism alone cannot do so, as its resources are too scarce. Regarding transformation we cannot account for the dynamicity required of powers in order to produce effects and do so continuously. The underlying problem is that too much is being asked of dispositionalism: a manifestation cannot occupy both one stage and the following at the same time. This seems to be the fundamental issue for processualists.

But perhaps this problem is not insurmountable. As Williams suggests, we don't need to defend the strong thesis of unbreakable processes to get dynamic causation from powers (2017). On the contrary, a "domino model" allows for enough change to distinguish causal dispositionalism from any other static view opposed by anti-passivists *a la* Groff.

Concerning the compositionalist camp it seems that the problem is greater yet, for without a clear account of how causes compose it is doubtful whether we can move beyond constant conjunction. Perhaps, then, the core aim that characterises the theory of dispositionalism is the main obstacle for any progress of the metaphysical theory.

3. Tropes Dispositionalism

3.1 Introduction

While many dispositionalists are agnostic over which theory of properties better fits the requirements of their metaphysics, others are explicit about their ontological commitments. For instance, Molnar, Martin, and Heil are among the most vocal advocates of a combination of Tropism and Dispositionalism. However, these scholars endorse only one version of Tropism. As will shortly become clear, there are two versions of Tropism that need to be examined.

I will distinguish between two versions of the ontology: *pure tropism* (PT) and *impure tropism* (IT). Regardless, I will show that the combination of trope ontology – whether (PT) or (IT) – and dispositionalism is neither coherent nor desirable. We must therefore abandon the project of trope dispositionalism, whether in its *pure tropism* form, *impure tropism* form, or *powerful qualities* form (PQ).

3.2 Tropisms

The ontology of tropes has been the subject of growing interest in the last few decades as an alternative to more standard forms of nominalism.[46]

[46] Theories often described as contemporary Tropisms in fact have ancient roots. For a discussion of Tropism in the fifth-century BC in the context of Anaxagoras' ontology, see (Marmodoro 2017b). Anaxagoras' version of Tropism falls under the category of Pure Tropism (PT). For a discussion of Tropism in the fifth-century AD in the context of Dinnaga Buddhist ontology, see (Ganeri 2001). Dinnaga's version falls under the category of Impure Tropism (PT). I will introduce the distinction between Impure and Impure Tropism in a moment, but for the sake of comprehensiveness let me add a methodological note. There are notable differences between Dinnaga's Impure Tropism and more contemporary forms of Impure Tropism, and the same is true of Anaxagoras' Impure Tropism and more contemporary forms of Impure Tropism. However, a careful assay of the details requires a separate discussion that falls outside the scope of the chapter. See (Simons 1994) for an interpretation of Locke, Meinong, and Leibniz as trope theorists. For an interpretation of Plato and Aristotle as tropists, with particular reference to the *Phaedo* (102b-d) and *Categories* (1a16-

Consider two vases, *a* and *b*, that have a common attribute in both being white. Nominalists typically understand the attribute agreement by specifying the condition (c) according to which we can meaningfully say "the vases are white". Depending on which form of nominalism is preferred, there are different ways of presenting (c). Class nominalism would argue that vases *a* and *b* are white because are both members of the class of white things. Predicate nominalism would instead say that the predicate "is white" is true of both *a* and *b*. Finally, concept nominalism would suggest that both *a* and *b* fall under the concept of "being white" (see Armstrong 1978a; 1978b; *inter alia*). Despite the stylistic differences, the common core of orthodox nominalism is that in order to account for a predicate such as "a is F" no ontological addition is needed: properties can be safely eliminated from the ontology.[47] This is not the case for the proponents of Tropism.

Tropism occupies a middle ground between nominalism and realism about properties. On the one hand, in accordance with realism, tropists reject property eliminativism – i.e. properties do not exist. On the other hand, in contrast to realism, they embrace an ontology that contains particulars alone. Put another way, Tropism is a form of moderate nominalism – or "luxuriant nominalism" (Van Inwagen 2015: 49) – that engages with the ontological debate on properties but construes them as sets of concrete property-instances.

According to trope theorists, the fact that there are two white vases, *a* and *b*, must not be explained in terms of one element – the whiteness – being shared by the two particulars. Rather, a particular possesses its own attribute, which is a further particular, primitively similar but numerically distinct from the attributes of the other.[48] The universality aspect of a property is, in the parlance of Tropism, just a resemblance of tropes and classes' membership. So, for instance, whiteness is the class of

1b9), respectively, see (Mertz 1996; Smith 1997). For a discussion of medieval Tropisms see (Gosselin 1990).

[47] Moreland, among others, labels all varieties of nominalism as "Extreme Nominalism". Here I use Armstrong's terminology and prefer to call these views simply "Nominalism" (Armstrong 1980). For a discussion of Tropism as a form of moderate nominalism, and how it relates to moderate form of realism, see (Moreland 2001; Armstrong 1989; *inter alia*).

[48] E.g. Heil: "If two balls possess 'the same' shape, the balls are exactly similar in a particular way, but this similarity is not further reducible or explicable. Similarity, on this conception of properties, is a primitive relation holding among properties." (2003: 144).

each white trope and these tropes, in turn, resemble one another (Williams 1953; Stout, Moore, Hicks, 1923; Campbell 1981).[49] Tropism therefore is the thesis that properties can be understood as particulars, and that they can be real without being universals (Martin 2008: 43-44; Ehring 1997: 10).

It is no surprise that the special nature of tropes, standing between particularity and universality, has generated a vast number of confusing labels. Tropes have been variously called *property instances* or *quality instances* (Jones 1950), *perfect particulars* (Bergmann 1967), *cases* or *aspects* (Wolterstorff 1970), and moments or existential modes (Husserl 1970; Ingarden 1964).[50] Despite this confusion, "abstract particulars" can be probably taken as the most general term referring to tropes. The first formulation of abstract particulars occurs in the work of Santayana, Wilson, and Stout, and so is also the first description of tropes' ontological form (Wilson 1926; Santayana 1928; Stout, Moore, Hicks, 1923; Stout 1930; 1936; 1921).[51] There are three features peculiar to the ontological form of tropes that we shall now address: their particularity, their abstractness, and their simplicity.

Let us start with simplicity. Tropism suggests that tropes are qualities that are similar to both universals and particulars. This double-nature of tropes, so to speak, has been a great source of confusion regarding their ontological form. As the founding fathers of Tropism sometimes acknowledge, it is difficult to discuss the particularity and abstractness of

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[49] According to Stout, resemblance is grounded in the distributive unity of the class. According to Williams and Campbell, blackness is the set of each black trope. The unity of the set is what grounds tropes' resemblance. It is important to note that, as a form of nominalism, moderate nominalism is more similar to resemblance nominalism than to class nominalism. The first reason is that members of each class are not, for example, black things, but rather all the instances of black. A second reason is that class nominalism admits both actual and possible particulars, whereas Tropism only admits of tropes as actual instantiated attributes.

[50] Although "abstract particular" is the most comprehensive term for tropes, *particularized properties* have also been used by several authors (Lowe 2006; Armstrong 2004; Jacobs 2007). For a critical discussion of the use of the latter label see (Levinson 1980; 2006).

[51] It is worth noting that Wilson did not explicitly refer to abstract particulars, preferring instead to talk about *particulars of universals* or *particularized quality* (Wilson 1926: 191). For an interpretation of Wilson as precursor of Stout and Santayana's conceptualisation of abstract particulars, see (Mulligan, Simons & Smith 1984). Note also that Stout's abstract particulars are often referred as *Stoutian particulars*: for use of this label, see (Moreland 2001; Schaffer 2001; Armstrong 1980). For an excellent reconstruction of the usage of "abstract particulars" in Wilson, Williams, and Santayana, see Heil (2011: 117-118).

tropes in isolation from one another (Williams 1953: 14). This difficulty, far from being just a descriptive issue, has roots in the simplicity of tropes. Let me explain.

Tropes are traditionally taken to be qualities that are understood as property-instances: entities that are partially particular and partially universal.[52]

Under some sense of similarity, the comparison is informative. There is, however, an important difference between property instances and tropes. Property instances are instantiations of a common quality that is a universal. A property-instance is an entity with a metaphysical structure: it is composed of a bare individuator and a universal as an essential constituent (Moreland 2001; *inter alia*). Thus, two instances of red are particular in virtue of having different bare individuators, and they are both instances of red in virtue of having redness as an essential constituent. Although property-instances have a double-nature, therefore, something about their metaphysical structure accounts for their particularity and something else accounts for their abstractness. Not so for tropes: tropes are simple, their abstractness and particularity having no separate ground – that is, they do not refer to non-identical elements of an entity (Campbell 1990: 20). We may say that there is nothing "in" a trope that accounts for its similarity to other tropes, nor anything "in" it that accounts for its particularity. In fact, given that they lack metaphysical structure, it seems that tropes are metaphysical atoms.[53]

Simplicity, or atomicity, is the fundamental claim every tropist must defend as a central feature of the theory (Jones 1950; Williams 1953; Stout 1930; Campbell 1990). If tropes were not simple, but rather complex, they would clearly be reducible to other ontological entities such as States of Affairs, or analysable as attributes in a realist theory of properties (Ehring 1997: 85-86).

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[52] E.g. Bennet: "A trope is a case or instance of a property: My house is a concrete particular that has whiteness and other properties; whiteness is an abstract universal that is possessed by my house and other particulars; and the whiteness of my house is a trope, an abstract particular. It is unlike my house in that all there is to it is whiteness, and it is unlike whiteness in that it pertains only to my house" (1988: 15-16).

[53] Oliver, by contrast, thinks the analogy can be maintained (1996: 71).

To see why this is the case, suppose that the only characteristic of tropes is that of being abstract and particular. A State of Affairs (SoA) is a composite of a qualitative element and a particular element: when a particular *a* exemplifies a property *A*, the combination always results in a particular that includes an abstract element, i.e., *a*'s being *A*.[54] Similarly, an instantiated universal, as a property-instance, is as we have seen a particular entity that includes an abstract element. This would imply that there is no difference between the SoA, an instantiated universal, and a trope. If there *is* a difference, as tropes theorists argue, then it is not sufficient for a trope to be abstract and particular: it should be simple too. While States of Affairs and instantiated properties are cases of (non)mereological unities, tropes are cases of atomic unities. As such, tropes should not be conceived of as abstract and particular, but rather as abstract-and-particular – that is, as an abstract particular – since the distinction between tropes' qualitative natures and their particularity is a distinction in *thought* alone, to which no real distinction corresponds in reality (Campbell 1981: 486).

Although discussing simplicity first is the best way to initially understand the notion of abstract particulars, our discussion would be somewhat superficial if we were not able to say more about each aspect of tropes' entangled double-natures. Roughly speaking, we have to identify in which respects abstract particulars resemble particular entities, and in which they resemble abstract entities. It will turn out that how to conceive of these aspects depends largely on whether abstract particulars are understood as the only ontological category: i.e., whether or not only tropes exist.

According to the classic account, tropes are fundamental, basic metaphysical building blocks, the very "alphabet of being" (Williams 1953; Campbell 1990; Stout 1921).[55] Entities of other categories are

[54] Thus Armstrong: "Particularity taken along with universality yields particularity again. [...] Let us call this phenomenon the victory of particularity. It seems to be immensely important for explaining the deep intellectual appeal of nominalism. It shows why it is so easy to think of particulars as particulars whether or not we consider them in abstraction from they properties." (Armstrong 1980: 115-116). I will discuss Armstrong's ontology of States of Affairs in the next chapter.

[55] Campbell claims that one reason to endorse a one-category ontology is not, strictly speaking, parsimony. Rather it is the "impulse of what we might call the Axiom of Uniformity, the conviction that some one basic pattern pervades the universe...[...]...there are pervasive basic constituent and pervasive basic structure in which they play always the same role." (Campbell

composed of tropes, but tropes, being simple entities, cannot be composed of other beings. In short, all other entities must be produced from fundamental ones, a view we might call "Pure Tropism" (PT).[56] According to most contemporary accounts of modes, however, tropes are not the only such entities. Rather, there are objects with properties, and these properties count as tropes, meaning objects and tropes are distinct: tropes, as *modes*, are not substance-like, but are simply particular ways that an object is. Contemporary accounts allow for a much richer ontology, whether two-category substances-attributes or objects-attributes ontology, or a four-category ontology (Heil 2003; Martin 1980; Lowe 2006; Wolterstorff 1960).[57] We might call this different account "Impure Tropism" (IT).[58]

According to (PT), reality fundamentally consists solely of tropes and their distribution. The existence and identity of concrete particulars are derivative from the existence and identity of tropes that, in bundles, compose objects. Tropes, then, are (fundamental) parts of objects.

1981: 1).

[56] This distinction can be found also in (Lowe 2006: 10). According to Lowe, what distinguishes a pure form of Tropism from other forms is that the former is conceptualised as substance-like particulars, whereas the latter are not. Here I will simply extend Lowe's taxonomy by introducing Impure Tropism, a category that includes himself together with Heil and Martin.

[57] Armstrong considers Impure Tropism to be the most tenable position: "In my estimation, the resemblance version of the trope theory is considerably superior to the natural class variant. However, as I have already said, I believe that a substance- attribute account, as in C. B. Martin's 'Substance Substantiated' (1980), is to be preferred to a bundle view." (Armstrong 1989a: 120). There are, however, very different impure views. Heil rejects universals and advocates a treatment of properties as 'ways' that are simple but, in contrast to objects, not basic. Lowe prefers an ontology that includes universals together with objects and modes, all of these counting as basic entities (Lowe 2006: 20-21). Thus: "The flower's particular redness--a certain mode of the flower which 'characterizes' it--is an instance of the property redness, a universal. In short, modes instantiate properties." (Lowe 2006: 92). On the same side there is Wolterstorff, whose ontology mimics Lowe's: his treatment includes cases, universals and objects (Wolterstorff 1960; Wolterstorff 1970b). All of these are ultimately impure accounts, since none of them accept tropes as the only fundamental basic entities.

[58] For instance, Heil explicitly dismisses trope-talk in favour of mode-talk because of the association between tropes and the bundle theory of objects: "Suppose that properties are particularized ways objects are. I prefer the traditional designation of such ways, modes, to the currently more popular tropes. I resist talk of tropes because trope theorists have by and large regarded objects as made up of bundles of tropes, and this I reject." He continues: "This is the 'bundle theory' favored by many philosophers who defend a conception of properties as tropes. It is precisely this feature of the most prominent trope theories that makes me reluctant to describe the conception of properties advanced here as a trope conception" (Hell 2003: 138-140). And again: "Williams's tropes are, I suspect, ontologically unstable in a way he occasionally acknowledged" (Heil 2015).

According to this view, tropes are better understood as *tropers* or *module tropes* (Garcia 2015: 133-134), or again *modular tropes* (Koons & Pickavance 2014: 98). Tropers are individual or "junior substances" (Armstrong 1989: 115; Campbell 1990: 15) that are existentially independent of the object that they compose, and that account for its manifest qualities. That tropes are existentially independent of the object they compose entails that tropers are *not* essentially tropers of an object; that is, they can migrate and change their location from one bundle to another; they are transferable (Ehring 1997).[59] That tropers account for objects' qualities entails that tropers are singularly-charactered, or perhaps thinly-charactered, particulars (Simons 2003). The core idea is that concrete particulars have qualities in virtue of having abstract particulars as parts that are themselves so qualified. Thus, if a vase is white, this attribute is a part of the object, and that part is a troper that is *itself* white. Alternatively, again, if a ball is spherical, the ball has a troper that in itself is spherical.

The formulation of abstract particulars as *tropers* is fairly recent. Nonetheless, the idea of tropers as special parts of objects goes back to Williams (1953). According to Williams, tropers, as abstract particulars, can be distinguished from more common concrete particulars since the former, but not the latter, are (a) diffuse and (b) compresent. To see how abstract particulars are special particulars in this first sense, we might consider a pen: it is made of two components, the pen-stick and the cap. Suppose that the pen is blue and the cap is black. Williams proposes to treat qualities, the blueness and the blackness, in the same way, we usually treat the pen and the cap. Both attributes are parts of the object. In this sense both the cap and the black are particulars. However, they clearly differ in kind. Williams calls the physical components "gross parts" (Williams 1953). When we separate the pen-stick from its cap, the result is two objects of the same sort, which is not the case for tropes.

[59] Traditional tropist accounts, such as Campbell's or Williams', individuate special tropes that must necessarily be members of the maximal sum. These are *form* and *volume*, as any occurrence of a trope essentially carries the presence of shape and size. So, whereas which tropes compose an object is contingent matter, the possession of shape and size is a matter of necessity. Campbell expresses this constraint by saying that tropes are "regional". The regionality of tropes also affects tropes' ontological makeup, as one might expect. According to Campbell, wherever there is a trope there should be a formed volume. But a trope location and its qualitative nature are not distinct: every trope is always found to be a quality of a certain region, and shape and size can only be found except in conjunction with certain qualities. Shape and size, then, are not tropes in their own right.

Williams calls the *tropers* "diffuse parts" or "thin parts" (Williams 1953). When we separate the cap from its blackness the results are not things of the same sort: the former will be an object, but not the latter will not. In this sense, the cap is concrete while the blackness is abstract.

Tropes as abstract particulars differ from concrete particulars in another important way. Tropes, similarly to more common concrete particulars, are spatiotemporal entities.[60] In contrast to other theories of properties such as Immanentism, and similarly to objects, their location in space-time is unique.[61] Virtually all tropes theorists maintain that tropes cannot be non-spatiotemporal since every Tropism is a form of Pure Naturalism (Campbell 1981: 485; *inter alia*). However, tropes are different from objects in an important way. Consider again the case of the white vases. These two propertied particulars cannot occupy the same location, but tropes can. Let us focus on a vase and its attributes. The vase can be white, round, have mass and so on. Each of these attributes is a trope. However, the way their particularity is expressed is different from the way the vase is considered to be a particular. While vase *a* and vase *b* cannot occupy the same region of space, whiteness, roundness, and mass, if construed as tropes can actually be understood as sharing the same position. They

[60] According to some views tropes are non-spatiotemporal. For instance: "According to the tropes theorist, two numerically distinct mass-tropes are non-spatiotemporal part of the two objects" (Furhrmann 1991: 59). And again: "charge is instantiated by particles. Wherever there is a charged particle, there the universal of charge, or else one of the tropes of charge, is present. It is located there, just as the particle itself is. Indeed, it is part of the particle. It is not a spatiotemporal part" (Lewis 1986b: 64). It is *prima facie* puzzling to take tropes as non-spatiotemporal, given that the standard account explicitly assumes only space-time entities. The distinction introduced here might help understand Lewis' treatment. According to Lewis tropes are non-spatiotemporal because they are unlike what Williams call "gross parts". But tropists generally agree that tropes, although abstract, are spatiotemporal; the distinction among concrete and abstract particulars is a distinction of dimensions. Here it seems that Lewis' treatment of tropes tends toward a realist interpretation: in short, he believes that tropes and universals are non-spatiotemporal in the same sense. Thus: "universals or tropes are non-spatiotemporal parts of ordinary particulars that in turn are parts of worlds" (Lewis 1986b: 86). Or again "Universals and tropes are present in their instances, and so must have instances if they are to be present at all." (Lewis 1986b: 66). However, tropes are in themselves instances; they are not entities that must have an instance to be present, for otherwise they would have been complex entities.

[61] Note that the form of Naturalism usually endorsed by an immanent realist implies that properties are to be understood multi-locationally. For instance, Armstrong's treatment of properties comes with a different account of Naturalism than the one advocated by moderate nominalists. Immanent universals can only exist instantiated as particulars, but, in contrast to concrete particulars, they can multi-locate in different spatio-temporal positions. Universals are wholly present in each of their instances, and therefore violate the axiom of localisation. This can be described as a form of Impure Naturalism (Moreland 2001).

can be co-located, or compresent, with other tropes (Williams 1953: 14; Ehring 1997: 11).[62]

What constitutes the particularity of tropers in the context of (PT) is somehow more controversial. Notoriously, Campbell (1990; 1981) argues that the particularity of tropers is due to their being localised in spacetime. According to Campbell "the metaphysic of abstract particulars gives a central place to Space, or Space Time, as the frame of the world. It is through location that tropes get their particularity (1981: 485). However, Maurin (2002), among others, has suggested that the particularity of tropers must be taken as a primitive fact. Although tropes' particularity will be relevant in the discussion that follows, for the sake of this section I shall not take sides in the debate.[63] Let us instead move on to "Impure Tropism".

An advocate of Impure Tropism (IT) disagrees with Pure Tropism (PT) on a range of issues, be these fundamental points or merely semantic quibbles. Regarding the latter, proponents of (IT) prefer to use *modes* or *aspects* instead of tropes (Heil 2003: 12; Lowe 2016: 101; *inter alia*). Regarding more fundamental disagreements, according to (IT) tropes are ways the objects are, and therefore cannot be conceived of as independent.[64] The identity and existence of modes are dependent on the identity and existence of objects that are the true basic entities.[65]

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[62] According to a number of scholars objects can occupy the same space at the same time (Wiggins 1968). A statue and its clay, for instance, occupy the same space-time region in virtue of sharing the same parts. Two tropes, however, are co-present not because they share parts, but rather because they are diffused entities. Coincidence and compresence, then, are different relations: the object can coincide but cannot be co-present.

[63] Campbell famously abandons the view discussed above in favour of an interpretation of location as quasi-trope (1991: 68-69).

[64] Campbell calls this the *parasitic* view of tropes. Thus "We are used to the idea that the redness of our piece of cloth, or Julius Caesar's baldness, if they are beings at all, are essentially dependent ones. Without Julius Caesar to support it, so the familiar idea runs, his baldness would be utterly forlorn. Without the cloth, no redness of the cloth. On this view, concrete particulars are the basic particulars. Tropes are at best parasitic." (Campbell 1990: 479).

[65] For instance, Lowe says: "The mistake is to suppose that an object is even partially constituted by its particular properties, as this inverts the true direction of ontological dependency between object and property. Particular properties are no more (and no less) than features or aspects of particular objects, which may indeed be selectively attended to through a mental process of abstraction when we perceive or think of particular objects, but which have no being independently of those objects and which consequently cannot in any sense be regarded as 'constituents' of objects." (Lowe 2006: 97). By making objects the basic entities, (IT) is closer to traditional, austere nominalism than (PT) is. Lowe expresses this point by labelling this view

The motivation to resist tropes-talk and favour the modes-talk instead is that tropes are traditionally understood as parts of objects. By contrast, proponents of (IT) reject this view (Heil 2003: 128,138; Heil 2011: 131; *inter alia*). To distinguish the tropes of (PT) from the tropes of (IT), the latter has been recently dubbed *modifier tropes* or, more familiarly, *modes* (Koons & Pickavance 2014: 98; Garcia 2015: 133-134). In contrast to tropers, modes are not thinly-charactered objects. They are rather the way the things are (Lowe 1995: 521). A way, or aspect, grounds the characters of objects without itself being characterised as such-and-such. In fact, it would be a mistake to consider modes in terms of substances, whether "junior" or not; modes have no being independent of the object of which they are modes (Lowe 2006: 75,97; 2011: 78). For instance, the white of the vase is a mode of the object but is not itself white. Likewise, the sphericity aspect grounds the sphericity of a ball without itself being spherical. Modifier tropes, or modes, only have *formal* characters such as being self-identical or particular. Let us call this requirement of Impure Tropism (object dependency) (*see* Heil 2003: 141-142*; inter alia*).

Given the dependency of modes on objects, modes are also non-transferable (Heil 2003: 140; Lowe 2002: 69; *inter alia*). The white of this vase is the white of this vase only and cannot be otherwise. As such, it cannot migrate to other objects (Heil 2003; Molnar 2003; Martin 1980; Levinson 1980). [66] As Armstrong puts it, reporting a private communication with Martin, tropes "are non-transferable. Tropes do not have to exist: they are not necessary beings. However, if they do exist, then they can only be tropes of the particulars they are properties of"

objectualism (2007: 623).

[66] So Heil: "When one billiard ball collides with another, the momentum of the first migrates to the second. A conception of this sort, like conceptions of objects as bundles of tropes, makes tropes out to be object-like entities that retain their identity while being affiliated with different objects at different times. Modes, as I am conceiving of them, are non-transferable. The way one object is cannot be transferred to another object." (Hell 2003: 140). Lowe rephrases the distinction between transferable and non-transferable as such: "individual substances, it may be said, are generically existentially dependent on their tropes - they must have some, but which they have does not matter - while tropes are strongly existentially dependent on the individual substances to which they belong. In point of fact, of course, most self-styled trope theorists would deny that tropes are strongly existentially dependent on the individual substances to which they belong, though I am inclined to hold that particularized properties - or 'modes', as I prefer to call them - do indeed stand in this dependency relation to their individual substances" (Lowe 2002: 69).

(1991: 193). Let us see how we should understand the abstractness of modes.

Let us start by observing that tropes are not abstract in the sense of being *abstractions*. Campbell famously describes tropes as things that can be "brought before the mind only by a process of selection, of systematic setting aside, of these other qualities of which we are aware" (Campbell 1990: 2). Following Campbell, Heil argues that modes "result from acts of abstraction: selective attention, Locke's partial consideration. Just as an object must be some way (nothing can be no way at all), ways must be ways something is. Property-bearers and properties, then, are equally 'abstractions'" (2003: 172). Both Campbell and Heil are clear, however, that to conceive of tropes in this way is not to understand them as mind-dependent entities. We can be acquainted with tropes via a process of mental selection – in Lockean terms, partial consideration – but the trope itself is a mind-independent entity (Campbell 1990: 3). As Maurin notes (2002: 23), this sense of abstractness can be successfully applied to things that are concrete but can be set aside. We can, for instance, systematically set aside concrete parts of an engine; but this would not make the parts of the engine abstract. The best characterisation of the abstractness of modes is perhaps offered by Lowe (1995). According to Lowe modes are abstract because they are "logically incapable of enjoying a separate existence, even though it may be separate in thought" (1995: 514). What makes modes abstract, then, is the fact that they are *existentially* and *essentially* dependent on the object they are modes of. The dependency between modes and objects allows advocates of impure tropism to avoid treating particularity as a primitive: in fact, the particularity of modes is derivative from the particularity of objects.

We now have a clear view of the ontological form of tropes. First, and foremost, tropes are metaphysical atoms: they are simple in the sense that their abstractness and particularity have no separate grounds. As discussed, the way in which tropes are conceived of depends substantially upon whether they are considered as independent or dependent entities. The first option is pursued by pure tropism. According to this view, tropes are tropers; they are abstract particulars that are special parts of objects they compose. According to impure tropism, tropes are modes; they are abstract particulars that are ways objects are.

I shall now turn to the relationship between the ontology of tropes and Dispositionalism.

