

Potentialities as properties

Jennifer McKittrick

Abstract: In *Potentiality: From Dispositions to Modality*, Barbara Vetter attempts to ground modality in properties that she calls “potentialities”. Whether potentialities are up to this task depends on what *properties* are. However, major accounts of the metaphysics of properties, such as Class Nominalism, Trope Theory, Immanent Realism, Platonism, are incompatible with Vetter’s claims about potentialities. Nevertheless, a modified account of potentialities might be compatible with Immanent Realism or Trope Nominalism.

Keywords: disposition; potentiality; power; property; universal; trope; nominalism.

1. Introduction

In *Potentiality: From Dispositions to Modality*, Barbara Vetter attempts to ground modality in dispositional properties that she calls “potentialities”.¹ Potentialities are said to have a number of features intended to make them suitable for this job. Seeing as potentialities are properties, whether they can do this work depends, in part, on what properties are. While Vetter makes a few suggestive remarks in her book, she gives little consideration to the question of which theory of properties is compatible with her claims about potentialities. In this paper, I explore a worry that no major approach to understanding properties is compatible with the claims that Vetter makes in *Potentiality*.² I suggest a modified account of potentialities that might be compatible with Immanent Realism or Trope Nominalism, then close by considering two objections to my proposal.

2. Vetter’s Account of Dispositions and Potentialities

Vetter introduces potentialities by way of the more familiar notion of dispositions – properties like fragility and solubility. On the standard conception

¹ Others use “potentiality” in other ways. Here, I focus on Vetter’s stipulated use of the term, and make no claims about potentiality in general.

² This chapter expands on points that I made in McKittrick 2019.

of dispositions, they are associated with conditionals. This association can be as strong as defining dispositions in terms of conditionals. That is to say, for example, “x is fragile” means (roughly) “if x were struck, x would break”. According to a simple conditional analysis:

“x has a disposition to manifest M in a certain stimulus condition C” =_{df}
 “If x were in C, then x would manifest M”.

As many have before her,³ Vetter rejects the semantic reduction of disposition ascriptions to conditional statements. Manley and Wasserman are among the other theorists who also argue against standard conditional analyses (Manley and Wasserman 2007). They point out that some dispositions such as loquaciousness seem to have no stimulus conditions. In those cases, it is not clear what the content of the antecedent of the associated conditional could be.

In addition to the missing stimulus issue, Manley and Wasserman make three interrelated observations about disposition ascriptions which Vetter picks up on. First, disposition ascriptions are context-sensitive.⁴ A wooden beam that is called “fragile” on a construction site would not be called “fragile” in an antique shop. Any analysis that specifies one stimulus-manifestation pair to correspond to “fragile” in one context renders the wrong result in other contexts. Second, disposition ascriptions can be comparative. A wine glass is more fragile than a coffee mug. Any analysis that associates the same conditional with the wine glass’s fragility and the mug’s fragility cannot do justice to such assertions. Third, the applicability of a dispositional predicate can be a matter of degree because they are “gradable”. Some things are “extremely fragile” while other things are “somewhat fragile”. Conditional statements, on the other hand, do not admit of degrees of truth (on most standard logics). If an analyst were to translate all disposition ascriptions in terms of pairs of circumstances and manifestations, they would have to find a pair for every degree of fragility, as well as pairs for every degree of every other gradable dispositional predicate.

In light of such problems, Manley, Wasserman and others argue that dispositions are connected to conditionals in more complex ways.⁵ Vetter, on the other hand, rejects the association between dispositions and conditionals entirely. Instead, she claims that disposition ascriptions are possibility statements. On her account “x is breakable” means roughly “x can break”, with no stimulus specified. While Manley and Wasserman propose a Proportionality

³ For example, see Martin 1994 and Bird 1998.

⁴ There are dispositional theories that hold that dispositions are context-independent properties (e.g. Mumford and Anjum 2011).

⁵ For example, see Lewis 1997; Bird 2007; Contessa 2013; McKittrick 2018.

Account according to which disposition ascriptions implicitly reference a contextually determined adequate proportion of possible circumstances, Vetter looks for mind-independent, context-neutral properties as the truth-makers for such statements. According to Vetter, if someone thought that context-sensitive terms such as “fragile” denote properties, then

they would have to countenance context-sensitive properties. But reality is not context-sensitive. Context-sensitivity is a matter of language, not the world. Context-sensitive expressions receive different semantic values in different contexts of utterance; reality provides the semantic values [...] (Vetter 2015: 80)

For Vetter, the metaphysical background in virtue of which disposition ascriptions are true is constituted by potentialities. Potentialities are disposition-like properties that are individuated by their manifestations. They are irreducible and metaphysically basic: While some potentialities are grounded in other potentialities “as we progress from the less to the more fundamental levels, we will always find potentialities. It’s potentiality ‘all the way down’” (25).⁶ For example, salt is soluble because its sodium and chlorine atoms are held together by ionic bonds, and being ionically bonded is grounded in electric charge, so arguably solubility is grounded in electric charge. If electric charge is absolutely fundamental, then it is an irreducible and metaphysically basic potentiality. But even if it is not fundamental, it is grounded in further potentialities, on Vetter’s view. While Vetter refrains from making claims about absolute fundamentality, the view she is clearly rejecting is one in which something has a potentiality in virtue of other facts that do not involve potentialities. There is no kind of ontological entity more fundamental than potentiality, for Vetter.