3.3 The Transferability Problem for Power Tropes

Let us start by examining the combination of pure tropes ontology and the metaphysics of Dispositionalism. Given the two requirements from Dispositionalism already discussed in chapter one, let us call *Pure Tropes Dispositionalism* (PTD) the view that powers are pure tropes, and they ground natural modality. To my knowledge, there are no dispositionalists who explicitly defend (PTD). [67] However, the combination has been adumbrated by Mumford (2004: 174,177; 1998: 160-161), who, more recently, admits that:

> I have become more sceptical of a substance-attribute metaphysics. Armstrong has a detailed version of it in his immanent realism in which there are both properties and particulars (Armstrong 1978). But as I have described (Mumford 2007b, ch. 7), the issue of instantiation is a major problem for any such view. Instantiation cannot be a relation, on pain of Bradley's regress, so we have to say something else about it. Armstrong has tried to improve his account of late (Armstrong 2004: 46–8), but I am not sure this works either. For that reason, I am now entertaining a trope ontology (see Maurin 2002, for instance), in which the tropes would of course be bundles of individual powers. And as some believe tropes reduce not only properties but also the traditional notion of substance, then particulars would be simple clusters of tropes and hence, ultimately, also large bundles of powers. We would thus have an account of properties and substances based on the powers ontology. (2013:14-15)

Mumford does not provide any further comment, nor does he spend time developing the view. However, an account that combines the metaphysics of Dispositionalism with Pure Tropism is not without plausibility. [68] In fact, the main motivation for endorsing Tropism rests not on parsimony, but rather on the:

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[67] Most notably, Keinänen (2011) together with Hakkarainen (2017) have been working at the intersection of tropes theory and Dispositionalism. However, their view is that the location of objects determines the location of the tropes and not *vice versa*. For that reason, Keinänen and Hakkarainen work mainly with Impure Tropism.

[68] To my knowledge the *only* scholar attentive to Mumford's silent commitment to Tropism is Contessa (2010: 359).

> impulse of what we might call the Axiom of Uniformity, the conviction that some one basic pattern pervades the universe...[...]...there are pervasive basic constituents and pervasive basic structure in which they *play always the same role*. (Campbell 1981: 1, italics added)

If the motivation for endorsing tropes is to build a framework in which the observable regularities are explained in terms of more fundamental entities whose roles are relationally fixed, then the original theory is not all that far removed from the spirit of Dispositionalism.

For the purposes of this section I shall take the claim that "we would thus have an account of properties and substances based on the powers ontology" not as a starting point to explore and describe the view in detail, but as a working hypothesis.

My job will be to assay whether or not the view of (PTD) is *prima facie* coherent and desirable. During this section I will mainly have in mind power structuralists as my audience (Bird 2007; Mumford 2004; *inter alia*).

Let us turn to the internally connect power-tropes, (a) and (b). If (a) and (b) are connected then their respective qualitative aspects, Q(a) and Q(b), and their particularity aspects, P(a) and P(b), are also connected. This is because tropes, as metaphysical atoms, have no separate grounds to their abstractness and particularity. Roughly speaking, if it is tropes that is under consideration as relata of the modal connection, then connecting two tropes amounts to connecting its aspects. Moreover, since the qualitative aspects and the particularity aspects are numerically one, the relation that connects the qualitative aspects must be identical with the relation connecting the particularity aspects. And so, if one is internal, the other must be internal too. This leads to an unwelcomed conclusion. Let us see what this amounts to.

Pure trope theory holds that it is necessary for a trope to have a location, and it is through their locations that tropes receive their particularity. Nonetheless empowering pure tropes, so to speak, lead to consider the particularity of tropes, and therefore their locations, as necessarily related; with the consequence of having to think of powerful pure tropes as necessarily hold the location they occupy. But these powerful pure tropes do not look like pure tropes anymore. In fact, if they necessarily

hold their location, it is not possible for them to move to occupy another location. The transferability features of pure tropes is violated, and therefore the view, as it stands, is at risk of being untenable.

Let us call the argument above the *transferability problem* for power tropes. The transferability problem seems to suggest that (PTD) is incoherent. The tension lies in the attempt to reconcile specific ontological features of pure tropes (in particular, their transferability), with a requirement from Dispositionalism concerning the nature of the connection between powers. If we want to make (PDT) viable we shall have to examine possible ways to solve this tension.

One easy way out of this problem is to deny that tropes are transferable: that is, to change our position toward Impure Tropism. This option will be explored in Section 3.3.2.

In the next section, I will suggest two solutions open to pure tropes theorists. I will show that the first lead to a view that I call Brute Dispositionalism. I explore the view and offer reasons to reject it. I then move to discussion a second solution that appears prima facie promising, as it also perform nicely in blocking Tugby's Meinongian Problem (2017). Unfortunately, I will argue that the view is tenable only if facts about natural modality are posterior to facts about the distribution of tropes; an unwelcomed result for dispositionalists, who seek to argue for the opposite claim. I will conclude that pure trope dispositionalism is not therefore an appealing version of the theory.

3.3.1 Pure Tropes Dispositionalism

In this section we shall look at each option in turn. The first is to deny the premise that "it is through their locations that tropes receive their particularity". After all, the argument does little to motivate this premise. Let us see how this might be done.

As discussed in the previous section, Campbell (1981) and Stout (1952) agree regarding the particularity of tropes being grounded in their location. This has been criticised extensively, however (Moreland 2001;

inter alia). According to Moreland particularity cannot be consistently construed on Campbell and Stout's lines (Moreland 2001: ch.3; 1985: 59). The reason is that if spatio-temporal location gives tropers their particularity, either tropers are one with their location or they are not. If they are not, then abstract particulars must be complex entities comprised of their qualities and place, which violates the claim to simplicity. However, if they *are* one with their location, then it is possible for one location to be united with many distinct qualities, making the individuation of distinct qualities impossible (Moreland 2001: 57-58).

In response to these critiques, Campbell has offered a revised trope theory endorsed more recently by Maurin (2002), among others. According to the revised version, the particularity of tropers must be taken as a primitive fact and so must its qualities. According to this theory, tropes are therefore primitive particularised natures (Campbell 1990: *inter alia*). It is clear that if particularity is primitive, the premise that location gives a trope its particularity is false: the particularity of tropes would be unanalysable, based on nothing at all, and so the conclusion cannot follow.

Armed with a consistent pure trope theory instead, let us see whether it is also compatible with Dispositionalism. Unfortunately, as I shall now show, this is not the case.

According to this version of (PTD), reality fundamentally consists of tropes' patterns of distribution, with each trope itself being a primitive particularised nature. Why are these natures modal? Given that tropes are metaphysical atoms, there can be no nature-conferring element in the tropes. If a trope is modal in virtue of having a modal nature, conceived of as an entity, then a trope has metaphysical structure – yet this is incoherent. Therefore, although Campbell often speaks of tropes "having a nature" (1990: 22,27), we are not entitled to interpret his theory along the aforementioned realist line.

A better way to approach the issue is to follow Lowe's suggestion to the effect that, in the context of Tropism, natures must not be understood as entities but instead as real definitions (2012: 107-110). This entails that to understand a trope as a primitive particularised nature – one that is modal – is to understand a particular kind of proposition: namely, the

proposition that a modal trope is a primitive nature that bears a modal relation R to another primitive nature.[69] Insofar as we understand what a primitive particularised nature is, and what the relation connecting two tropes are, then we understand what it is for a trope to have a modal nature (2012: 110).

There is, however, a problem with this line of argument. Since it takes tropes to possess a primitive nature we cannot understand the relation R as grounded in, or internal to, the tropes. This is because, in short, no analysis of tropes can be offered that supports internal relationality. If this is true, then the only way to understand R is to take it as primitive as well. Yet this proposal which should give dispositionalists reason for suspicion, since this version of (PTD) now amounts to the view that there are modal relations at the first-order level, but that these relations are *brute*.

In fact, if tropes are primitive modal natures, the pattern of instantiation of properties is not the result of their nature; rather, modal connections become brute facts concerning patterns in the world. Call this version of (PTD) *Brute dispositionalism*.

There are two reasons why dispositionalists might be tempted by Brute dispositionalism, and two reasons why they should reject it. Brute dispositionalism is, at its most elementary, the view that there are modal connections at the first order level. This is surely a dispositionalist *desideratum* and a conclusion they no doubt welcome. Moreover, since these connections are necessary, dispositionalists get the metaphysically necessary laws of nature for free. This is because, if every power trope of the kind A is necessarily connected with a manifestation trope of the kind B, then necessarily A will lead to B. Again, this is a dispositionalist *desideratum* and a conclusion that they would welcome. But there are two issues that, ultimately, render the view undesirable.

First, although dispositionalists want to claim that there are modal connections at the first-order level, they also need to offer a *metaphysical explanation* for these connections and the resulting pattern of instantiation. But according to the theory at hand the distribution of

[69] On this point see also Bauer (2013: 4-5).

tropes *just is* the pattern of instantiation and given that this pattern is a brute fact the connections in the patterns are brute as well. Now, although a Humean would disagree with a brute dispositionalist about the existence of brute necessary connections, they would – problematically – welcome the fact that the pattern of instantiation is brute. The accusation here is not that Brute dispositionalism is incoherent, for on the basis of what has been said so far it is not. The accusation is rather that Brute dispositionalism is as close to standard Dispositionalism as it is to Humeanism, and this is clearly at odds with the general theory of Dispositionalism.

Second, although dispositionalists want to claim that there are modal connections at the first-order level, they also need to argue that these connections hold between powers. Now, if there is a mark of a property being a power, it is its ability to exist unmanifested. But if Brute dispositionalism is true then tropes cannot be powers.

We saw above that Brute dispositionalism brings with it the metaphysical necessity of the laws of nature, but note that laws of nature are, according to this theory, necessary only if all pure tropes bear a necessary connection with other pure tropes. If that is the case, however, then all pure tropes in the distribution are necessarily manifested. This means, in short, that if Brute dispositionalism is true then the requirement concerning unrealised possibilities cannot be accommodated. Given that, according to Brute dispositionalism, pure tropes are necessarily manifested, and necessarily manifested properties cannot be powers, it follows that powers cannot be pure tropes.

As far as I can see, there is no way of out these problems. Regarding the first, the only way to deny brutalism is to offer a metaphysical explanation of the pattern. This, in turn, would require that there are facts about tropes that are not reducible to their distribution and that we can use these as *explananda*. But there are no such facts. If there were, then abstractness and particularity would have separate grounds, but this would be a substantial departure from Tropism and move instead toward an immanent universalist treatment of properties (see also Tugby 2011: 172). According to the latter, the particularity of a property instance is due to its being part of a state of affairs, whereas its abstractness is grounded in its nature – that is, the universal which stands as an element of the

instance. As we said above, no nature-conferring element can be added to tropes without inconsistency, and if we reject simplicity then we reject the pure trope theory altogether.

Regarding the second problem, it is enough to point out that tropes are actual particulars and given that there are no *merely* possible tropes in the actual distribution of tropes, pure tropes are necessarily manifested. As such, the only strategy left is to account for unrealised possibilities in terms of other possible trope worlds. This is not a strategy available for power theorists, however, as it would effectively explain a pattern of instantiation in the actual world with a pattern of instantiation in another world. This is, in fact, the very same violation of the theory of Dispositionalism as that mentioned above.

In summary, if my argument is correct then the revised version of pure trope theory is of no help in getting pure trope dispositionalism (PTD) off the ground. Indeed, the resulting view – Brute dispositionalism – does more harm than good. Let us now explore the second option available to pure tropes theorists.

The crux of (PTD) is that once we make R internal we fix the trope with its actual location, thereby making impossible both its transferability and its location being externally related. The fundamental assumption behind this claim is that R can be either internal or external only. If, on the other hand, R can be both internal *and* external without contradiction, no related problems would follow.

The kind of relation R that (PTD) needs in order to avoid said problems is one that, like a Moorean internal relation, guarantees that the *relata* could not have existed in any possible world without standing in R to each other. (In a Bradleyan fashion, we might say that R *flows* from the nature of the *relata*.) On the other hand, this relation must not make a trope's location essential to it: roughly speaking, it should guarantee, like traditional external relations, that tropes have a location only contingently. This can be achieved using resources already available to pure trope theorists. Let us see how.

Campbell distinguishes between *unfounded-external*, *founded-internal*, and *founded-external* relations (Campbell 1990: 112). Unfounded-external

relations are classic external relations like spatiotemporal relations; they do not flow from the nature of the *relata* and they hold contingently. Founded-internal relations are Moorean-internal; being founded is essential to the *relata*'s identity. An example of a founded-internal relation is an exact resemblance (Maurin 2002: 93). Lastly, Campbell identifies a third way between external and internal relations: founded external relations. Founded external relations are, like Moorean-internal relations, grounded or "founded" by the nature of the *relata*, but, like unfounded external relations, they are not essential to the *relata*: they do not tie the existence of the *relata* to the obtaining of the relation (*see also* Vallicella 2002). Roughly speaking, this kind relation allows its terms to survive alteration in relations.

Let us assume, for instance, that R holding between a power trope (a) and a manifestation trope (b) is founded-external. If so, then the tropes can survive an alteration of one of its aspects without ceasing to be connected as power and manifestation. Some of these aspects can simply be taken as *not essential* to the identity of the terms of the relation. To avoid the transferability problem, then, a trope theorist can reply that both their particularity aspect (the location) and the qualitative aspect are *parts* of the identify of tropes, but only the first is *essential* to the identity of the terms. If so, it is possible that the trope could have *not* had that location, since, given that R is external, it holds contingently. It is clear that if R is founded-external, there is no contradiction between the qualitative aspects being internally related and the particularity aspects failing to do so. Transferability is restored.

If that is correct, if (a) and (a) are pure tropes and powers, then R *must* be founded-external; or as Vallicella puts it, it must be an *internal contingent relation* (2002: 3-5). This relation guarantees that in other possible worlds where these tropes exist the relation flows from their nature, and so is essential, even if their location is not. Since the actual location that tropes have is not an intrinsic characteristic of the trope, they might have had another one altogether.

This solution has two chief merits. The first, and most obvious, is that it avoids making pure tropes non-transferable, thus avoiding the crux of the argument against (PTD). The second has to do with a recent attack on the coherence of tropes dispositionalism put forward by Tugby (2013a).

Tugby thinks, correctly, that one of the central theses of Dispositionalism is that a power bears a manifestation-relation to its manifestation. This notion serves the goal of fixing, or determining, the identity of a power. But, Tugby argues, since powers can also exist unmanifested "in cases where the manifestation of a thing's disposition never comes about, there will be nothing for the relevant trope to be related to" (2013a: 457). This is what Tugby calls the "Meinongian problem" for tropes dispositionalism (2013a: 460).

> by accounting for dispositional directedness in terms of a genuine relation, the trope theorists will be left with cases in which that relation has only one relatum. But, plausibly, relations only exist in so far as they relate one thing to another thing (or multiple things). And even if the notion of relations lacking some of their relata is coherent, which I suspect it is not, this still would not help the trope dispositionalists. Dispositions are directed towards specific kinds of manifestations, and it is precisely this feature which makes the identity of dispositions determinate. But if the trope theorist accounts for dispositional directedness in terms of genuine relations, and one of the relata is missing in cases of unmanifested dispositions, it could no longer be said that those dispositions had a specific directedness. This would leave the identity of many disposition tropes indeterminate. (2013a: 457)

Crucial for Tugby's "Meinongian Problem" is the assumption that tropes theorists are left with cases in which the relation has only one *relatum*, which is allegedly incoherent. Pure tropes theorists do have the resources to reject this assumption, and therefore to stop the Meinongian problem. If the relation in question is external-founded – and if such relation is indeed coherent, which I do not ultimately dare to say – then no incoherence for tropes dispositionalism follows: in fact, if the manifestation relation is an external-founded relation, the relation will hold between the *relata* in virtue of their existence, but one of the *relata* could cease to exist without affecting either the existence of the relation or the existence of the other *relata*.

Therefore a (PTD) advocate can resist Tugby's conclusion simply by rejecting his assumption that "plausibly, relations only exist in so far as they relate one thing to another thing". Moreover, even if one of the *relata* is missing, external-founded relations guarantee that the disposition maintains its directness, given that, like Moorean-internal relations, they flow from the nature of the disposition. Whether or not Tugby might have

overlooked this possibility does not unfortunately change the fate of (PTD).

According to the version of (PTD) discussed, external-founded relations are similar to internal relations yet do not entail necessity. Indeed, in contrast with Moorean-internal relations, external-founded relations do not equate internality with necessity. Furthermore, since patterns of trope distribution constitute the fundamental level of reality, no single trope bears a necessary relation to any other. Note that the problem is not that the identity of powers is indeterminate, since external-founded relations flow from their nature. The problem is rather that once we deny modal import to internal relations, we impede our ability to explain why particular tropes manifest. It is then merely a contingent fact that a power leads to its manifestation. Whereas Brute dispositionalism allowed for the necessity of the laws of nature, with this version of (PTD) there is no way of making laws of nature necessary.

Let us summarise what pure trope dispositionalism cannot accommodate. First, it cannot say that a manifestation obtains in virtue of facts that are not ascribable to tropes and their ontological forms. In fact, if Dispositionalism is true, manifestations should occur only in virtue of the nature of powers. Second, they cannot say that the obtaining of a manifestation occurs as a brute fact. If facts about manifestations obtaining are brute, then the pattern of instantiation is not the result of the nature of properties: rather, *it is a brute fact in itself*. This is tantamount to endorsing Brute dispositionalism, for which we have already offered reasons not to advocate.

Supporters of this version of (PTD) cannot but concede the first problem. They can, however, reply to the second problem in the following way. Brute dispositionalism is the view that the connection between powers-tropes is brute. But note that this version of pure trope dispositionalism does not entail that the connection between two tropes is brute, only that the obtaining of a manifestation-trope is contingent. Put simply, it does not rule out the possibility of that manifestation trope obtains in the tropes' distribution. How can this help (PTD)? Well, an advocate of the view can point out that given a power trope (a) and a manifestation trope (b) not obtaining, it is possible to find a trope (c) in a relation of exact resemblance with trope (a) whose respective manifestation tropes (d)

exactly resemble (b) but now actually obtains. That is, (a) leads to (b) because a trope (c), similar to (a), leads to another trope (d) similar to (b). Given that exact similarity is a founded-internal relation, equivalent to a Moorean-internal relation – i.e., internal *and* necessary – it is a matter of metaphysical necessity that (a) leads to (b) because a trope (c), similar to (a), leads to another trope (d) similar to (b).

Roughly speaking, in the absence of any prior necessary laws determining that manifestations will always be the result of certain power stimuli, laws would now derive their necessity from the fact that similar tropes happen to be manifested by certain stimuli.

However, note that it now seems as though laws would only capture Humean regularities. More precisely, we have inverted the direction of the explanation of modality. According to the line of argument presented, facts about the intra-world similarities of tropes explain why tropes are connected in the way that they are. This amounts to the claim that facts about modality are posterior to facts about the pattern of property instantiation – but then this is clearly no longer a dispositionalist theory. For, according to Dispositionalism, modality flows from the nature of properties, and there is no need to appeal to the four-dimensional pattern to explain why certain power tropes lead to particular manifestation tropes.

The upshot is as follows: if pure trope dispositionalism is a coherent version of Dispositionalism, facts about natural modality must be prior to facts about the distribution of tropes. But the view is tenable only if facts about natural modality are posterior to facts about the distribution of tropes, and so pure trope dispositionalism is not, therefore, an appealing version of Dispositionalism.

In summary, if my argument is correct then introducing external-founded relations is of no help to (PTD). Despite the theory's evident merits, it violates the direction of explanation of natural modality that characterises Dispositionalism. For this reason, we can only conclude that we should reject this version of (PTD).

3.3.2 Impure Tropes Dispositionalism

In contrast to pure trope dispositionalism the concern with impure trope theory is very much a cornerstone of recent developments in the metaphysics of Dispositionalism. John Heil (2003), George Molnar (2003), and Charlie Martin (2007) are prominent examples of dispositionalists who endorse an impure trope ontology.[70] Given the two requirements of Dispositionalism discussed in chapter one, let us call *Impure Trope Dispositionalism* (ITD) the view that powers are impure tropes or modes, and they ground natural modality. As for pure trope dispositionalism, I shall in this section assay whether or not the view is *prima facie* coherent and desirable. I will argue that, among the two views that we will analyse in a moment, the first do fall prey of the Meinongian Problem, while the second collapses into brute dispositionalism discussed above.

We should, as a very first step, point out that there are at least two versions of impure trope dispositionalism. The first comes from the alleged solution to the argument stated in the first section. There I briefly mentioned that if powers are impure non-transferable tropes then the problem raised by the argument does not apply: in other words, if the relation between tropes is internal then a power trope (a) and a manifestation trope (b) are not pure tropes, but can only be impure. Although this is a viable option it is not unanimously argued for, as it can only be accepted by those dispositionalists – namely power structuralists (Bird 2007; *inter alia*) – who regard the modal force of powers to be determined by the manifestation-relation structures to which they belong. By contrast, the "tropes revolution" in Dispositionalism views the modal force of powers not as relational structures, but rather as grounding counterfactuals.

Heil, Molnar, Martin, Contessa, and Jacobs are among the most prominent scholars to address this version of (ITD), which is commonly identified with the "powerful qualities" view (PQ). According to (PQ) there are no manifestation-relations – instead, powers are objects' ways of being and are both qualitative and dispositional. As such, they are

[70] Molnar argues that the combination of pure tropes and Dispositionalism is "pure mysticism", as, just like as Platonism, it allows for the existence of properties without bearers (2003: 43).

modal insofar they are truthmakers for certain modal truths, and, given that the relation of truthmaking is metaphysically necessary, the modal nature of a way is thus modally fixed (see Jacobs 2011: 10; *inter alia*).

Given that (PQ) offers a different understanding of the modality of powers – of what the very phrase "modal nature" means – it departs significantly from the structuralist (ITD).

Structuralists hold the view that modality comes from modal connections between properties. Powerful qualities theorists, on the other hand, hold the view that modality comes from the truth-making relation of necessity. As such, the second view assumes that modal facts are posterior to facts about properties, making it a special kind of Dispositionalism. By assuming that modality is posterior to properties, and assuming that the identity of properties is primitive, it is, therefore, ontologically committed to quidditism (see Azzano 2017; *inter alia*).

I shall firstly examine the structuralist way to (ITD), then assess (PQ), showing that neither view survives close scrutiny.

Recall, first, how we characterised impure tropes in Section (2.2). Contrast to pure tropes they are non-transferable. The reason is that modes have no being independent of the object of which they are modes (Lowe 2006: 75,97; 2011: 78). We called this the (object dependency) requirement (*see* Heil 2003: 141-142*; inter alia*). Impure tropes can only be tropes of the particulars of which they are properties, and so they are simply formal aspects of more fundamental particulars.

We might think, prima facie, that in virtue of (object dependency) the view is immune from the Meinongian problem. Impure tropes are not junior substances, and as such their being unmanifested do not amount prima facie to their being non-existent.

Yet, there is something about this requirement that is at odd with the usual dispositional strategy. Let us suppose that (a) is an impure power trope and (b) an impure manifestation trope. If (object dependency) holds, once we have particulars in place we also have modes. There is, in fact, no real distinction between the two: as Heil puts it, the truthmaker is always simply a particular being a particular way, and bare particulars

can exist only in the limits of abstraction (2003: 124, 141-142). But as impure powers tropes exist derivatively, it is dubious whether these impure powers tropes can now also exist unmanifested.

Here is the problem. Let us suppose that (a) is an impure power trope and (b) an impure manifestation trope. If (object dependency) holds then it is not possible for particular Y, when it exists together with (b), to fail to be (b). This latter, as impure trope, is only in fact existing at the limit of abstraction from Y. But given that unmanifested tropes are by definition unrealized, they cannot be abstraction from anything, that is, any existing particular. Therefore if (b) exist as an impure power trope of Y, it is necessarily manifested by Y. Yet since powers can exist unmanifested, the impure trope (a) and the impure trope (b) do not met the standard for being powers.

This suggests that the version of (ITD) in question falls trap of the Meinongian problem, with no serious way to evade it. If tropes are impure tropes then they cannot be powers, because impure tropes are essentially and existentially dependent upon the object of which they are impure tropes. Note that the accusation is not that Y cannot fail to be (b): this is because there could be a world in which Y exist without b existing. However, these are not worlds in which (b) fails to manifest, but rather worlds in which (b) simply fail to exist, in which no particular whatsoever is (b). The problem is that if (b) exist then Y needs to be existing as well, but there is no way of (b) existing and not manifesting,

We are already familiar with this problem since it applied to Brute dispositionalism as well. Note, however, that in this case the purported solution of accounting for unrealised possibilities in terms of other possible trope-worlds is in principle unviable. In fact, now all worlds in which (a), (b), X, and Y exist are worlds in which b is manifested. The only way to avoid this problem is to renounce (object dependency), which is tantamount to giving up Impure Tropism altogether. Since this is extraneous to the issue at hand, I shall now turn to (PQ).

We note, first of all, that according to (PQ) there is no metaphysical explanation for why a power is a property whose nature allows it to be the truthmaker for a given truth. Indeed, (PQ) powers are, strictly

speaking, not essentially dispositional but rather *paired by necessity* with a dispositional aspect.[71] Let me explain what I mean by this.

According to (PQ) the view that powers are modal courtesy of entering a relational structure is at best metaphorical (Contessa 2015: 12: Heil 2003: 80: Martin 2008: 49-50, 65). Powers are modal not in virtue of their nature, but rather their correlation with truthbearers. According to this view, the truthmaker need not be structured as the truth it makes true; property-truthmakers are instead unitary properties (Molnar 2003: 23). As such, we are not entitled to understand the directionality of powers as something "built into the property", as Heil suggests (2003: 124), since this threatens to imbue (PQ) with mysticism.

Nor can counterfactuals be taken to be contained in the property: instead, as Jacobs neatly puts it, to be powerful is not to have some internal structure, but to be "a nature sufficient to ground counterfactuals" (Jacobs 2011: 92). Given that a truthmaking relation is metaphysically necessary, the modal character of properties is also necessarily fixed. Therefore, according to (PQ), modal relations do not internally constitute a powerful property; rather, powers are quiddities that are primitively apt to be the truthmakers of counterfactuals (see Jacobs 2011; Contessa 2015; Martin & Heil 1999: *inter alia*). Given that for (PQ) advocates the appeal to truthmaking is sufficient, there is no explanation for *why* this or that particular quality is sufficient to make this or that counterfactual true. There is, in other words, no further explanation why a quality is necessarily paired with a dispositional aspect.

Of course, it would be unfair to conclude that (PQ) is not a genuine form of Dispositionalism, since (PQ) theorists have a coherent way to account for a modality involved with properties.[72] But there is, however, another worry that ultimately renders the view unattractive.

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[71] Regarding this issue see also Jaag (2014: 17), to whom I am indebted for a discussion in Berlin on the issues that are about to come. I am also grateful to Barbara Vetter for the organization of a lovely and challenging conference.

[72] To be clear, I am not claiming here that truthmaking is the only way for (PQ) to spell out the modality of powers: as Contessa has observed, we can formulate (PQ)'s assumption of truthmaking theory without being committed to truthmaking (Contessa *unpublished*: 5). However, virtually every (PQ) theorist does make this commitment, so I take here, as a working assumption, the fact that truthmaking provides (PQ) theorists with a coherent way to spell out the modality of properties.

According to (PQ) modal facts refer to counterfactuals (*see* Jacobs 2010: 242). But if the relation between powers and counterfactuals ultimately boils down to a relation between concrete entities and linguistic entities, then there is no modality in the world. That is to say: modal facts are not facts about physical modality anymore, but rather facts involving semantic entities. This cannot be right: even if (PQ) has a coherent way to account for the dispositionality of properties, their modality cannot rest on their relations with linguistic entities. If the modality of powers has to be physical, then it must rest on a relation between properties and a non-semantic entity.[73] In order to avoid the problem, advocates of (PQ) need to claim that counterfactuals individuate correlates in the world, but it is dubious that this can be accomplished with the resources available to (PQ) theorists. Let us see why.

(PQ) holds the view that tropes are truthmakers that ground the truth of corresponding counterfactuals: if a truthbearer *grounds* counterfactuals, then it is an entity that *explains* counterfactuals. To avoid the problem mentioned above, counterfactuals must be facts in the world – whether these are facts technically understood or simply states of affairs, does not concern us here. However, being powers tropes – that is, actual concrete entities – this strategy ultimately fails, since non-actual situations cannot be coherently *made up* using tropes. Why, then, do they necessitate counterfactuals?

To this there is no answer, since, as mentioned above, the relation of truthmaking *alone* is all that is accounted for. On this basis the necessity of the truthmaking relation becomes a brute fact, and likewise the necessity associated with powers. But if this is true then (PQ) just collapses into Brute dispositionalism, a theory we have already given reasons to reject.

The worry here is that the absence of the explanatory relation means that while we can make sense of the claim that powers necessitate counterfactuals, we cannot make sense of the claim that powers *ground* modality, for this is not entailed nor allowed by (PQ).

[73] On this point see also (Barker 2013; Azzano 2017).

One obvious way out of this impasse is to maintain coherence by claiming that counterfactuals describe other-worldly tropes. In this way, counterfactuals individuate worldly correlates. Yet other-worldly correlates are not those which meet the needs of Dispositionalism. In fact, Counterfactuals will then be fixed by facts about comparative similarities between different worldly patterns of instantiation. This amounts to the view that those facts about properties are posterior to facts about patterns of instantiation, since facts of comparative similarities now explain why a trope is sufficient to fix the counterfactual. According to this strategy, then, facts of comparative similarities are basic, while facts about the counterfactual nature of tropes are derivative. Once again, we have simply inverted the direction of the explanation of modality.

To avoid the problem powerful qualities theorists must find a way to show that facts about worldly patterns of instantiation are posterior to facts about comparative similarities. There is, however, no coherent way to argue for this at the same time as maintaining that powers are impure tropes.

Indeed, if facts about patterns of instantiations are posterior then particulars can exist prior to any property instantiation: that is, we need to commit to the existence of bare particulars.[74] Given (object dependency) this is not possible, however, since it entails that once we have particulars in place we also have modes. There is, in fact, no real distinction between the two: as Heil puts it, the truthmaker is always simply a particular being a particular way, and bare particulars can exist only in the limits of abstraction (2003: 124, 141-142). Therefore, there is no way to argue for the priority of facts about comparative similarities without rejecting Impure Tropism altogether.

In summary, if (PQ) is a coherent version of Dispositionalism then facts about natural modality must be prior to facts about the distribution of tropes. Yet the view avoids brutalism only if facts about natural modality are posterior to facts about the distribution of tropes. Since there is no coherent way to uphold this claim alongside the idea that powers are impure tropes, (PQ) is not an attractive version of Dispositionalism.

[74] On a similar problem see Barker (2013: 38-39).

3.4 Conclusion

If the arguments above are correct, the combination of trope ontology – whether in its pure of impure form – and Dispositionalism is neither coherent nor desirable. We must therefore abandon the project of Trope dispositionalism.

During our investigation we examined the *powerful quality view* (PQ), which has been shown to work with one of the two ontologies of tropes, the *modes* ontology. Albeit to argue against (PQ) was not our concern, if my arguments are sound it is therefore undesirable to uphold a powerful quality thesis about the nature of properties together with the ontology of modes.

Whether or not this problem is fatal for the powerful qualities view is not our concern at present. If, however, it can be proven that there is no non-tropist way to argue for powerful qualities, then my arguments, together with the aforementioned proof, would count as evidence against the powerful quality view in general. This would put (PQ) in hot water, but the task I leave for future works.

4. Immanent Dispositionalism

4.1 Introduction

In the previous chapter I addressed Tropism: the thesis that properties can be understood as particulars, and that can be real without being universals (Martin 2007: 43-44; Ehring 1997: 10). In the present chapter I shall discuss the very opposite position, according to which properties cannot be understood as particulars, but rather as universals. This theory is Immanentism.

Within the dispositionalist camp the majority of scholars are content with combining that metaphysics with the ontology of Immanent universals. While it is not uncommon to find dispositionalists flirting with immanent universals, it is hard to find an explicit defence of this move. In fact, virtually all versions of immanent dispositionalism simply assume the combination to be viable. The goal of this chapter is to examine whether this really is the case.

In this chapter I shall focus on Armstrongian Immanentism, and – perhaps to the reader's surprise – and set aside the analysis of Aristotelian Immanentism.

I will shortly explain this methodological choice. In the section that follows, (4.2), I shall turn my attention to Armstrongian Immanentism, differentiating between two versions of that ontology: *Compositional Immanentism* (CI) and *Tractarian Immanentism* (TI). In section (4.3) I shall present a problem for the combination of Immanentism and Dispositionalism. I will show that this problem affects *Tractarian Immanent Dispositionalism* (TID) but not *Compositional Immanent Dispositionalism* (CID). In final section I will show that, while (CID) initially stands up to scrutiny, (CI) is ultimately incompatible with Dispositionalism.

I will conclude that the combination of Immanentism and Dispositionalism is neither coherent nor desirable, and that we must, therefore, abandon the project of Immanent dispositionalism whether in its (CID) or (TID) form.

4.1.1 Immanentism and Aristotelianism

The view that properties are both universal and immanent is traditionally associated with Aristotle. In this chapter I will not address Aristotelian dispositionalism, however, as this would require an extensive discussion of Aristotle's *Metaphysics*, which cannot be adequately offered in this work.

I shall instead turn my attention to Armstrong's Immanentism. Armstrongian Immanentism remains the standard ontology of properties for dispositionalists: he exerted the greatest influence on the debate about Immanentism in the twentieth century and can be credited with renewing interest in immanent universals in questions of the metaphysics of modality (1975; 1978a; 1978b 1983; 1989a; 1989b).

For these reasons and others, the combination of Armstrongian Immanentism and Dispositionalism is the most common version of Dispositionalism to be found: virtually every advocate of Dispositionalism maintains that powers are immanent (Mumford 2004; Vetter 2015; *inter alia*), and some even explicitly articulate the modal theory using the concept of states of affairs (Borghini & Williams 2008).

Even Bird, who otherwise remains somehow agnostic regarding the debate over properties, can be seen as amending Armstrong's Immanent Realism. Indeed, Bird's potencies are universals that, like Armstrong's, are modally connected – the only difference is that these connections, unlike those belonging to Armstrong's universals, are metaphysically necessary. In contrast to Armstrong, therefore, the essence of Birdian universals is determined relationally and fixed univocally, powers being modally fixed properties. From this it follows that – contrary to the standard Armstrongian combinatorial ontology – if Dispositionalism is true then relations between universals cannot be external and contingent. And yet both views take related universals to determine or bring about

(or perhaps fix) first-order facts about their instantiation. And so, both views look for the same kind of metaphysical explanation for the occurrence of physical facts.

Note that Armstrongian realism is Aristotelian in spirit: both Armstrong and Aristotle are Immanentists about properties, and both regard universals as contingent rather than necessary entities, existing spatiotemporally "in" the particular that instantiates. It would be a mistake, however, to equate the two ontologies of properties. First, it is a matter of dispute whether Aristotle himself really held a view of properties as universals (Galluzzo & Loux 2015; *inter alia*).[75] There is, of course, no similar dispute in the case of Armstrong. Second, the Armstrongian and Aristotelian camps diverge when it comes to the question of what is the most suitable ontology of properties for powers. An emblematic case is the contemporary debate between *relationalists* and *non-relationalists* about powers.

As discussed in Chapter One, while the first camp thinks that powers are *related* properties, the second camp holds the view that powers are *relative* properties. The former, which includes Bird (2007) and Mumford (2004), capture powers' potentiality in terms of their relation to other powers, i.e., their manifestations. The latter, like Marmodoro (*forthcoming*; 2017a; 2007; *inter alia*), take powers to be special kinds of properties – namely, *pros ti* properties – and manifestations to be *stages* of those same properties.

Marmodoro's ontology is genuinely both Aristotelian and dispositional. Yet it is not well employed amongst dispositionalists. Thus, in what follows I will not engage with Marmodoro's Immanentism, but instead leave an account of Marmodoro and Aristotle's Dispositionalism to future works.[76]

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[75] The majority of contemporary scholars take Aristotle to be a realist about universals. This category includes, *inter alia,* Loux (1984; 2009), Galluzzo (2013), Mariani (2013), Lowe (1998; 2002b; 2006), Bergmann (1967), and Grossman (1992). For interpretations of Aristotle as a nominalist see Frede (1987), Cresswell (1975), Sachs (1948), Jones (1975), Hartman (1977), and Lloyd (1981).

[76] In contrast to tropes non-relationalists, who share the same ontology with relationalists, Marmodoro's immanent non-relationalism offers a different perspective on immanent properties. According to Marmodoro, powers are properties and properties are "enmattered" entities that have no "constituting elements" (*forthcoming*: 15). Moreover, these entities have two stages: a *first actuality* and a *second actuality*. The first corresponds to a power's potentiality, while the second to

4.2 Immanentisms

Given the popularity of this section's topic, and of Armstrongian universals in particular (pun not intended), I shall keep the discussion concise. The main task is to introduce the general features of immanent universals, together with two versions of the ontology, as discussed by Armstrong (1978a; 1978b; 1989a; 1989b; 1997).[77]

Advocates of universals generally agree that similarities among particulars must be explained in terms of those particulars sharing one element, that is, the property. Take the example of the white vases again (see Section 4.2). Universalists would say that the two vases are white because there is something – namely, the *whiteness* – that the vases share. As Aristotle first suggested, both the particular and the universal are things (*pragmata*): thus, the whiteness of the vase is as real and physical as the vase itself. However, universals are "common things" (*koina*), or "that which by its nature is predicated of several things" (*De Int.* 17a38-17b2), or again "whatever is one and the same in all things" (100a6-8). In contrast to particulars, universals are things that can be possessed, or instantiated. When a universal is instantiated, it is present in the particular in its entirety; particulars such as the vases do not share the *whiteness* by sharing *parts* of the whiteness, but rather whiteness is *wholly* present in two vases (Gilmore 2003: 420). Thus, universals are entities that, in contrast to tropes, have more than one spatio-temporal location.[78]

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the power's actuality: the manifestation is the "activation" of the power, a shift from the first to its second stage (Marmodoro 2007; 2014; *forthcoming*). The ontology of properties offered by Marmodoro is novel and interesting, but not yet developed enough to allow for a clear analysis of its compatibility with the requirements of Dispositionalism. Indeed, we are not told how we should think of these stages: whether they are distinct from the property only by a distinction of reason – much like the modes of Impure Tropism – or by a real distinction. Nor are we told how to interpret the claim that properties are enmattered simples. It seems, on the basis of the textual evidence, that there is less distance between Marmodoro's Immanentism and Impure Tropism, than there is between Marmodoro's Immanentism and Armstrongian Immanentism.

[77] Even regarding Armstrong's ontology, I will not deal with important aspects of his theory, such as the notion of instantiation as partial identity (Armstrong 2004; Baxter 2001; *inter alia*). My goal in this section is only to introduce aspects of the problems that are relevant to the discussion that follows.

[78] It is worth noticing that not all advocates of immanentism endorse multi-location. Notably, Lowe defends the view that universals are immanent, but he maintains that multi-location is incoherent. For this reason, he maintains that universals are not concrete, like Armstrongian universals, but abstract, more like transcendent universals (2002: 66; 1998: 155-156; 2006: 98-99; 1999). Another scholar who adheres to Lowe's view is Ellis (2001). For a wider discussion of multi-location and its problems see Barker & Dowe (2003).

Universalism is a divided house no less than tropism, for universalists fundamentally disagree about the *condition* of the existence of universals. The transcendentalist or Platonic camp claims that universals are *independent* of particulars and can exist even if they are not instantiated. Thus, as we shall see in Chapter Five, the nature of universals is such that they have no temporal or spatial connotation. Platonic universalism is taken to be incompatible with metaphysical naturalism because, according to the latter, all fundamental truths have a spatio-temporal location, and the world is nothing but a single spatio-temporal system containing spatio-temporal entities (Sober 2011; Rea 2002; Goetz & Tagliaferro 2008; Moreland 2001; *inter alia*). Clearly, given that Platonic universals are not spatio-temporal, it follows – or so the story goes – that Platonic universalism and metaphysical naturalism are incompatible.[79]

On the other hand, the immanentist camp claims that universals are *dependent* entities that in order to exist require the existence of particulars instantiating those universals. Immanent universals are the "way things are" (1978: 15), and there can be ways of things if and only if things exist and are prior to their ways (Inman 2018; Peramatzis 2011; *inter alia*). However, the dependence of universals on particulars is of a particular kind. This existential dependency is *non-rigid*, or *generic*, meaning that it is not essential to the existence of the universals that a *particular* instance exists (Galluzzo 2015: 109; Lowe 2006; Armstrong 1978a: 113); rather, it is enough that *one* of them exists, so that every universal that is instantiated at least once is a universal that can be taken as existing. Given that immanent universals are no less physical and real than particulars, immanentists generally claim that they are literally (metaphysical) parts of their inner structure (Galluzzo & Loux 2015: 3-4; Loux 2015: 40-41;

[79] On this point Markosian argues the following: "Now suppose…it turns out that the true physical theory concerning the actual world posits the existence of objects without spatial locations at all. (This supposition is consistent with the definition of 'physics' as the study of physical objects, just as the supposition that the true biological theory posits the existence of inanimate objects (oxygen molecules, for example) is consistent with the definition of 'biology' as the study of living things.) And suppose that these non-spatial objects are capable of interacting with spatial objects, like our bodies. Does it follow from these suppositions that materialism is false? It seems to me that it does. Moreover, I think most materialists would be perturbed by the discovery that the true physical theory was such a theory. In fact, I suspect that most materialists, upon being convinced of such a discovery, would throwing the towel and concede that materialism is false, after all." (2000: 385-386). I will argue in Chapter Five that there is no incompatibility between Platonism and naturalism.

Loux 2006: 215; Loux 2012; Wolterstoff 1970).[80] For this reason – again, so the story goes – immanentism is compatible with metaphysical naturalism. According to immanentism, the world is really nothing but a single spatiotemporal system containing only spatiotemporal entities (Armstrong 1978a: 126-130).

Immanentism is a form of *impure* naturalism, because immanent universals violate the axiom of localization.[81] That is, together with particulars, there can be physical entities of a certain sort – universals – and these entities can exist wholly at different spatial locations at once or at interrupted time intervals (see Moreland 2001: 85; *inter alia*). However, the innovations in ontology introduced by Armstrong permit the accommodation of the physicalist's desiderata with an ontology of universals. As Armstrong himself admits "My own sympathy is with substance/attribute plus universals. I think that particularity is a fundamental category. My attachment to particularity is, indeed, stronger even than my attachment to universals" (2005: 311).

Indeed, and as is well known, it is the ontological category of States of Affairs (SoA) that accommodates the requirement from physicalism (1978c; *inter alia*). In this context Armstrong's strategy is to *particularize* universals. According to Armstrong when a particular exemplifies an immanent universal, the particular-having-universal – the resultant entity – is itself a *particular*. Likewise, given that this resultant entity has a spatio-temporal location, the universal contained in the state of affairs has a spatio-temporal location too. A world of states of affairs is a world of particulars (Armstrong 1978a: 115). Here I shall quote Armstrong at length:

> This state of affairs is not repeatable. It is therefore a particular itself. Particularity taken along with universality yields particularity again. Hence the "thin" and "thick" conception of a particular. So particularity plus universality yields particularity. Let us call this phenomenon "the victory of particularity". It seems

[80] For a defence of immanentism that does without the view that familiar particulars have a more fundamental structure, see Van Inwagen (2015; *inter alia*). For a full defence of constituent immanent ontology see Smith (1997). For a full discussion of constituent ontologies, broadly understood, see Koons & Pickavance (2014: 109-120). It is also important to note that the denial of a constituent ontology does not entail Platonism: as we shall see in Chapter Five, there is a consistent reading of the Platonic ontology that takes Platonic properties to be immanent constituents (see Moreland 2013; *inter alia*).

[81] For a detailed discussion of *pure* and *impure* naturalism see (Moreland 2001; 2013; *inter alia*).

> to be immensely important for explaining the deep intellectual appeals of Nominalism. It shows why it is so easy to think of particulars as particulars whether or not we consider them in abstraction from their properties. How easy, in these circumstances, to hold the view that everything is a particular while overlooking that, in the sense in which this is true, the "particulars" involved already enfold universals within themselves. (1989a: 115-116).

As is clear and well known, a discussion of Armstrongian immanent universals cannot *de facto* be independent of a discussion of state of affairs. This is due, at least in part, to the fact that how we understand the relation between immanent universals and states of affairs makes a difference for the kind of metaphysical order underlying Armstrongian immanentism.

Armstrong himself developed two different versions of his impure naturalist ontology, based on two different interpretations of the nature of states of affairs.

According to the first, states of affairs are fundamentally *compositional entities* (Armstrong 1978a; 1978b; 1991; *inter alia*). In this picture worldly particulars are facts (or thick particulars) constituted, minimally, by a thin (bare) particular and a universal (1993: 430).[82] The thin particular (not the thick!) instantiates a universal, and both *constitute* the thick particular (2004: 18-19).

All three categories exist and are irreducible; this ensures that the abstractness and the particularity of SoAs have independent grounds *in* the SoA. Yet the first two cannot exist apart from being constituting parts of facts. So, in one sense, the existences of the parts depend on the state of affairs, and yet, in another sense, the existence of the state of affairs depends on the parts.

Indeed, whereas the latter can only exist as constituents, and never "outside" states of affairs, it is nonetheless contingent as to which universal composes which states of affairs, and so which properties a thin particular exemplifies. On the other hand, it is not a contingent matter that a state of affairs is made of the thin particular and the universal it is

[82] It is important to remember that whereas facts are not always understood as concrete entities (see Bergmann 1967) Armstrong's states of affairs must be. There is, for instance, no such thing for Armstrong as a non-obtaining state of affairs.

actually made of (Armstrong 1997; *inter alia*).[83] Constituents are indeed essential to the state of affairs. Put simply, its identity depends on the identity of its constituents. Yet the opposite does not hold, for it is not essential for a certain universal to be exemplified in the state of affairs in which it is actually exemplified. This is far from being a problem *per se* – quite the opposite. As is well known, it is this "flexibility" in composition that holds the key for Armstrong's Combinatorialism (1989b; *inter alia*). Let us christen this version *Combinatorial Immanentism* (CI).

Then there is the second version, which we will dub *Tractarian Immanentism* (TI). This second version was developed more recently by Armstrong (2004; *inter alia*) and, surprisingly enough, is ontologically very distant from (CI). While according to the latter universals are components of states of affairs, according to (TI) they "only exist at the limit of abstraction" and are "mere abstract factors" or "abstractions" (1983: 84,112, 121, 165; 2009: 42-43; *inter alia*).

The shift from compositional immanentism to tractarian immanentism is significant, and, although the introduction of facts *per se* would make any ontology deserve the name Tractarian, only (TI) is a real Tractarian ontology. In fact, in this version states of affairs are basic and fundamental, while immanent universals "despite [being] real, […] are not themselves existents" (Mumford 2007a: 96-97). According to this view, facts are *not* composed – quite the opposite, they come first, ontologically speaking. What (TI) entails is the fundamentality of facts as the world's building block, and their basicness in respect to universals and thin particulars (see also Maurin 2015: 199-200). Universals and thin particulars are now understood as *aspects* of thick particulars (Heil 2015: 7).[84]

As Vallicella points out, the adoption of (TI) seems incompatible with the adoption of (CI) (2016: 120). Despite sharing the same minimal element that characterizes the immanentist reading of universals, (CI) and (TI) conceive of them as different existents. On the first view, immanent universals, although not ontologically prior, are basic entities; on the

[83] As we shall see in the next section, this distinction is of primary importance for the analysis of the view.

[84] As we shall see, the similarities between (TI) and (IT) will play a role our analysis of immanent dispositionalism with a (TI) ontology.

second view they are entities whose existence is derivative from the existence of states of affairs.

This is a *prima facie* good news for dispositionalists, who now have two different versions of immanentism at hand: combinatorial immanentism (CI) and tractarian immanentism (TI). Let us now turn to the analysis of the compatibility between the metaphysics of dispositionalism and the ontologies of immanentism.

4.3 The Grounding Problem for Immanent Powers

As discussed in Chapter One, the grounding requirement from Dispositionalism amounts to the claim that we can explain the pattern of instantiation by appealing to the (modal) nature of properties governing, or grounding, their instantiations. Thus, dispositionalists take side with those scholars, like Raven (2013) *inter alia*, which take grounding to be a form of (metaphysical) explanation. Grounding, like explanation, is assumed to be an asymmetric relation and to impose strict order.[85]

This metaphysical explanation is cashed out – in line with what has been recently called the neo-Aristotelian metaphysical enquiry (see Maurin 2013) – in terms of ontologically prior entities and how they account for derivative entities (Schaffer 2009b; *inter alia*).[86]

Mumford (2006), and more recently Azzano (2017), have argued that the debate between dispositionalists and Humeans is really a debate concerning the metaphysical hierarchy of reality, and only secondarily a debate about the existence of certain kind of properties. I shall argue now that the grounding profile of Immanent universals is incompatible with the grounding requirement from Dispositionalism.[87]

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[85] See Thompson (*forthcoming*) for criticisms of grounding as a form of explanation.

[86] For a discussion of grounding as strict order see Raven (2013) *inter alia*. For criticism of Raven see Gonzalo Rodriguez-Pereyra (2005) *inter alia*.

[87] Tugby has recently argued that the combination of Dispositionalism and Immanentism cannot provide the explanation that the former requires. Here I shall quote Tugby at length: "On Armstrong's view, the relations between universals, which are themselves universals, are supposed to help explain why propertied things behave as they do. Yet, because universals are immanent, those universals ontologically depend upon the very sequences of worldly events that they are supposed to explain. This creates a structural problem, because it is far from clear how

Let us start by noting that if two immanent universals A and B, connected by a modal relation R, are powers, then facts about A, B, and their relation – call it Rab – fully ground the facts about the existence of instances of A and B. If A, B, the relation of instantiation, and Rab constitute the full ground for facts about instances of A and B, then A and B constitute a partial ground for facts about their instances. That is, the existence of A partially grounds the existence of A's instance, and the existence of B partially grounds the existence of B's instance. As for the second requirement, the modal nature of powers is prior to and grounds the pattern of instantiations.

Yet grounding facts stemming from Immanentism conflict with the sort of grounding facts required by Dispositionalism. According to the requirement from Dispositionalism, A's instance is partially grounded in A. But according to the grounding profile, of immanent universals the opposite is also true: A is partially grounded in its instance. In fact, a universal A can exist only if it is instantiated, i.e. if A's instance exists. Thus, Immanentism entails that the existence of A is fully grounded in A's instance and the relation of instantiation, and so partially grounded in A's instance.

If the existence of an instance of A grounds A, and *vice versa*, grounding is symmetric. This is not in itself a problem, but it is for any attempt to combine Immanentism and Dispositionalism. In fact, if properties ground, and are prior to, their instantiation, grounding must be asymmetric.[88] So if Immanentism is true, it is not possible for a power A,

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things could explain or determine the very things on which they ontologically depend…it is hard to see how Aristotelian dispositionalism can avoid the same sort of problem…On the Aristotelian view, the second-order facts which fix the causal roles of properties must be embedded within the worldly course of events on which they ontologically depend. But for this reason, it is far from clear how Aristotelian dispositionalism can avoid the sort of explanatory worry facing Armstrong's nomological realism. The obvious way for dispositionalists to avoid this problem is simply to deny that dispositional properties and their second-order relations ontologically depend upon the concrete world. And that is to accept Platonism" (2016: 1153-54). While, by the end of this chapter, I will agree with Tugby over the inadequacy of Immanentism, my agreement is for now only limited to one version of the immanent ontology.

[88] Sider has recently argued that Dispositionalism is in trouble if grounding is not symmetric (2016). More specifically, he argues that if Dispositionalism is true then facts about properties are in relation to symmetric grounding with facts about the laws of nature. I do not have enough space to discuss Sider's argument in detail, but there is, however, an immediate worry we can raise. If Sider is right, given powers *plus* laws *plus* symmetric grounding, we have two competing *and*

or any modally connected immanent universals, to ground the pattern of instantiation. Therefore, if A is an immanent universal it cannot be a power.

Let us call this the *grounding problem for immanent universals*. In this section, I shall examine the tenability of both combinations of Immanentism and Dispositionalism. Let us call *Combinatorial Immanent Dispositionalism* (CID) the view that takes powers to be (CI) properties. Let us *call Tractarian Immanent Dispositionalism* (TID) the view that takes powers to be (TI) properties. I shall test (CID) and (TID) against the grounding problem. I will conclude that while (CID) survives close scrutiny, (TID) does not. Let us see why.

4.3.1 Tractarian Immanent Dispositionalism

As discussed in Section (4.2), according to (CI) there is mutual dependence between universals and states of affairs. The (CID) model is combinatorial, meaning that states of affairs are (together with universals and thin particulars) taken to be additional category: they are composed of their constituents although not identical with them, given that the existence of both is insufficient for the existence of the state of affairs. So, states of affairs depend on universals and universals depend on states of affairs. Barnes (*forthcoming*) has recently suggested that both states of affairs and immanent universals are a topical example of symmetric dependencies. If Barnes is right, then (CID) is *prima facie* in trouble.

Fortunately for (CID), Barnes' conclusion can be rejected. In her analysis of the dependence between states of affairs and immanent universals, Barnes conflates *mutual* with *symmetrical* dependence. Barnes argues that, since universals depend on instances and instances on universals, this

exhausting explanations for the four-dimensional pattern of instantiation. To see why, consider two theories of physical modality: (A) = [powers+laws], (B) = [laws]. Given symmetric grounding, powers and laws have the same explanatory power, and so (A) and (B) would have the same explanatory power. But given explanatory parsimony we should favour (B) over (A). To avoid this (bad for dispositionalists) conclusion we must either reject symmetry in grounding or explanatory parsimony. But many scholars hold (A) for reasons connected to explanatory parsimony (see Mumford 2004; *inter alia*), hence we cannot reject parsimony and so must reject symmetric grounding instead.

"mutual dependence yields symmetrical cases of dependence" (*forthcoming*: 9). A closer look, however, reveals that no symmetry follows from mutual dependence.

Barnes' analysis is *prima facie* applicable to states of affairs as these are presented by combinatorial immanentism, for while she explicitly equates grounding and dependence, she also divides dependence and fundamentality. In fact, if there are cases of mutual and symmetric dependence, there are cases in which ontological dependence does not impose strict order; that is, cases that violate irreflexivity and asymmetry. This is in fact in line with (CID), whose requirement is that neither the category of universals nor the category of states of affairs has priority over the other.

Barnes, however, gets the grounding profile of immanent universals wrong. Immanent universals depend upon and cannot exist apart from their being constituents of states of affairs. By contrast, states of affairs are constituted by the universals that its thin particulars instantiate. While the thin particulars only contingently instantiate a universal, a state of affairs non-contingently depends on its constituent universal. Indeed, the identity of state of affairs depends on the identity of the universal, and so a state of affairs cannot exist, as the same state of affairs, without being essentially constituted by that universal.

Immanent universals non-rigidly existentially depend on instances (Tahko 2015; Lowe 2004; *inter alia*). A universal does not require the existence of a particular instance to exist; any instance will do. Thus, it is only contingently tied to a particular instantiation. On the other hand, instances – in this case, states of affairs – essentially depends on universals. The very being of an instance is determined by the relation in which it stands to the other. Roughly speaking, it is essential for the existence of a particular instance that the corresponding universal exists. The dependence at work here is the condition of identity of the dependant and so is a form of essential dependence (Lowe 2005: ch.4). This is not so in the case of the universals non-rigidly existentially depending on instances.

If the dependences between universals and instances are different, then the dependence in question is mutual but *not* symmetric. In fact, if it were

symmetric the universal would essentially depend on the instance, and the instance would essentially depend on the universal. But of course, this is not true, since it is not essential for a universal to exist in a particular instantiation, but rather any instantiation.

If my argument is right, we do not need to follow Barnes and worry about the tenability of (CID) against the grounding argument. In the next section, I shall explore (CID) more in detail to see whether we have other reasons to assert that the combination between Dispositionalism and combinatorial immanentism cannot deliver the explanation that the former requires; for now, I shall demonstrate that the alternative tractarian version cannot stand up to the grounding problem.

As discussed, the Tractarian version takes the existence of universals to be derivative of the existence of states of affairs, which are considered basic and fundamental (Armstrong 1997; *inter alia*). They are complex, but not composite. Facts, according to this view, are not composed of universals and thin particulars, which are instead *aspects* of more fundamental entities and exist "only at the limit of abstraction" (Armstrong 2009: 41-42).

Advocates of (TID) maintain that a state of affairs is a basic entity. As such, they can *prima facie* deny the premise that a particular *a* instantiating A is partially grounded in A. Indeed, it does not follow that states of affairs are grounded on their constituents, for otherwise states of affairs would not be fundamental and basic. Since states of affairs are taken to be independent of their constituents, the direction of priority is asymmetrically fixed, from states of affairs to universals.

The problem is that the direction, although fixed, is one about which the dispositionalist should be suspicious, and for the following reason. The Tractarian version avoids the problem of symmetry by making states of affairs basic entities. In doing so, however, advocates of tractarian immanentism reverse the direction of explanation. Dispositionalism requires that immanent powers be ontologically prior to the pattern of instantiation to fit the grounding requirement, but Tractarian Immanentism requires, on the other hand, that the pattern of instantiation is ontologically prior to the immanent power. Therefore, if powers are

Tractarian universals, there is no non-circular way of maintaining Dispositionalism and Immanentism.

To avoid this problem, advocates of (TID) can appeal to a form of metaphysical interdependence (see Thompson *forthcoming*) that avoids the problem just mentioned. They can claim that states of affairs are fundamental, but not independent of their constituents. The idea behind this approach is that a state of affairs <*a* being A> is not grounded in A and *a*, and yet is not independent of them either. Thus, A and *a* depend on, but do not ground, <*a* being A>. On the other hand, <*a* being A> does depend on, and ground, A and a. States of affairs are thus fundamental but not basic and independent. Those who take this path can also happily agree with Barnes in taking fundamentality and dependence apart (*forthcoming*: 9). In this way, they can avoid making states of affairs prior to immanent universals.

Unfortunately, this would not help advocates of (TID) either. A universal and the facts of Tractarian Immanentism are similar to the modes and the objects of Impure Tropism, respectively. Just like an object and its modes, the universal is necessarily part of the state of affairs it composes, and of all other particulars that instantiate it. In contrasts to its combinatorial counterpart, the universals of tractarian immanentism are not independent of states of affairs.

However, if the connection between particulars and universals is necessary, then given that universals exist only if they are instantiated, the universal essentially, and not just non-rigidly existentially, depends on its instantiations. In fact, if a universal were to have another instance from those it actually has, it would be another universal altogether.

Note that this is an objection to (TI) that is independent of the truth of Dispositionalism, yet it is particularly worrisome in conjunction with the dispositionalist thesis. For if that is the case, facts about the pattern of instantiation essentially fix facts about the identity of properties, and at the same time facts about the nature of properties fix the identity of instantiations. If this is true, the mutual dependence at stake is also symmetrical dependence, and so the grounding problem comes to affect (TID).

In summary: the combinatorial version of dispositionalism is immune from the grounding problem, but the tractarian version is not. Advocates of (TID) can either avoid the problem of symmetry by making states of affairs basic and fundamental, but inverting the direction of the explanation of modality, or else by denying that states of affairs are basic thus reintroducing symmetry. If we are looking for a stable version of immanent dispositionalism, we must therefore prefer the combinatorial to the tractarian. I shall now examine (CID) more in details.

4.3.2 Combinatorial Immanent Dispositionalism

We have so far established that if a combination of Immanentism and Dispositionalism is to be in principle viable, immanentists must abandon the more radical Tractarian ontology (TI). This was because, we recall, only the (CI) ontology can avoid the grounding problem. For the purpose of the following section, I shall now see whether or not the combinatorial version of Dispositionalism is coherent and desirable. I shall argue that in fact it is not. Let us start.

Given the requirement from (CI), if universals and their relation are grounded in instances of the pattern in which they figure, the former second-order relations *just ar*e the pattern of instantiation. Therefore, facts about the first-order pattern of instantiation are explained in terms of first-order components being modally related. Put another way: there are modal relations at the first-order level, and these are explained in terms of universals composing states of affairs that are modally related. Immanent powers ground the pattern of instantiation in virtue of *constituting* the pattern. If immanent universals exist, then they must be instantiated, and if such universals are modally connected, there are first-order necessary relations connecting instances of (a) and instances of (b).

Now, if there are necessary first-order relations between states of affairs containing (a) and state of affairs containing (b), then both states of affairs necessarily exist, and if they necessarily exist then (a) and (b) cannot fail to be part of them, and so exist necessarily as well as parts. But according to compositional immanentism it is contingent as to which universal composes which states of affairs, and so which properties a thin particular exemplifies. To deny that universals are instantiated contingently, will

tantamount be to reject (CI) and embrace (TI), and I have already demonstrated that we have reason to reject the latter.

Even if, per hypothesis, (TI) is a desirable ontology for dispositionalism, it does not help in solving the problem presented above. According to tractarian immanentism, universals are instantiated necessarily and so cannot fail to form that very fact.

On the other hand, a fact cannot fail to have the constituents it actually has. Thus, if *a* is A at all, it is necessarily A (Armstrong 2004). Facts of this sort are possible as long as some object has the disposition *d* for the manifestation of a state of affairs (Borghini & Williams 2008: 22). Then either all actual states of affairs – and *only* the actual states of affairs – are possible, or they are not. If they are, the entire four-dimensional pattern of instantiation is a unique block of necessity: all immanent powers are necessarily manifested, meaning that the requirement concerning unrealised possibilities cannot be accommodated. If they are not, then we must admit that there are possible states of affairs that are not actual. If we grant the existence of non-actual states of affairs, we can *prima facie* guarantee the existence of unmanifested powers – but unfortunately this option is not viable.[89]

In fact, an unmanifested power is a power that is independent of any actual states of affairs; but this cannot be the case according to (TI), as immanent universals enjoy no degree of independence from states of affairs. On (TI), the power's existence depends on their being a state of affairs instantiating their manifestation. For this reason, we must conclude that in this case, too, (TI) cannot accommodate the requirement concerning unrealized possibilities.

What has been said so far suggests that the combinatorial version of dispositionalism is in trouble, as it is not prima facie clear whether the view is compatible with the dispositionalist strategy.

In the rest of this section I shall explore one option available to advocates of (CI). I will raise a problem for the solution and explore four different

[89] This move would clearly offend against the naturalistic inclinations of immanent dispositionalists. Nor could they opt for fictionalism, like a proper Armstrongian, since unmanifested possibilities are not fictional possibilities.

strategies to deal with the criticism. Let us see which move is at immanetists' hand.

Advocates of (CID) can accept that there are first-order necessary relations connecting instances of (a) and (b), while denying that this entails the necessity of instantiation. They can claim, for instance, that R can 'flow' from the nature of properties, but also that it does not require the existence of the instance of one or the other universals to obtain. Roughly speaking, advocates of (CID) need the sort of relation R that advocates of (PTD) appeal to in order to escape the transferability problem for power tropes.

As for the pure tropes version of dispositionalism we can take R to be externally founded. If so, (a) can then be instantiated and connected with (b), without needing the state of affairs containing (b) to actually obtain. This is because, as already shown, if the manifestation relations are externally founded the relation will hold between the *relata* in virtue of their existence, and yet one of the *relata* could cease to exist without affecting either the existence of the relation or the existence of the other *relatum*. Therefore, if the state of affairs containing (b) can fail to obtain, it also does so necessarily, and so (b) is not instantiated by necessity.

There are two worries related to this tentative solution. The first is that this option is compatible with Immanentism, but only under an additional assumption that seems incompatible with Dispositionalism. Let me explain.

According to this solution, (b) exists despite the non-existence – at the present time – of states of affairs containing (b). However, this neither entails that (b) exists uninstantiated, nor that the non-existence of a state of affairs containing (b) entails the non-existence of (b) *tout court*. This is because the condition of existence of a universal is only that of non-rigid dependence. And so, insofar as (b) is instantiated somewhere else, we can consistently take (b) to lack one of its particular instances. Therefore, this option is viable only if eternalism is true: that is, if we admit of the existence of states of affairs containing (b) at some time apart from the present.

I shall now show that eternalism is incompatible with the inclinations of immanentists to take (CI) properties as causal, and not just modal, properties. If eternalism is incompatible with (CID), and (CID) is tenable only in virtue of the truth of eternalism, then (CI) is not consistent with (Causal) Dispositionalism.

Causal dispositionalism is the view that powers are, or act as, causes, and that *all* cases of causation can be explained entirely in terms of the causal nature of properties (Mumford & Anjum 2011; *inter alia*). Causal dispositionalism distinguishes itself from the regularity or counterfactual view, claiming that causation should be understood in terms of causes being essentially connected with, or *producing*, their effects. This novel and intriguing causal theory extends the explanatory project of Dispositionalism, putting its core thesis at work to offer a robust realist conception of causation based on powers.

According to causal dispositionalism, causation should be understood on the basis of irreducibly causal properties that, in turn, ground efficient causation in the world. Hammers smash, glass breaks, and gasoline burns: these particulars behave in such familiar ways because they *can* do so, because they instantiate causal properties that confer the appropriate abilities. When these abilities are *exercised* they produce a new state of affairs. In some cases, such as that of the glass, the change involves the same particular; in other cases, such as that of the hammer, it involves another particular; in others again, such as the gasoline, it involves both. That causation is production is the simple essence of (virtually) any dispositional theory of causation. Powers are abilities, or capacities, the exercise of which has the effect of producing a change in the particular that possess it or in the particular or particulars toward which they are exercised (Harré & Madden 1975: 5; Mumford 2004: 168; Mumford & Anjum 2011: 7; Groff 2013).

Causes are productive because they contribute to the being of another by their action; their productive power lies in the fact that they cause the effect to exist. Causes, according to this view, are producers, and causation is understood in terms of production, of physical change (Hall 2004). However, if eternalism is true, causation is not production. According to eternalism for a state of affairs to bring about another state of affairs is simply for the two to exist at different spatiotemporal

locations and be appropriately connected. Causes, according to this other view, are not related to change; quite the opposite, the lewisian strategy is indeed to analyse causation wholly in terms of non-changing features of the four-dimensional pattern. As such, an instantiation of an immanent power (a) does not produce the instantiation of its manifestation power (b), in any dispositionally meaningful sense. Eternalism is thus *prima facie* incompatible with how dispositionalists understand *causation*, given that the sense of causation as production requires an entirely different kind of analysis that eternalism cannot support. If we reject eternalism, however, then the non-existence of a state of affairs containing B entails the non-existence of (a), given that there is no other space-time location for another state of affairs containing (b) to obtain, and so ground its existence.

The worry just mentioned is serious only for causal dispositionalists, as advocates of dispositionalism who do not take powers to be fundamentally causal –Bird (2007), for example, or Vetter (2015) – can easily evade the problem.[90] There is, however, a second and more pressing worry at hand.

As in the case of pure tropes dispositionalism, the combinatorial immanentists advocate that make use of the external-founded relation will not assume that it allows for necessity. In contrast to Moorean internal relations, external-founded relations do not equate 'internal' with 'necessary'. Given that second-order relations just are the pattern of instantiation, therefore, no immanent universal bears a necessary relation to any other. It is, then, only a contingent matter that an immanent power leads to its immanent manifestation.

As far as I can see there are four options open to advocates of the combinatorial version of dispositionalism, which I shall now address in turn.

The first is to deny that manifestation occurs only in virtue of the nature of powers. An alternative is that the pattern of instantiation is determined by the modal nature of properties, *plus* some first-order fact about the condition in which these properties operate. According to this view, what

[90] I shall discuss this and other problems for Causal dispositionalism in greater details in the next chapter.

accounts for the manifestation of a power is the existence of that power in the condition allowing for its "exercising". Let us call this view the *conditional governance* view (CG).

(CG) should sound familiar to those readers already aware of the literature on dispositionalism (Bird 2007; *inter alia*). According to (CG), the full grounding base for the pattern of instantiation corresponds to the set containing the universal A, the universals B, plus the right first-order conditions, or stimuli. Let us represent this grounding base as <A,C(A,B), B>.

Given this grounding base, it is clear that grounding cannot be asymmetric. In fact, if (A,C(A,B), B) fully grounds the instantiation of A and B, then C(A,B) partially grounds the instantiation of A and B. Since C(A,B) corresponds to the instantiation of other universals suitable for playing the role of stimuli, facts about the pattern of instantiation are (partially) grounded in other facts about the pattern of instantiation. This means that not every entity that figures in the grounding base is ontologically prior to that which is grounded.

Advocates of (CG) maintain, like most of the advocates of dispositionalism, that it is in the nature of a power for its manifestation to obtain, given the existence of that power and the realisation of the appropriate conditions, or stimuli. In the absence of these latter, manifestations do not occur.

There is, however, a problem with this form of explanation, for now it seems that advocates of (CG) must claim that the manifestation of a power obtains because of *other manifested* stimuli obtaining. This is *no* explanation for why manifestations obtain, however, as it clearly presupposes *that* manifestations obtain. The problem is that either the explanation is regressive, or, if it *is* able to stop somewhere, it requires a non-contingent basis that explains why certain manifestations are realised. Since this requires the postulation of a necessarily manifested power, it is clearly a move that dispositionalists should avoid.[91]

[91] Some advocates of dispositionalism are happy to admit that there is no further explanation for why a power manifests, of for why certain properties instantiate: "we have reached a rock-bottom problem. Somehow – however, it may be – dispositions produce manifestations when met with appropriate stimulus" (Borghini & Williams 2008: 34). However, if (CG) advocates side with

A second possibility is to adopt the view, common among dispositionalists, according to which the pattern of instantiation is neither brute nor governed from without, but rather *self-governed*. As Jacobs neatly puts it: "the world unfolds as it does because of the way it is intrinsically" (Jacobs 2007: 129). [92] According to this second view, therefore, modality must be explained in terms of immanent powers constituting and governing the pattern. Let us call this the *self-governance* view (SG).

According to this view, and in line with (CID), immanent powers ground the pattern of instantiation in virtue of *constituting* the pattern. However, they are not prior to their instantiations, as maintaining that universals must be ontologically prior to the pattern begs the question against Immanentism. As Barnes suggests we can capture this view by saying that there is mutual dependence, or interdependence, between immanent universals and instances – i.e., states of affairs where neither the one nor the other is more fundamental. Advocates of the self-governance view can therefore deny that facts about properties being modally related are posterior to facts about the patterns of instantiation. If this is the view that (CID) must defend, then self-governance, or self-determination, can be taken at face value only if grounding can be taken to be reflexive – that is, if every entity grounds itself. Unfortunately, if reflexive grounding is true, then (CI) properties are not powers. Let us see why.

According to combinatorial immanentism, universals exist only if they are components of some state of affairs. Nonetheless, in contrast with (TI), (CI) powers possess a degree of independence from states of affairs. Note that if universals and their second-order relations that are grounded in instances of the pattern *just are* the patterns of instantiation, then reflexive grounding entails that nothing in the pattern can exist and be grounded without being dependent on itself.[93] Thus either independent entities are metaphysical impossibilities, or they are not part of the pattern.

Borghini and Williams in assuming that the directionality of powers is simply a brute fact, it is difficult to see how they can then avoid the worries connected with brute dispositionalism.

[92] There is a possible reading of Jacobs that holds the world to "unfold as it does because it unfolds as it does". I do not here pursue this interpretation, as I think it is an uncharitable and brutalistic reading of his theory.

[93] We could say that reflexive grounding, per se, only requires x to depend on x. As such, it does not rule out x also depending on other things. However, I do not see how some thing can

If the latter is true, then combinatorial immanent properties are not powers. This is because, according to the stipulations of (CID), immanent universals are powerful only if they constitute a pattern; if they fail to constitute a pattern then they fail to do their grounding job. This is not an option for advocates of (CID), therefore, and yet neither is the rejection of independent entities.

First, if independent entities are metaphysical impossibilities, then (CI) is strictly false. Distinguishing (CI) from (TI) is that (CI) properties are independent of states of affairs: as they are only contingently instantiated, they are only contingent components of the state of affairs that they actually compose. However, if universals ground the pattern of instantiation, and grounding is reflexive, universals are instantiated in states of affairs non-contingently: they necessarily exist in the worldly order of events that they are supposed to govern, and so they cannot be independent of it. Thus, either properties are not (CI) universals or, if they are, they are not powers.

If (CI) is false then it logically it follows that (CID) is false. However, it is nonetheless interesting to see how (CID) fails with respect to the requirements of Dispositionalism.

According to (CID), an immanent power exists only if it composes a state of affairs. According to Dispositionalism, however, powers can also exist unmanifested: it is possible, the theory claims, that there is a power that will be forever unmanifested and yet still count as a real possibility. In the context of (CID), a real possibility is a state of affairs for which there is an actual manifestation, and that can be obtained through a recombination of actual elements of the world (here meaning both universals and thin particulars). Clearly, all actual states of affairs are possible states of affairs. However, if an unrealised possibility is a real possibility, it is then a possibility for which there is no actual state of affairs – that is, no actual instance; and if it is not just a *mere* possibility, cannot be obtained by a recombination of actual elements either.[94]

existentially depend on itself *and also* on some other thing. It seems intuitive to interpret cases of self-grounding as cases in which *nothing more than x* is required to ground *x*.

[94] Notice that here we are discussing *real* not *mere* possibilities, which, for their part, *can* be obtained by recombination of actual elements. Yet dispositionalism cannot adopt the traditional

Likewise, an unmanifested power is a power that is independent of any state of affairs actually obtaining. However, if independent entities are metaphysical impossibilities then we must conclude that unmanifested powers are metaphysically impossible, and accordingly that powers are necessarily manifested.[95]

We have excluded (CG) and (SG) as possible solutions to our problem. Let us now examine the last two.

Advocates of the combinatorial version of immanent dispositionalism can make the following claim: given an instance (a) of an immanent power A and an instance (b) of an immanent manifestation B both failing to obtain, it is possible to find another instance (c) of the immanent power A that is similar to the instance (a) whose respective instance (d) of an immanent manifestation B is similar to the instance (b) and yet does obtain.

According to immanentism's treatment of particulars' similarities, instances (a) and (c) – and likewise (b) and (d) – are similar in virtue of sharing one component, namely the universal A and the universal B, respectively. Thus (a) leads to (b) because (c), which overlaps with (a), leads to (d), which in turn overlaps with (b). Given that these instances share an identical modal component, and the identity of this component is non-contingent, then it is a matter of metaphysical necessity that (a) leads to (b) because (c) leads to (d). In short: similar states of affairs manifest similarly.

Armstrongian response, given that unrealized possibilities are not understood as fictional entities.

[95] The problem here lies in the specific ontological form of (CI) properties, and so we might be tempted to avoid it by turning to (TI) properties again. Nonetheless, it is relatively easy to show that a similar problem affects the combination of (TI) with the self-governance view. Advocates of (TI) can *prima facie* accept the exclusion of independent entities without compromising their ontology. This is because, according to (TI), when immanent universals are instantiated they are necessarily so, existing independently only at the limit of abstraction. However, if (TI) is true, then a universal A cannot be the same universal without having exactly the instances it has: facts about the existence of instances fix facts about the identity of the property. In that case, however, facts about the identity of properties are posterior to facts about the pattern of instantiation, for there is no fact independent from and prior to the existence of the pattern of instantiations that can fix their identity. In other words, it is now the pattern of instantiation that explains why properties are modally loaded (how they are directed the way they are). According to dispositionalism, however, there is no need to appeal to the four-dimensional pattern to explain why certain immanent powers lead to certain manifestations.

Note, however, that this solution does more harm than good. According to combinatorial immanentism it is a contingent fact that (A) and (B) are instantiated, the theory holding that not every combination of a universal and a thin particular yields to a state of affairs. Universals are instead instantiated contingently, and so the existence of states of affairs is a contingent matter (Armstrong 1997: 139). Thus (A) and (B) are internally (and so necessarily) connected if only if both states of affairs containing (A) and state of affairs containing (B) can obtain.

Nonetheless, note that if facts about states of affairs possibly obtaining determine facts about universals being related, then facts about properties being modally related are posterior to facts about the patterns of instantiation. This is clearly *no longer dispositionalism*. According to Dispositionalism, modality *flows* from the nature of properties; its combinatorial immanent version, by contrast, entails quite the opposite. Indeed, if (CID) is true then the pattern of instantiation of properties is not the result of the (modal) nature of properties. To put it another way: if (CID) is a coherent version of Dispositionalism, the facts about natural modality are prior to facts about the distribution of immanent universals. However, the view under scrutiny is only tenable – according to the options just examined – if facts about natural modality are posterior to facts about the distribution of immanent universals. (CID) is not, therefore, an appealing version of Dispositionalism.

The only option left for advocates of (CID) is brutalism. In Chapter Three I already analysed Brute dispositionalism, mentioning that according to the theory there are modal connections at the first order level which ensure that, although brute, there is modality in the world. I also mentioned why dispositionalists should reject brutalism: namely because it leads to the rejection of unmanifested existence, and thus to the rejection of powers altogether. It is not hard to see that Brute *Immanent* dispositionalism is undesirable for familiar reasons.

I said in the last chapter that brute dispositionalists could get the metaphysical necessity of the laws of nature for free. Note, however, that laws of nature are (within the context of this theory) necessary only if all (CI) properties bear a necessary connection with other (CI) properties. This is in turn only possible if the respective states of affairs obtain. If that is the case, however, then all (CI) properties in the distribution are

necessarily manifested, because if states of affairs obtain they are actual states of affairs, and therefore all manifested possibilities. If Brute dispositionalism is true, then the requirement concerning unrealised possibility cannot be accommodated. Given that according to Brute dispositionalism (CI) properties are necessarily manifested, and a necessarily manifested property cannot be a power, it follows that powers cannot be (CI) properties.

In summary, despite the fact that the combinatorial version of immanent dispositionalism avoids the grounding problem it is incompatible with the requirements of Dispositionalism. I have shown that the introduction of external-founded relations can avoid the inconsistency generated by the specific ontological form on (CI) properties, but only on pain of introducing unsolvable issues regarding the metaphysical explanation of patterns of instantiation. I have also shown that all four attempts to solve the issue fail.

4.4 Conclusion

If the above argument is correct, then the combination of immanent ontology – whether combinatorial or tractarian – and Dispositionalism is neither coherent nor desirable. Immanent universals do not exhibit the particular grounding profile that Dispositionalism requires from properties. We must therefore abandon the project of immanent dispositionalism, whether in its (CID) or (TID) form.

Before concluding this section, I shall point out one important lesson we can draw from our analysis of immanent dispositionalism. Take (CID) again. It seems that there is no way to make the view consistent without compromising the first requirement of dispositionalism: namely, that powers can exist unmanifested. In fact, it seems that the doctrine of immanentism and the doctrine of unmanifested existence are mutually exclusive. For while immanentism requires that a universal exists if and only if one of its instantiations exist, an unrealised possibility is a possibility for which there is no actual state of affairs – that is, no actual instance – and it cannot therefore exist (as with everything in the immanentism worldview) as a recombination of actual elements.

As such, if an unrealised possibility exists then the manifestation of universals that compose it have no actual instances either, given that it is not part of any state of affairs. And yet – given the requirements of (CI) – a property that is not part of any state of affairs is an uninstantiated property. So, if powers are (CI) properties and can exist unmanifested, then there are uninstantiated properties – but of course (CI) denies that there could be such properties. Therefore, either the doctrine of uninstantiated properties is true and immanentism is false, or immanentism is true and the doctrine of unmanifested existence is not. Since the principal aim of this work is to find an ontological view consistent with the requirements of dispositionalism, and given that we already excluded tropes ontology, we must therefore accept the doctrine of uninstantiated properties. We should, on other words, accept Platonism.

Before taking a closer look at Platonic dispositionalism, I shall examine the view of those who take a different yet parallel approach to immanentism – namely, the view that immanent powers have a causal nature, and that they can be taken to explain causation. According to this view – *causal dispositionalism* – given that powers are causal and that only immanent universals, in contrast to Platonic universals, can be causal, then powers are immanent universals.

5. Platonic Dispositionalism

5.1 Introduction

In this, the final chapter, my aim is to evaluate the combination of Platonism and dispositionalism. The now familiar test is whether the former fits the requirements of the latter. But before I begin the enquiry, let me offer some summative considerations of what we have learnt so far.

As we have seen, the defeat of tropism did not automatically lead to the victory of universals *tout court*. In fact, the adoption of immanentism brings unacceptable modal consequences for dispositionalism: namely that immanent properties do not have the required grounding profile. This conclusion in itself means that *we must be Platonic dispositionalists if we are to be dispositionalists at all*.

Thus, if my analysis is correct so far, it is on this ground that dispositionalism should be defended. After presenting the ontology and metaphysics of Platonic properties in Section (5.2), Section (5.3) will be entirely dedicated to that task. My conclusion is that the introduction of Platonic properties is a move compatible with metaphysical naturalism, and with the project of explaining natural regularities.

Section 5.4 will discuss whether Platonic properties have the right grounding profile. I will argue that this is in fact the case, since the conditions of the existence of Platonic universals do not conflict with the grounding requirement, (NM).

In Section (5.5.3) and (5.5.4) I will examine whether Platonic properties can perform this task substantially and not just notionally. I will show

that the grounding profile of Platonic properties suffers from what Barker (2013) identified as the governing problem for dispositionalism (2013), which is, *mutatis mutandis*, the problem of inference for the Armstrongian nomic necessitation view. Although Platonic powers ground natural modality, their ontological priority and their independence prevents any substantial *metaphysical explanation* of the first-order pattern of instantiation. I will present a possible response open to a Platonic dispositionalist. While we can defend dispositionalism on Platonic grounds, I shall show that the governing problem remains a serious limitation for the view. The governing problem is not an argument against Platonic dispositionalism *per se*, yet if Platonic dispositionalism is to stand as the best dispositional theory of possibility it must prove itself on this ground. It is my belief that as long as this challenge goes unmet Platonic dispositionalism remains our only option, but is, in fact, an inadequate one. In the absence of a satisfactory response to the problem the theory is *intelligible* but not *informative*.

In section (5.5.1) and (5.5.2) I will discuss a minor, tough interesting problem for platonic dispositionalism: the problem of negativity. This is the problem of introducing negative facts in the ontology, facts about uninstantiated properties (see Tugby 2015: Ingram 2016). I will discuss this problem in the context of the Alien Paradox raise by Tugby (2015). I will show that a satisfactory response to the puzzle is at dispositionalist convenience; a response that dispense away with any truthmakers for those negative truths. I shall offer my solution in response to Tugby's *totality strategy*, i.e. the introduction of totality facts. I will argue that dispositionalists have better reason to adopt what I call the *zero strategy*.

Let us start.

5.2 Platonism

It is not easy to offer a univocal picture of the ontological form of Platonic properties; indeed, Plato himself modified his account between the early and the later dialogues. And yet a defence of Platonic dispositionalism must begin with a clear description of the ontological form of Platonic properties. As has been suggested already (*see* Tugby 2016), Platonic

dispositionalism can be extrapolated from one particular view of Platonic properties. Here I shall quote Tugby at length:

> The version of Platonism I have in mind here is a dispositionalist version of the general Platonic realist view that Moreland among others has articulated (2001, 2013). On this view, property instances, such as a rose's redness, are not simple entities but rather structurally complex. A property instance is metaphysically complex in the sense that the universal redness is in some sense in it. Importantly, Moreland cashes this out in terms of the notion of constitutive essence: 'Let us call this ''way of being in'' the relation of ''being an essential property-constituent of''' (2001, p. 98). But as Moreland then makes clear, 'this is not the spatial sense of in' (2001, p. 98). (2016: 1160)

Tugby correctly traces this view back to Moreland (2001: 98). However, Moreland has never clearly and unambiguously set out the view. We are not told, for instance, why Platonic universals cannot be "in" their instances spatially. Nor we are told whether ''being an essential property-constituent of''' suffices to distinguish an immanent from a Platonic universal, given that the former also inhere in their instances as essential constituent. In this section I shall address these issues.

The passages where Plato discusses his view are scattered throughout the entire Platonic corpus.[96] Nonetheless, the *locus classicus* in which forms are presented is the *Phaedo* (99d-105c). Forms are, first of all, beings (*Greater Hippias* 287c3-d2), and secondly, they are "one that appears many" (*Republic* 476a5-7). When two particulars resemble each other in one aspect, that aspect is a further entity that they have in common but that they do not privately possess. Thus, forms are universals.[97]

Universals are said to be "things in themselves" (*Phaedo* 66a2, 66e1-e2, 78d5-6, 83b1-2, 100b6; *Parmenides* 129d7-8, 130b7-8, 133c4; *Republic* 524d10). According to Plato, universals are the fundamental entities, that which is "really real" (*Phaedo* 247c). They are prior to particulars, whose existences are derivative and amount to no more than the fact "that

[96] Note that it is not entirely accurate to speak of Platonism as a view belonging exclusively to Plato. As some commentators have suggested, Aristotle *inter alia* (*Metaphysics* A 6 987a30), Plato was deeply influenced by the view of "the Italians" – i.e., the Pythagoreans. Perhaps, as Gerson (2005) puts it, Plato was not the first Platonist, but he was certainly one of the best.

[97] This is, of course, a matter of dispute. Notably, Brownstein denies that forms are universals and attributes an extreme nominalist position to Plato (Brownstein 1974). Others, like Grabowski, attribute to Plato a moderate nominalist view of properties (Grabowski 2008). I shall assume here that Plato is a realist and his forms are universals.

certain universals are instantiated and re-instantiated" (Findlay 1970: 252). According to the Platonic view for a particular to be anything real it must be in some way, i.e., have certain qualities or "show some look" (Perl 2014: 24-25). The world of particulars is then "less real" than the world of universals, which are "pure" (*Phaedo* 78b4): they are what they are in virtue of themselves, and nothing else. Unlike particulars they have no accidental determinations, and can only be possessed by, and never said to possess, further properties.[98] Not even spatial or temporal determinations alter their being: they are a-temporal (*Timaeus* 37e-38a, 52a2-8; *Phaedo* 78d1-80b4, *Republic* 479a2-3, 479e7-8), as they cannot meaningfully be said to exist at some location or at some time.[99] They therefore lack any contingencies; they are necessary beings.

Universals are not completely disconnected from the world of particulars. They are, in fact, immanent in them (*Phaedo* 102b4-6, 102c2).[100] The universals immanent in particulars are what Plato calls "the forms in us" (*Phaedo* 102d7-102e2; *Parmenides* 130b2-4). The ontological status of the "forms in us" – like their relations with the forms – is quite controversial. Plato himself is ambiguous as to the association between forms and the forms in us, variously describing it as a participation, a communion, and a presence (*Phaedo* 100c5, 100d6-8, 101c3-6).[101] Paradigmatic is the passage

[98] Thus, a relation between a universal and itself is not one of characterization. Propositions of the form 'xness is x' just assert that x-ness is the essence of x, that without which x cannot be what it is (*Phaedo* 100e5-6). So, for instance, whereas any particular beauty is beautiful because it participates in the form of beauty, the form of beauty itself is beautiful without any condition of participation. In this sense, forms are *monoeides* (*Phaedo* 78b4). For a similar interpretation of self-predicative statements as non-characterizing relations, see (Code 1986; Nehamas 1999; *inter alia*). For a different interpretation – self-predicative statements as participatory statements – see (Vlastos 1981; Wedberg 1971; *inter alia*). Although I do not concern myself here with exegetical problems, I tend to favour the former interpretation. The first reason is that it has textual support that is consistent throughout the Platonic corpus, whereas the latter interpretation is incompatible with the metaphysics of the *Phaedo*. The second reason is that the former interpretation allows us to overcome the third-man regress (*Parmenides* 131a1-b2): namely, that if a form is predicated of the form itself, an infinite regress seems unavoidable. This is not the case if we take self-predication as a non-characterising relation.

[99] So in the *Timaeus* (37e3–38a4): "The 'was, ' and the 'will be' are forms of time which have come to be, which we unthinkingly apply, not correctly, to eternal reality. For we say that it was and will be, but according to true speech only the 'is' belongs to it; but the 'was' and the 'will be' are said properly about the becoming which passes in time--for they are motions, but that which is always immovably the same does not become either older or younger through time".

[100] Aristotle argues against the immanent forms view in *Metaphysics* A9, labeling the view "absurd" (991b, 18-19).

[101] For an extensive exegetical analysis of the relationship between forms and forms in us, and Plato's alleged indifference to the usage of this terminology, see Fujisawa (1974).

mentioned above from the *Republic* (476a5-7) where Plato discusses the universality of the forms. The passage can be interpreted in two ways: firstly, that the same form is *in* many different particulars; secondly, that the same form *appears* through many different particulars. On the basis of these two interpretations I shall distinguish between two versions of the ontology of Platonic properties. The first, 'Extensional' theory equates the "form in us" with instances of universals, while the second 'Intentional' theory equates the "forms in us" with the appearance of universals.

According to the first interpretation there are universals and instances of universals. These entities are distinct, the first being the constitutive essence of the second (Nehamas 1973; Cornford 1939; *inter alia*).[102] One reason to hold this view is that Plato himself argues, in different places, that the "forms in us" are occupied by the forms (*Euthyphro* 5d1; *Meno* 72c5-7). In other words: forms are said to be "in" the instances. But how are we to understand this "in"?

To start with, let us note that one interpretation is plainly incompatible with the status of the forms, as described above. This is the spatial interpretation. If "in" has to be understood spatially, then there is a spatial relation between a universal and the instance. Although "being in" is a spatial asymmetrical relation, the more general "being spatially related to" is symmetrical: the instance is spatially related to the universal, and vice versa. However, if purity is true then universals are not in any place at all, and so they cannot stand in spatial relations with their instances in any meaningful sense.[103]

As many scholars have suggested, "in" should be understood in terms of ontological dependence. A universal is the essence of the instance, which is prior to and that in virtue of which the instance is what it is (*Phaedo*

[102] Vlastos (1969) can be partially considered to hold this view, although he says that only instances, and not forms, can be considered properties. Fine seems to privilege this extensional reading in ch.11 and 13 of (2003). Contemporary advocates of the view include Moreland (2001) and Fales (1990).

[103] For similar considerations see (Fales 1990: 189-190). Note also that for the same reason instances and universals are not spatially separated either, given that a local separation is a spatial relation. This is important insofar as forms and forms in use are said to be separated. Of course, separation could mean local separation or ontological separation, and I shall discuss in a moment that the separation at work is the latter. The *locus classicus* for the discussion of local separation concerning forms and forms in us is Aristotle's *Physics* 5.3 226b.

100d4-8).[104] Instances (rigidly) depend on universals both existentially and essentially. It is part of the essence of the instance of X to exist only if X exists, since the "form in us" is that specific instance and not another, only because the form is a constitutive essence in the instance.

Essential dependence entails existential dependence (see Tahko 2015: 102), such that by necessity an instance of X exists only if X exists. The connection between these dependencies and spatial metaphors is not intuitive, but rather a peculiarity of Platonic metaphysics. A universal is "contained" in its instance because it is what accounts for its existence. The "in" simply indicates the position of the universal in respect to the instance in the overall hierarchical structure of reality: a structure that admits no undetermined instances, that is, instances with no constitutive essences.

While the dependency of the instances from the universals explains the immanence of the latter, the reverse dependency – or rather the absence of – explains universals' transcendence, or more accurately their *separation*.

Plato, in the *Phaedo* (65d5-d10), introduces separation as the difference between sensible entities, such as particulars or their property instances, and non-sensible entities, like universals. According to Plato we can only experience qualities of particulars: the "being large", or the "being fragile" of objects. No particular can be experienced that lacks properties. On the other hand, no quality can be experienced that is not had by a particular. The only experience we can have of the world around us is necessarily an experience of an *impure* world, of things that are mixtures of many qualities. However, the non-sensibility of the universals is only a symptom of separation. To be a sensible entity, according to Plato, is to have certain characteristics that can be treated as individuating factors.

[104] This is the so-called "learned safe answer": "besides that safe answer I gave at first, I see another kind of safety, thanks to what we are saying now. For if you were to ask me what it is that, when it comes to be present in anything's body, makes the thing hot, I will not give that safe, ignorant answer – namely that it is hotness – but, thanks to what we now say, a more ingenious one: that it is fire." (*Phaedo* 105b81-c2). Here fire, as immanent form, introduces the form of hotness. Fire is not a form here, but a physical entity, i.e. the instance of the form. The learned safe answer is where Plato introduces a third level, in between forms and particulars. Other loci where Plato introduces instances are (103b5-6) where he discusses the "opposite in nature" and the "opposite in us," and (102d6-7) where he discusses "largeness" and the "largeness in us".

As we have seen, however, universals are not by themselves so characterized. In contrast to sensibles they can enjoy independent, unconditional existence; and since they are capable of independent existence they are not part of the sensible world.[105] Given that the dependence between universals and instances goes only one way, the hierarchical structure of reality admits uninstantiated universals, that is essences without immanent, sensible instances.[106]

The second view offers a different reading of the passage from the *Republic* quoted above. According to Perl (1999) and Stough (1976), among others, to "appear" should be read intentionally; there is but one entity, the universal, that shows in many ways. However, these ways are not numerically distinct entities: the "forms in us" are simply the images, or reflections, of forms. Furthermore, the reading of "in" should be interpreted intentionally: the universal is *in* the reflection in the sense that is cognitively presented in it (see Patterson 1987; Morris 1985; Perl 2014; *inter alia*). Just as my reflection in the mirror is nothing more than a reflection of myself, the image and the universal are identical.[107] The distinction between forms and "forms in us" is not primarily about levels of reality, but about our *mode*s of grasping reality (Perl 2014: 31).

In contrast to the Extensional reading, therefore, the Intentional reading denies that universals are present in things as metaphysical constituents or parts (Schipper 1965: ch.VI; *inter alia*). Rather, universals are "paradigms" (*Parmenides* 132c12-d4; *Euthyphro* 6e3-6) and particulars are imitations of paradigms (see Bluck 1957: 124; *inter alia*). Thus, a "large" particular just is a particular that manifests, without any intermediary, the largeness. As for the extensionist camp, particulars are less real than universals. However, this is because they are less adequate presentations of the forms, not because they have forms as essences.

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[105] The discussion of the notion of separation (*chōrismos*) as independent existence can be found in (Allen 2012). The separation of forms from sensible particulars can be grounded in several ways. For a comprehensive discussion of separation see (Fine 2003: ch.11).

[106] I maintain that it would be incorrect to say that there "are" uninstantiated properties. Separation as independent existence is a capacity of the universals, not a brute fact about them. For a similar consideration, although used to argue against separation as independence, see (Morrison 1985).

[107] In support of this interpretation, and on the source of the analogy, see also the *Cratylus* 432b5-c6. Bear is mind that this is *only* an analogy since, in fact, me and my image in the mirror are not identical.

As some scholars have observed, we should be careful in equating "paradigms" with "models" (see Fujisawa 1974; Patterson 1987; Perl 2014; *inter alia*).[108] To understand universals as "models" is to depict them as particulars of higher perfection that stand in a relation of reflection to their "copies".[109] Thus, they are conceived as "perfect particulars". Let us call this view *perfect particularism*, (PP). (PP) is a form of *abstract tropism*. For according to (PP) forms are no different in nature from their instances; both are particulars, just the first more real than the second.

(PP) opens the way for the third man regress against which Plato himself warns. Suppose I produce a statue and I offer it as a model, instructing someone else to produce ten copies of the statue. In the end there will be eleven statues. If the universal is understood as one of the many that share the universal character, the regress steps in.

On the other hand, universals can be understood as "designs" or "instructions". A design is a plan to be followed, rather than a particular to be copied. This interpretation generates no problems. Suppose now that I produce a design of a statue and, again, instruct someone else to produce ten copies. At the end there will not be eleven statues, but ten statues and one design. Given that the design does not share with the copies the same universal character, there is no danger of succumbing to the third man regress.

The interpretation of the "forms in us" as images or appearances has another important implication. According to the intentionalist interpretation, and in agreement with the extensionist reading, instances as appearances are dependent on the universals, both existentially and essentially. They do so in the same way a shadow depends on the object casting it. However, following the metaphor, intentionalists argue that also the opposite holds: that the object cannot fail to cast a shadow. Does that pose the threat of separation? Not at all.

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[108] It is worth noting that while Perl and Stough explicitly defend the intentionalist version as the correct ontology of Platonic properties (see Perl 2014: ch.2), Fujisawa takes the intentionalist version to be an alternative version of the ontology.

[109] According to Fine (1993) this is how Aristotle interpreted Plato's *paradeigmatism*.

According to the Intentionalist camp separation is not to be equated with the capacity to exist without instances (Perl 1999: 351-353). Separation here is understood along the lines of difference, i.e., the fact that universals cannot be perceived in their entirety in any of their instances (Perl 2014: 27-28; Reale 1997: 130). Yet it does not follow that universals can exist independently. In fact, they do not; they necessarily require their appearance (Perl 1999: 352).[110]

We now have a clear view of the ontological form of Platonic properties. They are necessary beings, fundamental and prior to any other beings. The extensionist version works with a three-category ontology that comprises universals, instances of universals, and particulars. The intentionalist camp dispenses with instances, which are considered just ways in which universals appear. For the extensionists, concrete particulars have qualities in virtue of having instances of universals, whereas for the intentionalist qualities are concrete things in themselves. So, for instance, the form of beauty is, according to the first view, the cause of a thing being beautiful, while according to the second view it is the cause of a beautiful thing. Thus, while extensionists adopt a levels-view of reality, in which particulars and their qualities are "less real" given their derivative existence and impurity, the intentionalists equate degrees of reality with greater or lesser intelligibility. Lastly, the former camp holds that universals are capable of independent existence and that, because of this, they can also exist without their instances although the opposite cannot be the case. By contrast, the latter camp denies instances in the first place.

It should be clear at this point that the version of Platonism that Tugby and Moreland have in mind is the extensionists view identified above. Distinguishing between the two views is important for at least two reasons.

Firstly, as I will show in Section (5.3), the distinction allows for a better reading of Armstrong's rejection of Platonic universals. His rejection is not rooted, as Moreland argues (2013: 249; 2001: 129), in his conflating the question of uninstantiated universals with the question of universals being part of particulars. Rather, it concerns one way of understanding

[110] To my knowledge this is a claim that is presented but not adequately supported by the intentionalist camp. I shall nonetheless present the view following what its advocates argue for.

Platonic properties, and the problems that follows from it. In fact, I will show that while Armstrong rejects Intentionalism, he is ready to accept, at least on paper, the extensionist version.

Secondly, I will also show that the distance between Armstrong and Platonic dispositionalists is closer than we might think: in fact, the compatibility of dispositionalism and Platonism is not total. As I shall discuss in Section (5.3.1.), whereas we have positive reasons to adopt extensionism, we also have reasons to reject the intentionalist version.

Before testing the Platonic ontologies of properties on the metaphysical ground of dispositionalism, I shall assay two common meta-ontological reasons to reject Platonic properties altogether.

5.3 Platonism and the Physical

It is no secret that Platonic properties have faced much opposition in the history of philosophy, particularly in recent decades. In fact, the ontological turn in the 1970s, during which the contemporary revival of universals began, led to plaudits for immanent universals and bad press for transcendent universals (see Armstrong 1978a; 1978b; *inter alia*). The ontological turn was driven by the naturalistic motivation of postulating only entities that empirical sciences were happy to countenance.[111] The peculiar nature of Platonic properties, of course, was considered at odd with naturalist commitments.[112]

The idea of an a-temporal a-spatial entity, such as those properties described by Plato, could not but clash with the intuitive need to place entities in space (and time). This need was not totally unjustified. Even if one accepted the distinction between particulars on the one hand and universals on the other, there was no reason to suppose the two enjoyed two different ways of existence. But if particulars and universals were to exist in the same way, where did universals exist?

[111] For an exhaustive discussion of metaphysical naturalism see Rea (2002).

[112] Thus Armstrong: "Such a view is unacceptable to Naturalists, that is, to those who think that the space-time world is all the world that there is" (1989: 76).

There was, and still is, no answer to this question. For Platonic universals, according to the doctrine, have no specific location in space; they are not even anywhere or everywhere, on pains of an inaccurate reading of the alpha privatives in *a*-temporal *a*-spatial. The only straightforward way out of the puzzle was to distinguish the two categories as referring to, respectively, spatiotemporal– or concrete – entities and non-spatiotemporal– or abstract – entities. The intuitive need for placement did the rest, resulting in the conception of what is today the common-sense view of Platonism: the two-worlds model.[113]

According to this view *separation* implies that while particulars inhabit the spatio-temporal world, universals belong to a sort of unfathomable heaven, i.e., the Platonic heaven. This heaven functioned as a receptacle of universals and every *entia non grata* (Quine 1960: §50). To add insult to injury the naturalistic camp turned to Plato himself, looking for a tool to remove epiphenomenal entities from their ontology: the Eleatic test (*Sophist* 247d-e). Not only did entities need to be placed in space, but they also needed to be individuated and tested, that is, affected in some way. Only causally efficacious entities could have stood the test.

However, given the peculiar unchanging nature of Platonic properties, they could not have passed the test with success. The choice was either to accept naturalistically unpalatable entities but banishing them away from doing any serious philosophical and empirical work, or rather to refute their existence altogether on the basis of their committing a serious offense against Naturalism. My goal is to show that the contemporary approach to Platonism is mainly based on prejudice, not on serious philosophical analysis.

Why is this discussion relevant for the scope of this dissertation? The reason is that contemporary dispositionalists tend to consider a Platonic version of Dispositionalism unpalatable, or even implausible, on the basis

[113] Notably, Armstrong claims "Once you have uninstantiated universals you need somewhere special to put them, a "Platonic heaven," as philosophers often say. They are not to be found in the ordinary world of space and time. And since it seems that any instantiated universal might have been uninstantiated--for example, there might have been nothing past, present, or future that had that property--then if uninstantiated universals are in a Platonic heaven, it will be natural to place all universals in that heaven. The result is that we get two realms: the realm of universals and the realm of particulars, the latter being ordinary things in space and time" (1989: 76).

of the accusations mentioned above.[114] So, for instance, Heras-Escribano rejects Platonic dispositionalism purely on the basis that: "The main problem with Platonism is that it argues in favor of the existence of a second-order transcendent realm, distinct from our spatiotemporal realm" (2016: 11-12). He continues: "this clearly cannot be parsimonious, because it postulates the existence of non-natural entities and realms, which also violates ontological naturalism" (2016: 23). On the other hand, Giannotti (2016) argues, "if PD (Platonic dispositionalism) violates the Eleatic principle, then dispositionalists ought to reject PD". It is, then, a valuable service to Platonic dispositionalism, and dispositionalism in general, to remove these meta-ontological worries once and for all.

The following section is divided into two sub-sections. In 5.3.1, I shall show that there is no Platonic heaven, and, if one can be postulated, it also strips *entia grata* from the spatiotemporal domain. In 5.3.2, I shall show that an application of the Eleatic principle either leads – depending on the form this application takes – to unwelcome conclusions for the advocate of immanent universals, or else puts no pressure on Platonism.

My conclusion is that the meta-ontological worries related to Platonic dispositionalism have no solid ground. Thus, whereas dispositionalists attracted by Platonism have no *prima facie* reasons to dismiss their inclination, dispositionalists that explicitly argue against the Platonic version of that metaphysics should find better ways to attack the view.

5.3.1 Imagine There's No Heaven

Although I mentioned above that the two-worlds hypothesis is generated by the intuitive needs of the naturalist camp, this is not entirely accurate. In fact, the idea of a world of universals separated from the space-time world can be traced back to Russell (1912).

Russell was no enemy of Platonic properties; indeed, he suggests in many early works that, if universals exist, they must be like the entities that Plato describes. He was also a supporter of the Platonic heaven, a "world

[114] A notable exception to this trend is Tugby (2013a; 2013b; 2015; 2016; 2017).

of being is unchangeable, rigid, exact, delightful to the mathematician, the logician, the builder of metaphysical systems, and all who love perfection more than life" (Russell 1921: §9).

Russell's motivation for placing Platonic properties in a heaven was twofold: firstly, in contrast to particulars universals are *immutable*, and secondly, in contrast to particulars they are *unobservable*. If my reconstruction of the Platonic ontology for properties is accurate, Russell is right in taking properties to be unchangeable and unobservable. However, I am skeptical whether Russell is on the right track in inferring that there is a second realm, beyond the spatiotemporal, which is inhabited by universals.

Let us consider, first, *unobservability*. If we adopt the intentionalist version of the ontology, what we observe when we look at the world of particulars are images of universals. Images are less perfect than the universals themselves because, when we look at them, we do not perceive universals in their entirety. However, this does not mean that universals are unobservables – it simply means that we can only perceive them partially. However, when we do, it is still the universals that are the objects of our observation, so they are observable after all. Therefore, no heaven is needed if *unobservability* is the criterion.

What if we adopt the extensionist view? According to this version, it is true that we do not perceive a universal – blueness, say – itself. However, we can still perceive instances of blue. That means "unobservables" must mean *direct* unobservables. Call this (Unobservable1).

It is dubious whether (Unobservable1) is an adequate criterion. In fact, many entities figuring in our best scientific theories in general, and of space-time in particular, fall under (Unobservable1). The criterion will then force any serious naturalist to conclude that such entities do not in fact exist in space-time. If "unobservables" means (Unobservable1), then *unobservability* is not, we might say, the stairway to Platonic heaven.

We turn now to *immutability*. Russell suggests that since universals do not change, while space-time entities do, universals cannot exist in space-time. Let us therefore call the thesis that nothing unchangeable exists in space-time (immutability). Here we do not need to appeal to any

distinction between the two versions of the ontology, but rather to focus on change and ontologies of space. According to relationalism, space and time are not independent substances; that which exists is simply the material content of the universe, i.e., concrete particulars. Space and time are defined through the spatiotemporal relations of concrete particulars: space itself does not exist in the absence of concrete particulars. Change, according to relationalism, is a change in the order of constituents; that is to say, change is about relations of distance between them. However, the *relata* of these relations – matter points – are not themselves subject to change.

It might be objected that when distances vary, *relata* change their positions. This is not so, however, since, given the absence of absolute space, there is no position the *relata* have in respect to a framework of reference. Therefore, if we hold (immutability) together with relationalism, Platonic properties will not be the only *entia non grata,* as matter points would also count as such. For this reason, any relationalist about space cannot consistently endorse (immutability): if they want to put Platonic properties in heaven, they require a better alternative. In search of this alternative we will now turn to substantivalism.

According to substantivalism space-time exists as an independent substance, over and above the material content of the universe. Space and time are the continuous and pervasive media that extend everywhere and every-when. Since space itself is independent of the existence of matter and the changes matter undergoes, substantivalism is silent on whether entities within space change or not.[115] As such, the view does not logically exclude the existence of unchanging entities in absolute space.

It can be objected here that entities in absolute space-time occupy spatial relations to one another, and if they are so related then they are also causally related, and therefore must undergo change. Note, however, that this is a requirement from causality, which is additional to (and independent of) the requirements imposed by substantivalism. So once again, immutability does not seem to be the appropriate criterion by which to banish Platonic properties.

[115] Note that this is true for substantivalism but not for super-substantivalism, according to which space-time is the only (kind of) substance.

Russell's reasons for placing Platonic properties in heaven are not fine-grained enough to filter just the *entia non grata*. Nonetheless, as mentioned in the previous section, the most vehement criticism of Platonic properties comes from David Armstrong.

Armstrong criticized Platonism for doing a disservice to the cause of universals, claiming that it offered more problems than solutions (1978a: 75-76). He thinks that the lack of a spatial location is the source of these problems, and indeed, he offered up his theory of universals as an alternative to the Platonic view (Armstrong 1978a; 1978b; *inter alia*). More specifically, his theory is intended to be compatible with naturalism, insofar as universals are taken to be spatially located wherever their instances are located (Armstrong 1978a: 126-129).[116] According to Armstrong, the lack of spatial location belonging to Platonic universals has two unfavorable consequences:

(1). Objects lack metaphysical structure.
(2). Properties exist outside space-time.

Let us look at each problem in turn. The first objection stems from the idea that, although concrete particulars are composed of parts, if universals have no location in space then they are not in the beings that characterize them (see Moreland 2001: 129-130). Thus, concrete particulars become undifferentiated wholes, resembling each other but not in virtue of any facts about their metaphysical structure: there is no internal differentiation of properties characterizing these particulars (Armstrong 1980).[117]

Armstrong thinks that "a separate-realm theory of universals permits of a blob as opposed to a layer-cake view of particulars" and that this is an argument against Platonic theories (Armstrong 1989: 76).

Yet Armstrong's conclusion is informed by a limited and inaccurate analysis of Platonic ontology. The version of Platonism that Armstrong has in mind is Intentionalism: in a number of places he characterizes

[116] We already discussed this view at length in Chapter 3.
[117] Armstrong deploys the argument regarding blob theories principally against nominalism (Armstrong 1989; ch.2-3). However, as is clear from *Nominalism & Realism* (1978a; 1978b), Armstrong came to use this argument also against Platonism.

Platonism as the view according to which "Universals stand apart from particulars..the latter may participate in or imitate the former to a greater or lesser degree" (Armstrong 1978a: 76). Perhaps we can concede to Armstrong that if Intentionalism is true then (1) follows, but we have no reason to think this is the case for extensionism.

Firstly, in the exegetical debate regarding the platonic ontology intentionalism proves no better than extensionism. Secondly, Armstrong himself suggests that:

> It is true that the thing could also be given a property structure. However, then the properties that make up this structure cannot be universals but must be particulars. They would have to be tropes. At any rate, without bringing in tropes in addition it seems that Platonic theories of universals have to treat particulars as bloblike rather than layer-caked. I think that this is an argument against Platonic theories (1989: 77).

The view described is precisely the extensionist version of the ontology, in which the "forms in us" are equated with property-instances. So, if extensionism is true (1) does not follow. Therefore (1) does not hold for "Platonic theories" *tout court*: if we reject intentionalism then (1) can be avoided.[118]

What about (2)? It seems that *prima facie* the extensionist version is not immune from this criticism. However, I shall show that upon closer examination the extensionist version stands up to scrutiny. I argue, in short, that we cannot infer the existence of a heavenly realm from the fact that Platonic properties lack a physical, spatiotemporal location. To see why let us examine how the two ontologies of space-time interact with this particular problem.[119]

According to relationalism space is not a thing over and above concrete entities: it is not, according to this view, an entity in its own right independent of material bodies. Rather, its existence is derivative from the functional structure of material particulars. Spatially arranged material bodies are what constitutes space-time, and any statement about

[118] I will show in the next section that we have independent reasons to reject the intentionalist view, based primarily on its compatibility with dispositionalism.
[119] For a complete discussion of the two views see (Dasgupta 2015; Pooley 2013). For an historical reconstruction of debate see (Slowik 2016).

space ultimately holds true in virtue of the relations between bodies.[120] To be "in" space-time, according to relationalism, is to be a constitutive part of space-time: in other words, constituent parts are the material objects from which space is built.

These objects have properties: size, shape, extension, and so on. Platonic properties, however, lack these features. A universal – blackness, say – does not exhibit the features of a spatiotemporal entity. It does not have extension or duration. While its instance fits these requirements, blackness itself does not. From this, however, does not follow that Platonic properties are "outside" space-time. It only follows that they are non-constitutive spatial parts, entities that play no role in its constitution.

Consider the constitution of a house. A relationalist would say something along the following lines: the house just is all its constitutive parts in a certain functional configuration. Each of these parts is spatially related to one another, like a door in respect to a wall, or a window in respect to its frame, and so on. These are deemed to be basic spatial relations. Now consider something that is spatially included in a wall, like a small grain of concrete: considered functionally, this grain is not part of the house. Although it is part of a spatial part, it fails to qualify as a spatial part of the house.

Yet, we would not say that grains are "outside" the house; only that, in this case, the transitivity of parthood of classical mereology fails (see Seibt 2014; *inter alia*). *Mutatis mutandis* the same goes for Platonic properties: we cannot draw the conclusion that they are "outside" space-time from

[120] The canonical reference for relationalism is Leibniz (see Sklar 1974: 169; Friedman 1983: 219; *inter alia*). For arguments against this interpretation of the Leibnizian conception of space see (Broad 1981: 171-173). This interpretation of Leibniz is indeed controversial, given that, on the one hand, he rejected the view that space exists independently of concrete particulars but, on the other hand, he also rejects the view that space is material (see Slowik 2016: 63). There are a number of different views that fall under the label of relationalism, or relationism. The view as presented here is more accurately described as "eliminative relationalism". Eliminative relationalism restricts the scope of spatial geometry to a finite number of concrete particulars (Barbour & Bernotti 1977; Barbour 2003; *inter alia*). Another view, "sophisticated relationalism", also admits possible particulars or primitive modal properties in the construction of spatial relations (Manders 1982; *inter alia*). What these views have in common is the rejection of space as independent no-material entity, i.e. substantivalist space-time. For a comprehensive overview of the many different relationalist positions see (Slowik 2016: ch.1). See Vassallo & Esfeld (2016) for a contemporary version of sophisticated Leibnizian relationalism, and Dorato (2000; 2008) for a sophisticated metric field relationalism that includes modal properties, i.e. dispositions.

the fact that they fail to constitute it. Nor we can draw the conclusion that, since they lack location, they are also then non-physical. We can only deduce that there is a physical part of an object constituting space-time that is not a part of space-time.

However, nothing about Relationalism requires that every part of an object constituting space-time is also constitutive of space-time.[121] On the contrary, there can be parts that fail to constitute space-time without failing to constitute physical objects from which space-time derives. Note that this solution is available to Armstrong.

When discussing the location of (physical) external spatiotemporal relations he accepts that although they do not have a location, they cannot be placed outside space-time. Here I shall quote Armstrong at length:

> Where are external spatiotemporal relations located? Here, it seems to me, we could cheerfully concede, if we wanted to, that they are not located, yet not place them 'outside space and time'. For it is part of the essence of space and time that they involve such spatiotemporal relations. So, if they help to constitute space-time, then it is no objection to their spatiotemporality that they are not located in space-time (Armstrong 1988: 111-112; 1997: 136-138)

Properties such as having a mass or having extension are essential to material objects; without them, objects would fail to be material in any meaningful sense. Evidently, then, these properties help to constitute material objects. Now, given that space-time is derivative of material objects, even if these properties do not have a location within space-time, along the same line of reasoning we can "cheerfully concede" that they should not be placed outside. Why Armstrong should insist that Platonic properties should be placed in heaven is not then clear.

Let us now move to substantivalism.[122] According to substantivalism, space is an independent entity in its own right. Material objects do not

[121] Note that this will turn out to be false according to super-eliminative relationalism, whereby all spatial relations must be coextensive with material relations (see Futch 2008: 48; Field 1985: 34).
[122] One famous champion of the view is Newton (see Sklar 1974: 161,182-4). In *De Gravitatione et Aequipondio Fuidorum* he argues: "space is eternal in duration and immutable in nature ...Although space may be empty of body, nevertheless it is not itself a void; and something is there, because spaces are there, although nothing more than that" (in Dainton 2010: 113). Or again: "So it is necessary that the definition of places, and hence of local motion, be referred to some motionless being such as. . . space in so far as it is seen to be truly distinct from bodies" (in Pooley 2013:6).

constitute space-time, rather, space-time supplies the stage upon which material objects exist and act. The easiest way to understand this view is to think about space as a box in which objects are contained. According to this view, everything within the box is spatially contained in the box. Whereas relationalism takes spatial relations to be basic, substantivalists argue that spatial relations are derivative from the location of particulars in space. However, in contrast to material particulars an abstract object does not stand in spatial relations with other entities. While it makes sense to say that my mug is three meters away from me, it does not make sense to say that the cosine function is three meters away from me. There is no region R1 of space occupied by that function making it true that R1 is three meters apart from the region occupied by me, say, R2. If this is the case for the cosine function it is equally plausibly true of any other abstract object, properties included. It seems that no non-spatial sense of "in" can be offered courtesy of Substantivalism, for, according to that theory, being "in" just is to have a corresponding region R occupied. Therefore, there is no such region occupied by abstract entities.

Does it follow from this that Platonic properties are therefore "outside" space-time? The answer seems to be yes, but, as I shall show, no such conclusion follows. For in the context of substantivalism what we take to be the meaning of "outside" is rather peculiar.

Consider again what distinguishes relationalism and substantivalism. Faced with the question of what the geometrical structure of space is, the former camp will understand the question in terms of patterns of material particulars. Facts about whether space is Euclidean or non-Euclidean will then be derived from facts about the geometry of material patterns.

By contrast, the substantivalism camp will understand the question in terms of direct facts about the properties of space-time itself. These

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However, this view was not new even in Newton's time. Giordano Bruno, for instance, argues: "There is a single general space, a single vast immensity which we may freely call void..This space we declare to be infinite.. It diffuseth throughout all, penetrateth all and it envelopeth, toucheth and is closely attached to all, leaving nowhere any vacant space" (Jammer 1993: 89). One variation of substantivalism is super-substantivalism (Sklar 1974: 221-224), otherwise known as monistic substantivalism (Schaffer 2009) or Cartesian-Spinozistic substantivalism (Esfeld & Lam 2008). While substantivalism holds that space-time is one among other substances, super-substantivalism claims that space-time is the only substance.

properties play a fundamental explanatory role, if not because they feature in the fundamental laws that figure in special relativity.

Now consider this argument. It is clear that substantivalism space-time – call it SST – has geometrical properties, which we might call GP. Everything that is "in" SST is contained in space-time and occupies a region R of it. However, GPs are not contained in SST; there is no R region corresponding to GPs. Are they then "outside" SST? If they are, then, following the naturalistic motivation of the objection, we should deny their existence. However, this denial, given the role of GPs, will amount to an equal or even greater offense to Naturalism than their acceptance. If they are not outside SST, then we can accept the existence of entities that do not occupy any region of it: in other words, they are "in" SST, but not in the spatiotemporal sense.[123]

In either case the objection either vanishes or loses much of its force. Note again what has been said above: Armstrong is ready to accept that spatiotemporal relations are not outside space-time although they lack location. It is unclear, then, why we should not follow the same line of reasoning and avoid putting Platonic properties in heaven.

In summary: *immutability* and *unobservability* are not enough to exclude Platonic properties from space-time. Nor, based on our analysis of relationalism and substantivalism, do we have any philosophically serious reasons to postulate the existence of a Platonic heaven based on properties' lack of spatiotemporal location. I hope to have shown how this prejudice can be resisted and that it is not a serious meta-ontological worry: a Platonic realm has no ontological weight and thus does not

[123] Notice that, more generally, we now got that at least some properties (GPs) are not instantiated, for to be instantiated is to occupy a region of space-time. Given that GPs are fundamental properties, it follows that some fundamental properties are not instantiated. This view is troubling for anyone willing to accept a combination of substantivalism and Immanentism about properties, for this combination requires that universals ontologically depend on their instances, whose existence depend on their occupancy of a multitude of regions Rn. Given that GP properties do not depend in this way for their existence, some properties must therefore exist uninstantiated. As such, Immanentism collapses into Platonism (Moreland [2001] has discussed further problems for the combination of substantivalism and Immanentism). Note also that if modest super-substantivalism is true then we can extend the argument to not just topological properties but to any other properties, and on this basis draw the conclusion that some non-fundamental properties are not instantiated either. For a discussion of moderate and radical super-substantivalism see (Lehmkuhl 2016).

compromise parsimony. It is, at most, a mere figure of speech. I shall turn to the Eleatic test.

5.3.2 When You're a Stranger

The second problem for Platonic properties is the well-known Eleatic stranger meta-ontological principle. The Eleatic principle, or test, is postulated as a criterion to identify those beings that can be considered "real" and, therefore, included in our ontology. Although the principle is independent of Naturalism it derives normative force from naturalistic commitments.

Strictly speaking, the Elastic test itself only allows for the separation of entities into real and unreal kinds. It is only by introducing a supplementary naturalistic claim – namely, that causally active entities alone can be allowed for in an ontology – that the principle can be used to ontologically exclude certain beings (see Colyvan 1998: 314).[124]

Indeed, while its original formulation goes back to Plato (*Sophist* 247d-e), it is only in its 'naturalised' form that is has exerted a great influence on contemporary metaphysics, in particular following Armstrong's defense of *a posteriori* realism (or impure naturalism).[125] Armstrong's view is, in short, that "causally inert entities in no way explain anything that happens in the natural world" (1989: 8). And again: "if they (uninstantiated universals) are powerless in the space-time world, then whether they exist or whether they do not will make no difference to what happens in the space-time world. Are they not useless postulation then?" (1988: 104).

[124] A brief comment is required. This observation holds, I think, for the traditional definition of the principle: "whatever has the ability to affect and being affected is a real being" (*Sophist* 247d-e; Alexander 1920). What advocates of metaphysical naturalism add is simply that entities that do not pass the test cannot be postulated as existing in space-time. However, they can still be said to exist outside space-time: therefore "real" is not to be equated with "existing". Note, however, that for other formulations what I have claimed turns out to be false. Cowling (2015), for instance, defines the Eleatic test in the following way: "Necessarily, some entity x exists if an only if x is causally active". In this case, the test has direct normative force.

[125] We have already discussed Armstrong's Impure Naturalism in Chapter Four.

Following Armstrong (1978a; 1978b) and Molnar (2003), *inter alia*, the majority of dispositionalists have endorsed immanentism about universals in order to provide an account of modality and causation compatible with Metaphysical Naturalism (see Allen 2017: 27-28; Vetter 2015: 270-271).[126] The question is whether Platonic powers can be ruled out or not based on the Eleatic test.

In this section I distinguish between two versions of the Eleatic test and conclude that neither puts particular pressure on Platonism. Whereas the first version rules out Platonic universals, it also has unfavorable consequences for immanent powers. To avoid this problem immanentists can adopt a second version of the test but doing so entails that Platonic powers turn out to be causal after all.[127]

The first version of the principle adheres to the original Platonic formulation, according to which "whatever has the ability to affect and be affected is a real being" (*Sophist* 247d-e). Yet, there are others, more contemporary formulation that are available. Cowling, for instance, claims: "Necessarily, some entity x exists if and only if x is causally active" (2015: 307). The core assumption of this version of the test is that we can accept only *causally operative* entities into our ontology and nothing else. A causally operative entity is an entity that is efficiently causal, i.e., it makes a causal contribution to causation (it can affect or be affected by).

[126] Dispositionalists that adopt the principle are Mumford (1998; 2004a; 2004b; 2009a; 2009b), Mumford and Anjum (2011), Bauer (2013), Tugby (2017), Ellis (1990), Molnar (2003), and Heil (2003; 2005). The Eleatic test plays a vital role within Dispositionalism: it is taken to support the causal identity of properties (Shoemaker 1980) and count against the postulation of quiddities (see Mumford 2004; *inter alia*). Notable exceptions to the anti-Platonism trend are Fales (1990: xiii), Kistler (2002), and Bird (2007).

[127] Bird (2007: ch.3.2.2) provides a simple and elegant response to the Eleatic attack. He claims that since Platonic properties are necessary beings, and the test can only be applied to contingent beings, the test simply cannot be used against Platonic properties. Bird assumes as much because the test is about a difference that an entity makes in the world, but "that comparison makes no sense with respect to necessary beings" (2007: 54-55). Although I find this line of argument appealing, I nevertheless have two worries. Firstly, the difference-making version is only one of the two versions of the Eleatic test, and therefore Bird's argument does not deflect criticism that stems from the other. Secondly, not every necessary entity is the same: Platonic properties have the capacity to exist uninstantiated, and so they can make a difference in terms of entities that have them or not.

Aristotelian, or immanent, powers are usually endorsed on the basis of their causal import: it is because particulars have (immanent) powers that they causally behave the way they do. Thus, powers are taken to be explanatory of efficient causation between things. There is, however, no efficient causal work powers do by which we can say they pass the test. For consider a case of causation dear to dispositionalists: the sugar cube. Causation here is the cube's dissolution in hot tea. The hot liquid affects the cube, by dissolving it, and the cube affects the hot liquid, by sweetening it. So, both the cube and the liquid pass the test. Nonetheless – or so the story goes – causation occurs, and can be explained, in virtue of the powers of the particulars interacting so to "bring about" the effects. Note, however, that powers do no causally operative work: nothing efficient occurs to the property, and the property performs no efficient action. They, the powers, neither dissolve nor become sweet. What "brings about" the effect is only the alleged powerful particulars.

To be sure, the powerful particular can ontologically depend on the existence/instantiation of an immanent and powerful property. Were the particulars differently propertied, therefore, the effect might not occur. However, this does not imply that the property in itself is causal, but rather that we use, or appeal to, the property in order to *explain* causation. Yet, if the property itself is not that which affects or is affected, then it is not causal in any efficient operative sense – this being the sense required by the first version of the Eleatic test. On this basis the test compels us not to postulate the existence of properties at all: it does not matter whether a power is a trope, an immanent universal, or a Platonic universal, as none of its forms will be available for dispositionalist to use. It is not at all clear, therefore, how dispositionalists who are unsympathetic with Platonism can consistently use this version of the Eleatic test at the same time as holding to the fundamental claim that "powers are properties".

This leads us to postulate that powers can safely pass this first version of the test only if the universal itself is causally *operative*. If, roughly speaking, universals are *causes*. There are, however, three problems with this line of argument.

Firstly, that would entail that particulars do no causal work in causal interactions. If universals themselves are causally efficacious, it is they who do all the work: none is left to particulars. If this is true, however,

we should not admit particulars in our ontology, since, given the application of the test, they will be causally idle entities. [128] Dispositionalists cannot welcome this conclusion for two reasons: it is clearly at odds with the naturalistic commitments they are trying to preserve, and the entire point of postulating causal powers is to explain causation between "powerful particulars". This approach entails, however – *pace* Whittle (2016) – that particular or substance causation is false. The only way to deny this conclusion is to argue that some causal work is left to particulars; yet this will not do for the following reason. If particulars have a causal role that is irreducible to the causal work of properties, it means that causation cannot be explained entirely in terms of causal properties. And of course, this is precisely the opposite of what causal dispositionalists argue for.

The second problem is that if the universals are themselves causally operative, they are entities that can affect and be affected by. That is to say that they can change. Change is a causal phenomenon that occurs to universals as causally operative entities. However, according to Dispositionalism causal interactions occur to something in virtue of its possessing causal properties. As such, if the universal is causally operative and undergoes change it must possess a higher-order property in order to do so. In other words, if the universal changes it must have the potential to change, which is of course a power, i.e., another property. We should therefore ask: is this high-order property causally operative? If it is not then we are back to where we began, so it must be so. But if it is, then once again it could only be so because it possesses another higher-order property that must itself possess another higher-order property, and so on, *ad infinitum*.

Then there is a third, more pressing problem for dispositionalists. Consider what it is that allows properties to be causal. According to dispositionalists it is a tendential nature, or directedness, that grounds a power's ability to produce physical effects. Each instance of first-order directedness is grounded on second-order facts about the internal relation between the two universals that are individuated as the power

[128] Oddie (1982: 288) points out a similar problem that affects Armstrong's account of causation. Roughly speaking, Oddie correctly observes that if causation is the nomic relation between properties, then States of Affairs become causally idle and should be removed from any ontology. This is an unfavorable result as States of Affairs are the basis of Armstrong's metaphysical view.

and the manifestation: this is what determines the first-order causal connection. However, as Armstrong has correctly pointed out (1988: 111), internal relations fail to conform to the spatiotemporal criterion. Since these relations are non-spatiotemporal then they are not causal in any efficient sense – which, again, is what is required by this first version of the Eleatic test. Note, moreover, that if dispositionalists take their naturalistic commitments seriously they will be forced to remove internal relations from their ontology, given that these are causally idle – i.e., non-operative – entities. However, if internal relations depart the ontological stage, on the basis that first-order causal facts depend on second-order relations, so must efficient causality between properties.

To summarize: if we take the Eleatic test in its first formulation either powers, in any of their ontological forms, fail the test, or else they pass it but not in any efficient operative sense. In the former instance dispositionalists are prevented from using the test as an exclusion test against Platonic properties, and in the latter, they admit the causality of internal relations but must, for the same reason, then admit the causality of Platonic properties. Let us now turn to the second version of the test.

The second version is a modification of the original Eleatic principle. Instances of this second version are Armstrong's "Everything that exists makes a difference to the causal powers of something" (1997: 41), and Mumford's "for any intrinsic non-abstract property P, P exists if and only if there are circumstances C in which the instantiations of P have causal consequences" (1998: 122; 2004: 190), *inter alia*. The core idea behind this version of the test is that we can accept in our ontology also *causally relevant, together with causally productive,* entities. A causally relevant entity is an entity that is relevant for causation, but the principle so construed does not impose that the causally relevant entities must be themselves causal: all the principle prescribes is that we must accept every entity that *makes a contribution* to causation, even those entities that make a non-causal – that is, non-operative – contribution to causation. [129]

On this version of the test Armstrong can admit totality states of affairs in his ontology, despite the fact that they are not causally operative. This is because, Armstrong argues, they are causally relevant, a relevance that

[129] The distinction between causally operative and causally relevant is not new. Similar strategies can be found in (Armstrong 2004: 76) and in (Jackson & Petitt 1990: 115-116).

is spelled out counterfactually: things would have been caused to be different if the state of totality had not obtained (2004: 76).[130] Clearly, however, we can argue along similar lines that Platonic properties are causally relevant as well.

Suppose, then, that there are Platonic powers. Suppose that, in a possible world, Platonic power A, instantiated by a particular X, lacks the relevant unrealised Platonic manifestation B. According to dispositionalism the existence of the manifestation B is entailed by the existence of the particular X having the power A. In fact, as we saw in chapter one, dispositionalism cannot admit a world in which things are fragile yet nothing is breakable. If this is true then B makes a difference to the causal powers of something: if B were not to occur then X's power to A would also not occur.[131] In other words, things would have been different if Platonic power A had not obtained. The Platonic power is casually relevant and, therefore, passes the Eleatic test. Plato himself would, I suspect, happily accept this version of the test given that this is exactly how he presented the causal import of his forms: the real cause, something without which things would have been caused to be different to the way that they are (*Phaedo* 99a-99c; 100e5-6).

Things are even simpler if we follow Mumford's definition. For according to Mumford causal relevance is defined as the possession, or instantiation, of certain properties producing a causal consequence. However, according to this sense of relevance no substantial differences can be found between an immanent, tropist, or Platonic view of properties. For the principle holds true of all the three views: the mere possession of properties – which is in itself a non-causal fact – can have causal consequences. Thus, Platonic properties cannot be rejected by the application of the Eleatic principle so construed.

To summarize, if my assay of the first version is correct then dispositionalists should not appeal to it in order to reject Platonic properties. If, however, they appeal to the second version then Platonic

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[130] As Bird has pointed out (2006), Armstrong's formulation of the test works against Armstrong's own actualism. It is therefore dubious whether Armstrong can adopt this version of the principle while maintaining Naturalism.

[131] Thus Vetter argues: "If there is no property to function as its manifestation, then the potentiality never gets to be the potentiality that it is supposed to be" (2015: 271).

properties turn out to be causal – in the sense mentioned above – and thus pass the test. Therefore, no causal idleness, nor violation of Metaphysical Naturalism, follows from the postulation Platonic properties.

I hope to have shown that the meta-ontological worries related to Platonic dispositionalism have no solid ground. Platonic properties do not seem to bear any problem that makes them incompatible with metaphysical naturalism. Thus, whereas dispositionalists attracted by Platonism have no prima facie reasons to dismiss their inclination, dispositionalists that explicitly argue against the platonic version of the metaphysics should find better ways to attack the view. With the adoption of Platonism the project of explain the *natural* modality is no less vindicated.

Let us now move to examine, finally, the view that powers are platonic properties.

5.4 Platonic Powers

In Chapter Four, I argued that immanent universals are unsuitable for the grounding job. The second-order nomic connection between a power and its manifestation is taken to be explanatory of the pattern of instantiation in the world. However, it is unclear how immanent universals can ground the pattern while, at the same time, being dependent on their concrete instances. In this section I will show that Platonism not only is safe from the meta-ontological worries mentioned above, but also that it is superior to immanentism in accommodating the requirements from dispositionalism. My main thesis here is simple: that the condition of existence of Platonic properties, their ontological priority with respect to their instances, is key to fitting the grounding profile of powers. Let us start.

At the beginning of the chapter I presented the basic ontology of Platonic properties, mentioning that one of the features of this ontological form of property is their priority. Platonic properties are prior to their instances because they are separated from them (*Phaedo* 65d5-d10); they can exist without the latter existing and thus they are capable of independent existence.

However, as Aristotle suggested in his discussion of Platonic priority (*Eudemian Ethics* 1217b10–15; *Metaphysics* M.2, 1077a36–b11), separation is necessary but not sufficient for priority. In *Metaphysics* 1077a14–20, Aristotle distinguishes definitional priority and ontological priority:

> not everything which is prior in account is also prior in substance. For these things are prior in substance which, if separated, surpass in being, while things are prior in account to some items whose accounts are constituted from the accounts of the former; and these do not apply at the same time. For if the attributes are not over and above the substances, like that which is moving or is white, white is prior to white man in account but not in substance; for it is not possible to be separated but is always together with the compound. (1077a36–b7)

Ontological priority is defined as a priority that requires separation and transcendence, that is, *surpassing in being* (1077b2-3) or *having a greater reality* (*Phaedo* 247c). If one item surpasses another in being then the opposite cannot hold: that is to say that the former cannot be surpassed by the latter, for otherwise fundamental entities would be fundamental in the sense of "being derivative from themselves". However, this is to define fundamentality in terms of derivativeness – even if it is self-derivativeness – whereas usually the definition is taken to be the other way around. Put another way, transcendence fixes the directness of priority (*see* Peramatzis 2011: ch.9). By allowing only one direction – from prior to derivate – Platonism entails that the existence of universals is not dependent on the existence of the instances, and necessarily so.[132]

Yet, despite the fact that universals are independent from their instances, instances of universals are dependent on universals. According to Plato the "forms in us" are dependent on the forms for more than just their existence. In the *Phaedo* (99d-105c) Plato speaks of the forms as causes of the forms in us, but we should be cautious here. Plato distinguishes causation that occurs among the "forms in us" and causation that occurs among "forms in us" *and* the forms. While the first type of causation is identified with efficient causation (99a-99c), the second is identified with formal causation (c-4; 100d4-8). Universals as formal causes are different from efficient causes in that they are ontologically prior to efficient causal

[132] Aristotle describes in this way the asymmetry that characterises the relation between Platonic universals and their instances. In the *Eudemian Ethics* (1217b11–12) he argues that Platonic universals are ontologically prior in that, were the instances to be destroyed, they would not be destroyed with them.

phenomena. More precisely, they explain why certain efficient causes have the causal role they have. Thus, formal causation is causation that fixes the identity of the "forms in us", or instances.

Nevertheless, I do not think it is favourable to explain this relation in terms of causation. As Tugby says, it "does not sound like the right sort of relation to modern ears in this context" (2016: 26). My preferred way to cash out the relation between instances and universals is in terms of essential dependence. That there is a relation of essential dependence between the two means that universals are essential constituents of the instances, whose identities depend on the existence of the former. It is clear that, while we can get a universal without its instances, we can never think of an instantiation of a universal A existing without the universal A.

Thus, to summarise, Platonic properties have the following grounding profile: whereas the universal is ontologically prior and *essentially* independent from their instances, these are *essentially* dependent on the universal.

Here is the first consequence of the grounding profile for Platonic powers. Recall the grounding profile for immanent properties: according to immanentism instances *essentially* depend on the universal; an immanent universal generically-existentially depends on the instance (see again Section 4.2-4.3). This kind of grounding profile is what generates the *grounding problem* discussed in Chapter Four. However, the grounding profile of Platonic properties does not, *prima facie*, result in the same problem. The core of the problem was that the symmetry involved in the condition of existence of immanent properties conflicts with the asymmetry involved in the grounding profile of powers. No such problem follows from Platonic properties that are, by their very nature, ontologically prior and essentially independent. This is already an advantage of Platonic dispositionalism over immanent dispositionalism, particularly in its (TI) form.

A second consequence concerns the notion of *modal nature*. As discussed in Section 1.5 the modal nature of powers is taken to be *irreducible* and *fixed*, and with a Platonic understanding of powers we can make better sense of the requirements related to their ontological profile.

Let us start with *irreducibility*. The standard dispositional strategy of presenting the irreducibility of powers is mainly negative and consists in showing that the modal import of powers cannot be captured by reductive analysis, conditional analysis (see Bird 2007: ch.2.2; *inter alia*), or by traditional modal notions such as necessity and possibility (Mumford & Anjum 2011a; Mumford & Anjum 2011b; Mumford & Anjum 2010). Yet if irreducible means, "cannot be analyzed reductively", this is clearly uninformative with regards to *why* the modal nature is irreducible. It is merely an epistemic suggestion, a suggestion of how *not to think of* powers – a "clumsy and inexact" attempt, as Martin would say (1994: 9). Notice that if the claim that powers have an irreducible modal nature is not cashed out in ontological terms – i.e., as an element of the ontology and its features – it is then part of the ideology of dispositionalism (McKitrick 2003: 366; *inter alia*). It enters the frame without explanation – yet we should, if possible, try to minimize the number of ideological primitives contained within the theory so as to improve its epistemic credentials (Cowling 2012; *inter alia*). Platonism allows for exactly this.

Let us consider again the grounding profile of Platonic properties. Given the independence of the universal from its instances, it is a (trivial) possibility compatible with Platonism that universals exist, that they are ontologically prior to instances, and that *some* of them are uninstantiated. Likewise, it is also (less trivially) possible that universals exist, that they are ontologically prior to instances, and that *all of them* are uninstantiated. The former is a world where *only some* concrete things exist; the second a world in which *no* concrete things exist. I do not provide an argument here for the metaphysical possibilities of these kinds of scenario, yet I am not alone in thinking that focusing on *small* or *empty* worlds is a useful technique (Armstrong 1989a: ch.4, sec.2; Saenz 2014; *inter alia*). Let us focus on the second, the empty worlds.

If this world is possible, it is a world in which universals are potentially but not actually instantiated. In this world there are modal facts about properties that are irreducible to facts about the pattern of instantiations. This is because in the empty world properties are still potentially instantiable, and so there are prior modal facts dictating how their potential instantiations must be connected at the first-order level. Yet,

since the world is empty, there are no first-order physical facts to which modal facts can be reduced. Given that facts about instantiation and uninstantiation are fundamental facts about properties, it follows that there are fundamental, irreducible modal facts about Platonic universals.

In Section (5.5.2) I shall apply a similar strategy in order to offer a response to the problem of truthmakers for facts about the uninstantiation of properties. For now, let us turn to *fixity.*

The standard strategy of accounting for the fixity of powers is generally by contrasting powers with non-modal, or categorical properties. Categorical properties, it is said, have their modal roles contingently: that is, their modal role can vary across possible worlds. That the modal nature of properties is *fixed* simply means that the modal role of powers is the same in all possible worlds (Bird 2007; *inter alia*). Fixity facts are facts about the constitution of the property; the fact that powers are nothing but nomic links with other powers (Bird 2007; Mumford 2004; Molnar 2003; *inter alia*). This is what fixes the nature of the property and inescapably dictates its modal role. Yet possible-worlds explanations are not available to dispositionalists because possible worlds are not among the entities postulated in their ontology. Since they cannot serve any real explanatory purpose, this strategy is merely illustrative.[133] While *fixity* serves us well in distinguishing between categorical and dispositional properties, therefore, it is unsupported by the ontology, instead being a part of the ideology of dispositionalism. We should expect, given that dispositionalism is a property-based account of modality, that facts about properties should be directly involved in explaining *why* the second-order manifestation relations hold by necessity. And indeed, Platonic dispositionalists might have a ready-made solution at hand.

Indeed, if necessary entities like Platonic universals are related (see again Section 5.2), the relation itself should hold by necessity. This has been already been noted by Tugby (2013b: 327-328): the core idea is that the modal force of the second-order connection can be accounted for by, and is derivative from, the Platonic powers involved. So, once again, it is the ontological form of Platonic properties that delivers fixity. Like Armstrong and Fales I believe that "the principle has some plausibility",

[133] Armstrong acutely recognizes this point at the beginning of his section on strong necessity (1983: 163).

and yet must admit, like Armstrong, that "I do not know how to give positive arguments for the principle" (Armstrong 1983: 165; Fales 1990).

Lange (2008) can arguably be seen as offering a positive argument for the principle. For suppose, *per absurdum*, that connections between necessary existents are contingent. Given that it is in virtue of being connected that powers have their modal role fixed, the connection is contingent only if contingencies are apt to ground necessary truth. But they are not – or so Lange argues. Wildman has recently cast doubt on Lange's conclusion (2018), and I shall not, in this chapter, provide a defense of Lange. Nevertheless, if we concede the *prima facie* plausibility of the principle *we have an ontological explanation for why the connections hold necessarily*.

In respect of the two criteria mentioned above Platonism seems suitable. Indeed, by simply postulating Platonic universals we offer an ontology of modal properties whose nature is fixed and irreducible. Notice that, at the same time, ideological parsimony (see Cowling 2012; *inter alia*) is achieved without increasing our ontological commitments, given that the postulation of universals and instances is an ontological cost that – having set tropism aside – is unavoidable. Yet the analysis is not complete. As explained in Section 1.5, with *fixity* and *irreducibility* comes an additional requirement: *unmanifestation.*

In Chapter One I showed that modally fixed properties can exist unmanifested: i.e., independently of their physical realisations. A vase – to use an example dear to dispositionalists – can be said to hold the property of fragility independently of that property being *manifested*, that is, independently of whether or not the vase displays its fragility by breaking. Here I shall quote Tugby at length:

> The third fact about irreducible dispositionality to be considered..is that an instance of a disposition may exist even if it is never manifested. Acceptance of this fact is *central* to the realist view about dispositions. According to the realist view, dispositions are properties in their own right and so may exist even if they are not being displayed. Whilst the manifestation of a disposition is potential only, the disposition itself is actual. Given that this is so, the fragility of a particular vase, for example, would be ascribable to it even if the vase never comes to be broken. (2011: 169, italics added)

What dispositionalism wants to capture is the idea that a manifestation, even if unrealized, exists no less than the actual capacity of the particular that bears it.

Unmanifested existence is a core element in the ideology of dispositionalism. It is, roughly speaking, the denial of the Megarian thesis that the world contains only actual elements. Megarians, as both Aristotle and Plato reported, were those who denied potentiality (δύναμις) and granted being only to the immediate, to what is *displayed* (*Metaph.* 1046b30–1047a20; *Theaetetus* 142a–143c). To accommodate this claim Bird suggests that the fundamental distinction under which dispositionalism operates is between realized (or concretized) and unrealized (or non concretized) (2006; 2007: 103). Thus, dispositionalism is committed to the thesis that what is concrete, or realized, does not exhaust what exists in actuality.

As we have discussed in Chapter Four the profile of immanent universals conflicts with the unmanifestation requirement. In fact, immanentism does not distinguish between existence and instantiation because for a property to exist *is* to be instantiated. Thus, given that the relation between the instantiated universal and its instance is that of existential dependence, there cannot be a universal if there is not at least one instance that supports it. However, an unmanifested power is a power that is not realized (not concrete), and so it should lack any concrete instances as well. Therefore, immanent universals cannot exist unmanifested; and the view that modally fixed properties can exist unmanifested, i.e., independently of their physical realisation, cannot be supported by immanentism.

In contrast, it should be *prima facie* clear that Platonists and dispositionalists are in agreement in rejecting the Megarian thesis. For Platonists, who endorse facts about the uninstantiation of properties, there are things that are actual but not displayed, or realized. For dispositionalists, who endorse facts about powers that remain unrealized, there are also things that are actual but not displayed or realized. This is, I believe, the crossroads of a Platonic theory of potentiality (see also Tugby 2015). Simply by endorsing Platonic properties we can explain *why* powers can remain unrealized: namely, because if powers are understood Platonically they can exist actually and unrealized. To be instantiated is

an irreducible potential of a Platonic universal – F, say – that manifests in another property G, being instantiated. Likewise, what is lacking, in an unmanifested F, is the instance of the related property G. This is the core idea behind the *governing* principle postulated in Chapter One.

Of course, Platonic dispositionalism has its problems. Here are two undesirable consequences of the grounding profile of Platonic properties.

Firstly, while Platonic independence is able to account for facts about irreducibility, fixity, and unmanifestation, it also leads to the acceptance of negative facts and negative truths. These are truths about uninstantiated properties, and whatever makes those truths true has to be accounted for by Platonic dispositionalists. I shall discuss this consequence in Section (5.5.1) and (5.5.2.)

Secondly, and more problematically, Platonic independence creates a problem for the *governing* principle. The puzzle seems to be the following: if the arguments in this thesis are correct, there is no hope of grounding natural modality by making the pattern of instantiation identical to what should ground this pattern (as in the case of tropism). Nor is there any hope of making the grounding base dependent on the pattern (as in the case of immanentism). The only hope is to make the grounding base ontologically prior and independent. And yet if the grounding base *is* independent of what it grounds – that is, if it's possible for F and G to exist but have no instances – then the grounding base does not ground the occurrence of its instances. This is bad for Platonic dispositionalism. Nevertheless, the accusations only hold given the truth of necessitarianism, and we have not yet provided reasons to hold this additional commitment independently of the problem. I will discuss this objection and a possible response in Sections 5.5.3 and 5.5.4.

5.5 Two Problems for Platonic Dispositionalism

I hope to have shown that the combination of Platonism and dispositionalism is stable under the requirements from the metaphysics. In these final sections I shall discuss two problems for Platonic dispositionalism. The first, which I shall call the *problem of negativity,*

pertains to the truthmakers for those negative truths which (PD) generates in relation to uninstantiated properties (Ingram 2016). The second, the *governing problem*, is a refined version of the inference problem affecting non-Humean theories of modality in general (Sider 1992). This problem, in the context of dispositionalism, has been recently outlined by Barker (2013), and it consists in the accusation that the link between second-order facts and first-order physical facts is purely notional, not substantial. My conclusion is that Platonic dispositionalists can, in theory, address the first problem. I will, however, offer no conclusive strategy to approach the second: for now Platonic dispositionalism can only manage, rather than solve, the governing problem.

5.5.1 The Problem of Negativity for Platonic Powers

One of the reasons to welcome an ontology of Platonic properties is its ability to accommodate the existence of alien properties, those that could have been instantiated but in fact they are not (see Lewis 1986: 66-67). The attentive reader will have noticed by now that neither tropes nor immanent universals offer the same benefit. Given that we cannot make sense of "possible tropes", as discussed in Chapter Three, we cannot make sense of alien tropes either. And again, the conditions of the existence of immanent universals – i.e., their existential dependence on first-order instances – have unacceptable modal consequences when it comes to alien properties. Let us call (alien) the notion that it is metaphysically possible to have an instantiation of a property that is not actually instantiated and cannot be derived from a conjunction of instantiated properties (Lewis 1983: 37). Thus, alien properties cannot be immanent universals.

In this section I shall not address the question of whether we should hold (alien). Many dispositionalists with immanentist inclinations do in fact deny that we ought to (Borghini & Williams 2008). I will not engage in this debate, but instead discuss one problem that the alleged compatibility of dispositionalism with (alien) raises for the former view: the problem of negativity. Let us start.

Tugby has recently claimed that an ontology of Platonic properties is better equipped to solve what he dubs the "alien paradox" (2015: 30-31).

(1). It is true that instantiations of alien properties are metaphysically possible. (Possibility)
(2). Truths about what is metaphysically possible have truth-makers. (Truth-maker)
(3). Truth-makers determine their corresponding truths. (Determination)
(4). All truth-makers exist. (Existence)
(5). Everything that exists is actual. (Actualism)
(6). Truths about alien properties are not determined by what is actual. (Alienation Principle)

I think we should read (6) as saying that *some* truths about alien properties are not determined by what is actual; accordingly, to generate the "paradox", we take (2) and (3) to mean *all* truths/truthmakers. Accordingly, the disambiguated paradox is as follow:

(1). It is true that instantiations of alien properties are metaphysically possible. (Possibility)
(2). *All* Truths about what is metaphysically possible have truth-makers. (Truth-maker)
(3). *All* Truth-makers determine their corresponding truths. (Determination)
(4). All truth-makers exist. (Existence)
(5). Everything that exists is actual. (Actualism)
(6). *Some* Truths about alien properties are not determined by what is actual. (Alienation Principle)

The paradox consists in the fact that each proposition is independently plausible but their conjunction is not. The reason is this: whereas we think that it is a metaphysical possibility that uninstantiated properties could be instantiated (1), given the plausibility of (2-6), we have no basis to claim that it is, in fact, the case. Tugby's solution is to deny (6) and claim that truths about alien properties are determined by what is actual, given that, according to Platonism, both instantiated and uninstantiated universals are fully actual (2014: 43-35). So far so good for Platonic dispositionalism.

Ingram has recently suggested, in response, that Tugby is committed to a negative ontology, given that according to Tugby's solution truths about possible alien instantiations are facts about the non-instantiation of certain properties (2016: 1284-1285).[134] As Ingram nicely puts it:

> The fact that some universal isn't instantiated (or is uninstantiated) is a fact about what isn't the case. The fact that some universal F is instantiated is a positive fact; its negation, that some universal F isn't instantiated, is a negative fact...And platonists about possibility, insofar as they are committed to facts about properties being uninstantiated, more generally, are also committed to such negative ontology. (Ingram 2016: 1275)

The worry is that since the very notion of Platonic properties entails negative truths, Platonic dispositionalism owes us an explanation of what the truth-makers for those truths could be.

Tugby, who believes the rejection of truthmakers necessitarianism can only come at high cost, starts its quest for truthmakers (2015:32).[135] He takes 'totality facts' to be the determiner of those truths.[136] Here I shall quote Tugby at length:

> On this theory, then, the truthmaker for the truth that a property F is not instantiated is the fact that such-and-such property instantiations exist, combined with the (higher-order) fact that those are all the instantiations that there are. Since, by hypothesis, an instantiation of F will not be among those first-order instantiations, the totality fact necessitates the truth that F is not instantiated. If we combine this approach with my Platonic view, we are left with the following account: truths about possibilities being mere possibilities are made true by the existence of the relevant universals together with the totality fact that such-and-such property instantiations are all that there are. (2017: 46).

In Section 5.5.3. I will give a sustained explanation as to why, for independent reasons, the adoption of totality facts is troublesome. In

[134] So Tugby claims that "the truthmaker for a truth about a possibility being a mere possibility must ultimately consist in a conjunction of facts: the existence of the relevant universal plus whatever determines the negative truth that the universal has no instantiations. In the latter case the most obvious candidate would be a negative fact. For as indicated above, it seems undeniable that the concept of an alien property involves negativity. An alien property is precisely one that is not instantiated, but could have been" (Tugby 2017: 45-46).

[135] Thus, Tugby claims: "To deny such a principle would be to hold that a state of affairs could make a certain proposition true is one case, while in another case that same state of affairs might not make the proposition in question true. It is very difficult to see how this could be" (2015:32).

[136] Tugby is not the only one to adopts this style of solution. See also, most notably, Armstrong (1997), Schaffer (2010), and Cameron (2008).

what follows I will suggest a solution to the alien paradox that dispenses with totality facts, but also with truth-makers for negative truths. Put simply, my solution to the paradox involves the rejection of (truth-makers). Let me explain.

5.5.2 The Zero Strategy

As mentioned already, it is entirely compatible with Platonism that all the properties that exist are uninstantiated. To picture this world is to picture an *empty world* (see Armstrong 1997: 107 Saenz 2014, *inter alia*).

Let us grant that this world really is possible: what does this scenario tell us about the grounding of negative facts? This is a world where there are no positive first-order physical facts; in this world the fact that "some universal isn't instantiated" clearly occurs. The proposition is true *of* that world. Does also the proposition require some element *in* the world to ground its truth – in other words, does it require a truth-maker? The answer is no. To see why, let us start with a maximally empty world and then progressively load it up with (positive) facts.

Suppose that chairs, students, philosophers, and trees all exist. Further suppose that while they exist none of them is F, but they are G, H, I, and so on. In this *loaded* world the statement "some universal F isn't instantiated" is grounded in chairs, students, philosophers, and trees not being F. Now let us gradually remove objects from this world. Despite the grounding base being different every time we remove an object, the resulting base is still sufficient for the obtaining of the negative fact. Indeed, even an empty world is. Note, however, that we are now saying that regardless of whether or not we have one grounding base or another – or none – the fact that "some universal F isn't instantiated" will occur. Therefore nothing – and so not even totality facts – seems to ground negative facts.

After Fine we can now call these *zero-grounded* facts. Zero-grounded facts are "exotic" cases (2012: 48); they are grounded by *zero-many* facts; they are neither *ungrounded* nor require any additional ontological 'filling', or *extra work from God* (Fine 2012: 47). They are rather grounded and made true by default. Here I shall quote Fine at length:

> The case in which a given statement is zero-grounded, i.e. grounded in zero antecedents, must be sharply distinguished from the case in which it is ungrounded, i.e. in which there is no number of statements - not even a zero number - by which it is grounded. We may bring out the difference by means of an analogy with sets. Any non-empty set {a, b, ...} is generated (via the 'set-builder') from its members a, b, ... The empty set {} is also generated from its members, though in this case there is a zero number of members from which it is generated… Thus 'generated from nothing' is ambiguous between being generated from a zero number of objects and there being nothing - not even a zero plurality of objects - from which it is generated; and the empty set will be generated from nothing in the one sense and an urelement from nothing in the other sense. (2012: 47)

The intelligibility of this aspect of the grounding grammar proposed by Fine, I think, rests on the analogy with the set machine, and in the possibility of making sense of a *process of generating sets*. Given the purpose of this section I offer no further analysis of this issue. However, if the analogy is granted then negative facts can be seen as zero-grounding facts.

This poses a problem for truth-maker maximalism, *pace* Cameron (2008) and Armstrong (2004), as the proposition "some universal F isn't instantiated" is made true (by default) but lacks truth-makers.

Here is an objection to the *zero* strategy. The *empty world* is supposed to convey the idea that even a world empty of things, a world of *nothingness*, is enough for the negative fact "some universal F isn't instantiated" to hold. Therefore, if this negative fact exists then it does so necessarily, but if *this* is true then the strategy proves too strong. Facts about (alien) cannot be understood as necessary, for (alien) is itself the thesis that it is metaphysically *possible* for a property that has no actual instantiation to be instantiated. The relative negative fact "some universal F isn't instantiated" is then a contingent fact. Yet, if this is true if negative facts are contingent then the zero strategy *fails* to explain why they occur. In fact, if nothing stops a negative fact from occurring, similarly nothing explains why it possibly does occur. And this is exactly what the strategy owes us in order to offer a complete solution of the paradox.

I think there is something to this objection, yet for the following reasons reject the claim that it a serious one.

First, the objection is troublesome only if grounding necessitarianism is true. But this is an open question, and indeed new arguments for the truth of contigentism about grounding have recently been made (see Skiles 2015; *inter alia*). Clearly, if grounding contigentism is false, or if it proves to be incompatible with dispositionalism in general, the zero strategy is doomed to fail. But this is not the case, at least *prima facie*.

For instance: to endorse contigentism about grounding in the context of zero-grounded facts is to say that the contingent occurrence of these facts can be explained in terms of preventing or enabling conditions. If this sounds familiar that is perhaps because this is what the *conditional governance* (CG) view discussed in Chapter Four claims.

Let us suppose, for the sake of argument, that the negative truth about F not being instantiated is zero-grounded, contingent, and explained by some positive *preventing* facts about G being instantiated (or something of that sort).

I am thinking about similar cases involving particulars and negative facts about them. The fact that <there is no Pegasus> is the fact that nothing in the four-dimensional pattern *pegasized*, so to speak. In virtue of what does this negative fact occurs or non-occurs? One explanation is the following. The fact that <There is something that is Pegasus> *prevents* the negative fact from occurring. The core idea is that these conditions would explain the non-occurrence – or the occurrence, in the case of an *enabler* – of the contingent negative fact. I do not consider this to be ultimate evidence of compatibility between dispositionalism and grounding contigentism, but insofar as the issue is open to debate I do not consider this to be a serious worry.

Second, a Platonic dispositionalist might simply be agnostic in the dispute between necessitarianism and contigentism. If truths about uninstantiation are contingent negatives then there is no *substantial* explanation for why these are zero-grounded. As Fine notes, the explanatory ground of contingent negative truths is just an empty set, a ground of zero conjuncts (2012: 48). Put simply, truths about uninstantiation are negatives that do have a metaphysical explanation,

only one not given in terms of other facts (whether fundamental or not), and whose truths do not rely on any existing truthmakers.

Third, and following from the second point, the zero strategy fits nicely within the dispositionalist framework. According to the metaphysics of dispositionalism second-order connected universals allegedly determine the pattern of instantiation. But if there are alien properties, and therefore alien powers, these powers exist *without* grounding any first-order physical facts. If Platonic dispositionalism is true, an alien power is a power that *never* determines anything in the physical pattern – it is, so to speak, powerless.

An explanation of the metaphysical possibility of an alien power occurring cannot, therefore, be given classically in terms of the power being connected at the second order level. This is in itself an important question, as it involves tricky situations about impossibility conditions in a power world. Yet our question for the present time is another, namely, what an alien power would *bring about* were it to be instantiated. Our question, however, is how that could come to be instantiated in the first place. Clearly, no existing power could be so powerful because that would entail a second-order connection between the former and the latter, which would make the latter *not* an alien power.

An alien power stands – to use a phrase of Bird's (2007) – outside the second-order relational structure through which all other universals are individuated. If this is so, it is no surprise that truths about uninstantiation are zero-grounded. Those truths are independent of the occurring of any positive facts, and so true independently of truthmakers. And yet they are not fundamental, as one might be tempted to think, because, unlike *worldly* powers, they are not ungrounded.

Unfortunately, I must leave a fuller analysis of the consequence of the zero strategy for future works, so let us summarize.

A solution to the paradox is now available, one that is based on the rejection of proposition (2). Tugby (2015: 32-33), alongside Cameron (2008: 262-264), argues that a rejection of (2) – (truthmakers) – is a price too high to pay, and we should only do it if we have little choice. Yet it seems we do. For consider alternative strategies.

Michele Paolini Paoletti (2016) has recently provided a tempting rehabilitation of negative properties, in conjunction to their role within the metaphysics of dispositionalism. Although I am sympathetic with the project of explaining negative truths in terms of the instantiation of negative properties, my intention is simply to urge those dispositionalists who resist the rejection of (truthmakers) to consider how less revisionary this alternative line of response is.

As such, my provisional conclusion is that, after all, the *zero* strategy is available at dispositionalists' convenience.

5.5.3 The Problem of Governing for Platonic Powers

In his "The Emperor's new Metaphysics of Power" (2013) Barker analyzes the second problem raised for platonic dispositionalists. Barker does not discuss the problem the way we presented it. Instead, he connects the alleged failure of the grounding claim to the more traditional inference problem affecting non-Humean theories of modality in general – including, for instance, the DTA account (Dretske 1977; Tooley 1977; Armstrong 1983). Barker's discussion is, I think, of great help in unpacking the second worry. Let me explain.

Barker distinguishes between two roles of powers: *constituting* and *governing.* Here I shall quote Barker at length.

> Role 1 (Governing Role): X holding of F and G determines that if F is instantiated by object x then G will be instantiated, (or will tend to be), by x or something related to x.
>
> Role 2 (Constituting Role): X holding of F and G enters into the constitution of F and G. The identities of F and G are fixed by their entering into X-relations.
>
> The governing role is to do with what *constrains instantiation* of properties F and G. The constitution role is to do with what *fixes the identity* of the properties F and G. (2013: 21) italic added.

Barker claims, correctly in my opinion, that the two roles are usually taken together. Yet distinguishing the two roles is useful to understand the second problem raised at the end of Section 5.4. If the grounding claim

interpreted along the line of Barker, it is indeed two claims, one about constituting identity, the second about *making* regularities the case. It is clear that the accusation only targets the second role. This is because platonic properties do succeed in fixing the identity of the instances at the first-order level – see again Section 5.4.

Interestingly enough, Barker suggests that, precisely because dispositionalism is a modified version of Armstrongian realism, it indeed suffer from the same problem: the inference problem. As van Fraassen famously observed (1989), metaphysical accounts of physical modality suffer from two problems. The first is the *inference* problem, the second the *identification* problem. The former affects non-Humeans; the latter is the problem that Humeans have of saying which prior brute first-order patterns count as laws. The inference problem, in our context of discussion, is about how prior modal facts *govern* events, how they *make for* physical regularities. Following Barker, let us call this the *governing problem*.

As far as we are concerned here, it is Sider that gives the best summary of the *governing problem:*

> "Calling "nomic necessitation" merely indicates that the entailment must exist. But why should some state of affairs in the lofty realm of universals, a fancy relation's holding between two universals, translate into hard facts below, facts about earthly particulars that fall under those universals?" (Sider 1992: 261).

Barker (2013), and Barker and Smart before (2012), rehearse the problem against dispositionalism. Clearly, if the Armstrongian picture suffers from the problem of governing, its modified version could suffer as well. Why, in fact, should we think the second order *full* ground – A,R(A,B),B – determines regularities in the distribution? The problem mentioned above is nothing more – and nothing less – than understanding in what a *modal force* consists of; that is what *forces* instances of B to follow into the world upon instances of A. So, here's the problem for platonic dispositionalists

The fundamental argument of dispositionalism is that powers metaphysically explain first-order physical regularities. According to (PTD) and (ITD) – tropes dispositionalism – the manifestation relation that fixes the identity of powers and the physical manifestation relation

realizing the regularity are identical. Therefore, unless self-explanation is accepted as tolerable solution, tropes dispositionalism does not fit the fundamental argument, and I hope to have shown that other serious worries pertain to the view. Neither (CID) nor (TID) will do either: despite the distinction drawn between the two relations, they make the former metaphysically dependent on the latter, in contradiction to the fundamental argument. The only option left for dispositionalism is to make the former *metaphysically independent* from the latter, which is precisely what Platonism allows dispositionalism to achieve. The problem with this strategy, however, is that Platonic properties lose all explanatory power: since they are now independent, they cannot be explanatory relevant for facts about regularities. They can ground the existence of facts about the pattern of instantiation, but they cannot *govern* their instances.

To review our options: we know that while it would evade this particular issue, *brute dispositionalism* creates more problems than it solves.[137] *Immanent dispositionalism* are ruled out. The view fails to account for what Barker call the constituting role and the governing role of powers. Only *Platonic dispositionalism* remains in play, yet it is, *prima facie*, in a better state: the constituting role is secured. But the view is ultimately in a bad state, (PD) meets (NM) only formally. In fact, the problem first presented by Van Fraassen was not meant to be (just) a formal problem, but also an issue regarding explanation.

What the *inference* problem asks for is an explanation of what (if anything) prevents physical regularities from failing to follow laws; what the *governing* problem asks for is an explanation of why regularities follow *from* laws (or powers). *Prima facie* it seems that refraining from engaging with this second question is a defeat for dispositionalists. If the notion of grounding is to play any serious role, it is *only* because the relation *at least* conveys the sort of metaphysical explanation required by the *fundamental argument* of dispositionalism.[138] The *fundamental argument* requires an answer to be given.

Or perhaps not. Schaffer has recently advanced the view that we do *not* in fact owe any such answer, since the entities posited to satisfy the

[137] Cf. Chapter Three (3.3.1-3.3.2) and Chapter Four (4.3.2)
[138] See again Chapter One (1.5).

fundamental requirement are enough to do the job (2016). Here I shall quote Schaffer at length:

> So it seems to me that the Inference Problem is based on a confusion. Thus imagine someone saying to the modalist who accepts the T axiom, "I cannot see how it could be absolutely impossible to have Box p but not p. How does your Box govern the truths?" Such a person has simply not understood that the modalist has posited something whose work includes underwriting this very inference via T. Or imagine someone saying to the metaphysical knowledge-firster who accepts Factivity, "I cannot see how it could be absolutely impossible to have Ksp but not p. How does your K dictate the truths?" Such a person has simply not understood that the knowledge-firster has posited something whose work includes underwriting that very inference via Factivity. Thus when Lewis (1983, 366) says to Armstrong: "I cannot see how it could be absolutely impossible to have N(F, G) and Fa without Ga", I reply that Lewis has not understood that Armstrong can and should stipulate that N is a relation such that Inference for DTA holds. (2016: 580)

A dispositionalist persuaded by Schaffer can argue that if it is in the business of powers to govern then there is no need to explain this further insofar as an axiomatic description of the rules of governing is given – and we already offered exactly that in Chapter One.

According to this Schafferian approach, life is simple for dispositionalists. It is in fact enough to bring the governing principle laid out in Chapter One – namely, 'given two properties a and b, and their instances, if a modal connection holds between a and b, if instance a occurs instance b will also occur', or something of that sort– and the inference problem, and therefore the governing problem, vanishes.

By accepting modal primitives in our ontology, we automatically accept also their governing role as primitives. It is therefore pointless, if not question begging, to ask for an answer to the *inference* problem, and therefore also pointless to ask for answer to the *governing* problem.

If we can make sense of Schaffer's argument we do have a provisional response to the governing problem. Unfortunately, I do not believe this a fruitful path to follow. In the next and conclusive section, I shall explain why. As it will be clear, much of the problems rest on the adoption of totality facts. I then also hope to better persuade the dispositionalist

reader that the *totality strategy* is to be avoided, since it loses its ontological support.

5.5.4 As Deep as Governing Needs to Get

According to Schaffer the non-Humeans need only include, in their theory, an inference principle in order to dissolve the inference problem. In the case of DTA, for example, $\mathrm{N} < \mathrm{F}, \mathrm{G} >$ needs to be supplemented with the appropriate inference principle $\mathrm{N} < \mathrm{F}, \mathrm{G} > \rightarrow (\forall x)(Fx \rightarrow Gx)$ (Schaffer 2016: 578). In short, if the inference problem is a *linking* problem then offering an inference principle is all that is required of non-Humeans.

Schaffer argues, correctly in my opinion, that the reason to accept his view is that if the primitive posit would not do the job it is supposed to do, then positing that primitive would be idle (2016: 580-2). This makes sense, yet the argument Schaffer employs to persuade the reader is unconvincing for a Platonic dispositionalist, and indeed for dispositionalists in general. Let us see why.

First, Schaffer's alleged solution to the inference problem is not property-based. Schaffer, in contrast with Tooley (1977; *inter alia*) or Armstrong (1997; *inter alia*), does not think that there is any special feature of universals that is involved with a solution to the inference problem (2016: 585). But dispositionalists *must* say that there is something about the universals that does the job: *as a matter of fact*, according to any dispositionalist physical modality can be explained *only* and *entirely* in terms of the modal nature of powers. On the other hand, the axiomatic solution does not even presuppose that properties exist.[139]

[139] One could object that we can use the same line of reasoning to reject our previously defended zero strategy. This is because, as with the Schafferian strategy, the zero strategy is not property-based. Yet I claim that a Platonic dispositionalist has no reason to be worried. The zero strategy, in contrast to the Schafferian strategy, has nothing to do with positive physical modality, for it is a problem of truthmakers for *negative* and not positive truths. As stated, I am sympathetic to the negative properties strategy recently explored by Paoletti (2006). Yet I just mention that my strategy is more parsimonious, as it dispenses with postulating negative (in addition to positive) truthmakers for negative truths.

Second, Schaffer's argument rests on the example case of modalism. While non-Humeans *can* be modalists, not all are, nor are dispositionalists to be counted as such. Schaffer himself acknowledges that the case of modalism and the case of second-order relations among universals are different (2016: 581). While modalism requires an axiomatic principle that guarantees entailment *only*, the second requires, in addition, a *production* principle.

The idea is that laws, powers, or whatever is predicated as having *modal force*, does not merely *entail* but also *produces* or *brings about* regularities (Maudlin 2007; Schaffer 2016). As Sider (1992), *inter alia*, puts it, the validity of the inference from powers to regularities is not enough to make the view attractive; we need "not only the inference preserved, but its nature explained" (1992: 267). This point is sensitive for dispositionalists, who owe us an explanation of why, given second-order connections *entailing* first-order regularities, some regularities are realized (or produced) while others go unrealized (or unproduced). As mentioned regarding consideration one, the point seems to be that the theory must not be just intelligible *but also* informative.

The following is how someone who is Schafferian about the governing problem can respond.

According to the criticism given above, the Schafferian solution fails to deliver the explanation that the fundamental argument requires. More specifically, it fails to explain why some regularities are realized while others go unrealized.

Surely, however, this is asking too much from dispositionalism! The fundamental argument of dispositionalism is (more modestly) that, given certain second-order manifestation relations among universals – understood as Platonic, based on our findings thus far – only one pattern of instantiation is possible, because the pattern is metaphysically determined by those prior facts. It is *not* about why this is the only possible pattern, that is, why there are the powers that there are.

This is particularly clear if we view the problem through the lens of those who investigate the ontology of powers in a dynamic or Aristotelian way (Jacobs 2007; Groff 2013; *inter alia*). Those, in other words, who take the

metaphysical determination of the pattern of instantiation as a diachronic rather than a synchronic affair.

Recall Jacobs' claim that "the world unfolds as it does because of the way it is intrinsically" (Jacobs 2007: 129). According to this view a power theory of possibilities must explain why, given modal facts and initial conditions, the four-dimensional distribution of properties develops in time as it does. Yet it does not have to explain *why* there are the initial conditions that there are. That is a brute fact. Surely, no version of dispositionalism examined so far – apart from Platonic dispositionalism, perhaps – could attempt a metaphysical explanation of the initial conditions. Even if such an explanation were available, however, it would not be needed. As Schaffer says: "the non-Humean is positing laws whose business it is to govern, end of story. That is as deep as "governing" gets and as deep as it needs to get" (2016: 586).

We cannot but concede the point. Yet let us make clear what the Schafferian is doing: she wants to adhere to (NM), meaning that she wants to maintain the claim that "powers ground natural modality", but at the same time she denies that we require an additional explanation for what *makes* regularities the case. A Schafferian dispositionalist could claim that while (NM) is true, not all cases of grounding are cases of explanation. So in spite of the fact that (A,R(A,B),B) grounds the pattern of instantiation, some facts about the pattern – like the fact that B is manifested – are grounded but *not explained*. At most, these are cases in which grounding supports explanation.

Let us look yet more closely at what is assumed here. Platonic dispositionalists that adopt this strategy need to assume, together with (P) and (NM), an additional claim about the nature of grounding. They can say that cases such as those mentioned above either are lacking an explanation, or that they are cases in which the explanation is *not only* cashed out in terms of powers and second-order manifestation relations, but in terms of some additional element. To appreciate the difference between the two responses let us examine them one by one.

The first is committed to the claim that unionism is false. According to unionism grounding is explanatory *by nature*, hence every instance of grounding is an instance of explanation. Put simply, grounding *is*

metaphysical explanation. On the other hand, those who deny unionism – let us call them *separatists* – claim that at most grounding *backs* explanation, but grounding and explanation nevertheless remain distinct (see Raven 2015). Therefore, if the Schafferian response is plausible it is only on the assumption of separatism. As such a Platonic dispositionalist *must* defend not only (P) and (NM), but also (separatism) as a *substantive* claim about dispositionalism.

However, there are no reasons why the truth of dispositionalism should in principle be dependent on the truth of separatism. This would be surely too revisionary. After all, dispositionalism is agnostic over whether all grounding relations are explanatory: all it requires is for grounding to bear some relation to the notion of explanation, such that we can offer a dispositional explanation by tracking grounding relations.

The second response is connected with the *totality strategy* introduced in the former section. Recall the *conditional governance* view discussed in Chapter Four and mentioned again in the last section: Platonic dispositionalists can say that some facts about the pattern of instantiation are grounded by powers yet explained by second-order facts *plus* some other facts. Assuming that the grounding relation does not *fully* explain the manifestation of a power, we are not led into any (meta)metaphysically loaded commitment, either separatism or unionism.

If this response succeeds in being both intelligible *and* informative, then we should concede to the Schafferian dispositionalist that they have a strategy to deal with the governing problem. They can maintain that by positing powers and their second-order manifestation relations as *full grounds* for first-order facts, the inference principle guarantees that the former entails *and also explains* the latter. Unfortunately, I shall show in the following few final paragraphs that this is not the case and that we have very few motivations (if any) to adopt totality facts.

According to what has already been said about the conditional governance (CG), a Platonic dispositionalist can argue that the grounding base does its job of *bringing about* the first-order physical instance only if condition C obtains as part of the base. Thus, for instance, the fact that <power A manifests> is grounded in the existence of powers, a

manifestation relation, and a set (c) of facts about stimuli that are necessary for that particular manifestation to obtain. The set (c) of conditions guarantees that the physical regularity is explained *and* entailed by its grounding base. Let us make this clearer with an example.

Suppose that there is a departmental office that contains three philosophers: Andrea, Lewis, and Jacob. Each of them likes metaphysics. So, the fact that Andrea likes metaphysics, Jacobs likes metaphysics, and finally that Lewis likes metaphysics, *grounds* the fact that every occupant of the room likes metaphysics. Yet, it does not follow that Andrea, Lewis, and Jacobs liking metaphysics *entails* that every occupant of the room likes metaphysics. There could be some worlds in which Andrea, Jacobs, and Lewis are occupants of the room and all like metaphysics, and yet, given that there could be a fourth occupant – Aimee – it is false that all the occupants in the room like metaphysics (As a matter of fact, our new office is indeed open to other peers.) Therefore, in order to secure the entailment, we have to add a condition according to which Andrea, Lewis, and Jacobs, are the *only* occupants of the room (see Mellor 2003: 213-15).[140]

Likewise, it seems that we have to include in (c) not only facts about stimuli, *but also* any other facts that secure the entailment. For instance, facts about the manifestations of those stimuli, and the stimuli for those as well, and so on, for these are all relevant in explaining how A manifests. Not only that, it seems we have to include facts about the existence (or non-existence) of preventers for the manifestation of A. Put simply we need the *totality fact* that such-and-such property instantiations are *all that there are*, or something of that sort.

Note, however, that in order to secure the *linking* between the grounding base and the physical regularities it purports to ground, we have just removed our ability to offer a response that is both intelligible *and* informative. Let us see why.

Minimally speaking, dispositionalism requires grounding to bear some relation to the notion of explanation such that we can offer a dispositional

[140] Here I have merely adapted Mellor's criticism (2003) against truthmaker necessitarianism. Mellor is not the only critic of this view: others are Parsons (1999), Heil (2000), and Schaffer (2010). Recently Mellor seems to have changed his view, however (2009).

explanation by tracking grounding relations. Thus, the minimal feature that needs to be secured is that, if the grounding base grounds physical regularities, the grounding base is also at least *explanatory relevant* for those regularities. Here we are just assuming that, if grounding is explanatory in the sense required by this solution, then grounding must be non-monotonic like all explanatory relations (Rosen 2010; Raven 2012; Trogdon 2013).[141]

Yet the alleged solution seems to include other things beside what is relevant for the explanandum, and thus violates non-monotonicity. For now, that we have included a totality fact of some sort within the grounding base, it seems we have a grounding base that includes, within the totality facts, some explanatorily irrelevant facts. Indeed, if the explanation for why second-order facts *make*, *bring about*, or *produce* regularities includes *every* worldly fact that supports the explanation, then we should be suspicious over whether the explanation in question is *really* relevant and therefore informative.

In contrast to negative truths and negative facts, contingent positive facts such as those discussed so far cannot be true by default either, on pain of vacuous explanation of the physical. To avoid the problem, we should guarantee that the conditions necessary for the grounding base to do its job are appropriate, that is, *explanatorily relevant* to what is grounded – i.e., physical regularities. Perhaps I am overlooking something, but I see no way this could be achieved without compromising the *informativeness* of the explanation.

My provisional conclusion is that the response provided by the Schafferian dispositionalist does not succeed in offering a response to the *governing* problem which is both intelligible and *informative*.

I thus offer no false hope to the reader who is so far persuaded that it is on Platonic grounds that we can defend dispositionalism. In fact, it is on the battlefield of the *governing* problem that I confess I should halt my campaign; for so far, I admit, I have no *conclusive* strategy.

[141] Let me be clear here. By saying that grouding must be monotonic we are not assuming unionism. We are not claiming that grouding is identical with expanation, but the milder claim that grounding share formal properties with explanation. One of which is non-monotonicity.

Disappointingly, all Platonic dispositionalists can do is stand their ground and maintain, as suggested in the last section, that the governing problem is not a problem directed specifically against (Platonic) dispositionalism and, as such, cannot be used to dismiss the view. To what extent Platonic dispositionalists are, or should be, happy with this response I am not sure – speaking only for myself, I know I am not satisfied. But the task of finding a better response I leave to a future work.

5.6 Conclusion

In this, the final chapter, my goal was to motivate the adoption of Platonic dispositionalism (PD). I have discussed two versions of Platonism, rejected two meta-ontological worries related to Platonism, and presented several positive reasons to adopt the view. In short, I hope to have shown that dispositionalists should be Platonists if they are to be dispositionalists at all. Yet (PD) does not come without problems, of which I have discussed two: the *negativity problem* and the *governing problem*. While I offered a response to the former, I admittedly did not offer any conclusive strategy for defending against the *governing* problem. Now, the governing problem is not an argument against Platonic dispositionalism *in particular*, and therefore we should bear in mind that it would be uncharitable to *prima facie* dismiss the view on that basis. But if Platonic dispositionalism is to be the best dispositionalist theory of possibility it must confront this problem, and as long as this challenge is left unmet then Platonic dispositionalism remains a flawed option – even while it is the only one available to us. In the absence of a satisfactory response to the problem we might say that the theory is *intelligible*, but not *informative*.

Final Remarks

As I said in the Introduction to this work, there is a rather rich range of interesting dispositional endeavours. During my PhD I made contact with a great number of scholars working on dispositionalism, many of whom, whether directly or indirectly, have contributed to the shape of my research question. Yet despite the fact that much of my findings are purely negative in nature, the motivation behind this work was and is to contribute to and advance the debate regarding the theory of Dispositionalism, and anti-humean theories of modality more in general.

My understanding of dispositionalism is reduced to its minimal, yet, I argue, core elements. Dispositionalism is first and foremost a property-based theory of modality.

The work dispositionalists ask of properties is, however, far from usual. Properties are asked to not (only) ground facts about resemblance, or to account for our semantic expressions – as the orthodoxy might suggest – but also to ground facts about natural, or *physical*, modality. Those who advocate the view maintain that actuality and possibility are somehow indissolubly connected, and that this connection holds in virtue of the modal nature of properties. The ontology of dispositionalism is an ontology that postulates, *primus inter pares*, properties with modal nature (P). Dispositionalists call these properties powers, mostly because of the role they play in doing what it is said they should do: explaining (natural) possibilities. The fundamental argument of dispositionalism is that these powers ground natural modality and that facts about the first-order physical level are not brute facts but are open to metaphysical explanation (NM).

As I argued, it is on this basis that the theory must be defended. In fact, despite the fact that dispositionalists are united in this commitment against their neo-Humean opponents, they lack a common understanding of what are powers, what their explanatory import is, and how exactly they govern or determine physical facts. This lack of clarity

is the main problem for the view and stands in the way of its future development.

If dispositionalism is defeated here, the theory failing to marshal its forces behind its core claim, then *the entire campaign is kaput*. Fortunately, if I am right, dispositionalism emerges the victor. Indeed, the conclusion of my work is that there is an adequate dispositional ontology, and that is Platonism. Stronger still, I conclude that *dispositionalists must be Platonists if they are to be dispositionalists at all*. This I take to be the central contribution of this work.

In Chapter Two I examined *causal dispositionalism* (CD) – the view that powers are properties with a causal nature, and that this nature explains causal patterns at the first-order level. I have distinguished between two versions of causal dispositionalism: the *compositional view* (CV) and the *processual view* (PV). Nevertheless, both versions fail to provide a satisfactory account of powers-based causation. Since they offer no theory that satisfies the claim that powers explain efficient causation, it seems that recent complains about the current "overpowering" trend (Bird 2016) are justified.

In Chapter Three I distinguished between two versions of the tropist ontology: *pure tropism* (PT) and *impure tropism* (IT). Regardless, I have argued that the combination of trope ontology – whether (PT) or (IT) – and dispositionalism (D) is neither coherent nor desirable. We must therefore abandon the project of trope dispositionalism, whether in its (PTD), (ITD), or *powerful qualities* form (PQ). In Chapter Four I examined whether the combination of immanentism and dispositionalism – *immanent dispositionalism* (ID) – is viable. I distinguished between two versions of the Armstrongian ontology, *combinatorial immanentism* (CI) and *Tractarian immanentism* (TI), and concluded, yet again, that the combination of immanentism and dispositionalism is neither coherent nor desirable, and that we must, therefore, abandon the project of immanent dispositionalism whether in its (CID) or (TID) form.

It is in Chapter Five that I finally analyzed the ontology of Platonic properties and laid out my defence of Platonic dispositionalism. While I consider this, as I say, to be the main contribution of the work,

nevertheless during the journey the analysis brought to light various other minor, yet no less interesting, findings.

Firstly recall *brute dispositionalism*. While I suggested that this version has unfortunate implications (see Chapter Three and Chapter Four), it is still an option, at least *nominally*, for foes of Platonic properties. And indeed, given that brute dispositionalism is property-theory independent – being compatible with both tropism and immanentism – brute dispositionalism is also a non-ad hoc view which we should give a hearing. It is, if you like, a form of *minimal anti*-humeanism. Whether we have *positive* reasons for holding brute dispositionalism is a discussion that I leave to future works.

Secondly, and perhaps more interestingly, there is the role of immanent properties in non-Humean theories of modality. As discussed, within the dispositionalist camp the majority of scholars are content to combine that metaphysics with the ontology of immanent universals. Nevertheless, I have shown that the adoption of immanentism brings unacceptable modal consequences for dispositionalism – and *not just for dispositionalism*: the grounding problem for immanent powers has consequences beyond that theory. Recall the DTA account of nomological modality discussed in Chapter Four. According to this account, nomic relations hold between immanent universals, N [F.G]. As Barker has already noted (2013), the only difference between nomological modality and dispositionalism is that N is contingent and thus does not fix the identity of the properties, which are, according to the former view, quiddities. It remains the case that immanent properties must have the same grounding profile for the second-order facts to make or bring about physical regularities. And yet, if the argument presented in Chapter Four is correct, the unacceptable modal consequences of immanent properties will occur *for any non-Humean theory* that requires of them some explanatory work in physical modality.

Thirdly, as we dealt with *meta-ontological* issues two findings emerged form our discussion (see Chapter One and Chapter Five respectively). Firstly that although we should be careful about adding primitives to our metaphysics, the adoption of modal primitivism does not offend against ideological parsimony. In fact, the benefits of parsimony *per se* do not entail that any theory that is less parsimonious is also less acceptable. Moreover, even if we assume that there is an ideological cost associated

with the introduction of modal primitives, there is no reason why the cost cannot be borne ontologically. Second, and in contrast with the general sentiment, the adoption of Platonic universals *per se* – independently of whether in conjunction or not with dispositionalism – does not offend against metaphysical naturalism. I have argued that nothing about Platonism, and most importantly nothing about current theories of space-time, entails that Platonic properties are "outside" the spatiotemporal domain. Moreover, I have argued that the Eleatic test either fails to exclude the existence of Platonic properties, or else it compromises the acceptability of causal properties *per se*, whether tropes, Platonic, or immanent properties. I therefore urge advocates of the Eleatic test to reconsider the meta-ontological use of the principle. Finally I have argued that, when taken in conjunction with dispositionalism, some aspects of the Platonic ontology of properties actually bring meta-ontological benefits. Indeed, if Platonic dispositionalism is adopted then ideological parsimony is achieved, without increasing ontological commitments.

Fourth, and following the previous point, recall the view known as *causal dispositionalism.* This novel and intriguing causal theory extends the explanatory project of dispositionalism, using its core claim to offer a robust realist conception of causation based on powers. The enquiry of Chapter Five suggests that, while many philosophers of science and causation coming from otherwise different perspectives seem to envisage a benefit to postulating real powers as physical causes, the view, both in its (CV) and (PV) versions, fails to provide a clear account of the composition of causes. Therefore, it fails to meet the promised explanatory power, the expectation of which grounds much of the interest in the view.

It is also worth mentioning what I would have liked to discuss in greater detail but was unable to due to lack of space.

First, I would have liked to say more about what dispositionalists ought to think particulars are. Dispositionalists could hold the view that particulars are bundles of properties, or rather they could hold an ontology of states of affairs. Or they can go more radical: novel directions in the application of dispositionalism to the philosophy of science shows that the metaphysics is also compatible with a version of structural realism, that dispenses with the traditional understanding of powerful

particulars (see Esfeld 2009; Dorato & Esfeld 2009; Dorato & Esfeld *forthcoming*; *inter alia*). Whether or not dispositionalists need particularity in the picture is a question that, I believe, is far from being settled.

Second, I would have like to have discussed, together with Armstrong, Marmodoro's immanent ontology. In fact, it is worth noticing that the results of Chapter Four only count against immanent properties traditionally conceived; the chapter is silent over the more ancient ontology of immanent properties. Perhaps, then, not all is lost for immanent dispositionalism (although, as discussed in the chapter, the adoption of Marmodoro's immanent ontology within contemporary metaphysics is not met without resistance).

Thirdly, I would have liked to contribute to an answer to the problem of the composition of potentialities, discussed in Chapter 4. Albeit non-relationalists *a la* Marmodoro have, prima facie, the green light, much work is required for a theory of powers composition. First, the theory should provide a clear understanding of *powers parts.* If my analysis is correct, the contemporary notion of *proper parts* does little to explain what kind of parts powers are. Yet, CEM is not the only mereological theory at hand. It is business for future work to determine to what extend medieval theory of mereology can offer a suitable understanding of powers parts. Second, the theory should provide a clear account of parthood relations between powerful parts and powers wholes; a theory that, minimally, is able to offer insights in the structure of potentialities. Unfortunately, nothing of that sort is on the horizon. Part of my future plan of research is devoted to remedy this.

Fourth, and finally, I would have like to engage more with problems of the metaphysics of science. This will constitute the core of my forthcoming line of research, and so I shall not say any more about it here – only that it is my intention to develop and provide arguments in favour of a Platonic account of physical modality, thereby establishing Platonism as a genuine alternative in the metaphysics of science.

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