In addition to being context-independent, potentialities differ from dispositions in a number of other ways. Ordinary disposition ascriptions typically suggest that the occurrence of the manifestation is highly likely, but not certain. For example, while it is not metaphysically impossible that I become a drug dealer, I would not say that I am “disposed” to become a drug dealer.⁷ Furthermore, while I may be necessarily self-identical, I would not say that I am “disposed” to be self-identical. Potentialities, on the other hand, come in a wide spectrum of degrees, meaning that the likelihood of their manifestations ranges from not impossible to necessary (21). The part of the spectrum where dispositional ascriptions are usually appropriate typically ranges over the upper half, but short of necessity. This picture nicely accommodates the fact that dispositional predicates are gradable. Because a potentiality comes in

⁶ Numbers in brackets, unless otherwise specified, refer to *Potentiality*.

⁷ Thanks to Edward Becker for this example.

a wide spectrum of degrees, it is a determinable property and all of the specific degrees to which it can be possessed are its determinates (43, 95). A sturdy crowbar has some degree of breakability because it is not unbreakable. A fragile glass and a sturdy crowbar have different determinates of the determinable potentiality breakability.

Intuitively, if specific dispositions are determinates of determinable potentialities, and potentialities are more fundamental than specific dispositions, then potentialities are determinables which are more fundamental than their determinates. Several statements from Potentiality demonstrate Vetter's commitment to this view:

1. "*Potentiality comes in degrees*" (emphasis mine, 95).
2. *A potentiality is a determinable and its degrees are its determinates*: "We can think of that relation [between a given potentiality and its various degrees] again, on the model of the relation between height and the particular heights: that is, as a relation between a determinable and its determinates" (95).
3. *A disposition is a degree of a potentiality*: "having a disposition such as fragility is a matter of having the right potentiality (in this case the potentiality to break or be broken) to a contextually sufficient degree" (22).
4. *Therefore, a disposition is a determinate of a determinable potentiality*.
5. *Potentialities ground dispositions*: "The notion of a potentiality has been introduced as the metaphysical background to the context-dependent notion of a disposition" (96).
6. *The dispositions which are grounded by a potentiality include the dispositions which are degrees of that potentiality*: "having a disposition such as fragility is a matter of having the right potentiality (in this case the potentiality to break or be broken) to a contextually sufficient degree" (my emphasis, 22).
7. *If A grounds B, then A is more fundamental than B*: "the more fundamental grounds the less fundamental" (23).
8. *Therefore, determinable potentialities are more fundamental than their determinate dispositions*: "the general dispositions are not only equally fundamental as the specific ones, they are *more* fundamental" (57).⁸

While I will take issue with this conclusion later, I do not take this argument to be a *reductio ad absurdum* of Vetter's view, but merely an explication of what is implicit in the text which I believe she would endorse. Other remarks are

⁸ It is not clear from the context of this quote whether it applies to determinables and their determinates as well as single and multi-track dispositions, and so the rest of the argument above is necessary to establish this conclusion.

also suggestive. She asks rhetorically “why should the maximal determinate potentiality be more natural than its determinable? [...] Simply stipulating the one to be more natural than the other is ad hoc” (287). (Note that “more natural than” tracks “more fundamental than” as well as “grounds” (29).)

3. *Theories of Properties*

3.1. Vetter’s Remarks

Since Vetter’s book *Potentiality* does not include a lengthy discussion of the metaphysics of properties, we can quickly examine most of what is written there on that topic. In articulating her background assumptions, Vetter writes:

I will be maximally liberal about which properties there are. The properties that there are include the properties of: being electrically charged and being fragile, being green and being grue, being self-identical and being identical to me, and being such that grass is green. Some of these properties, to be sure, are more natural than others. [...] In general, possession of the more natural properties grounds possession of the less natural ones, thus we might equally speak of more or less fundamental properties. [...] I do not take the fact that a property’s instantiation is grounded in the instantiation of other properties as a reason to reject the grounded property – on the contrary. (29)

She goes on to speculate that her claims about non-natural properties can be reformulated by those with more austere preferences (30). Consequently, this non-committal liberalism about properties places few constraints on which metaphysics of properties that she can employ. However, Vetter makes other remarks that are more suggestive:

I assume that there are properties, and that a property is the kind of entity that different particulars can share. When two apples are both red, then there is a property that they both possess, the property of being red. Accordingly, different things can share a potentiality for the same property: the sheets of paper in this book all share the potential to burn. (29)

Furthermore, she assumes that “there are properties, in the sense of universals that can be multiply instantiated” (270). I’ll call this view “Aristotelian” or “Immanent” Realism, according to which two things that have the same property literally share a single entity – the universal.⁹ It contrasts with a Platonic or

⁹ While I follow Vetter in calling this view “Aristotelian”, I leave it to scholars of Aristotle to debate whether Immanent Realism is accurately attributable to Aristotle.

Transcendent Realism according to objects instantiate properties by standing in relations to universals that exist elsewhere. Vetter resists Platonism, writing “[a] Platonist approach [...] goes against the motivation of this book: the idea that modality is ultimately a matter of how objects, in the ordinary, concrete sense, are” (270). However, like her liberalism about properties, Vetter regards her preference for Immanent Realism as a non-issue for the purposes of her current project. She speculates that her theory of potentialities is consistent with certain forms of Nominalism, according to which universals do not exist. She writes:

Nominalists about properties have different strategies in dealing with our ubiquitous talk of properties shared by things. One is to claim that when we say that two apples share a property, what we say is not in fact true, but something similar is (the two red apples have more or less exactly resembling tropes, or they are both members of the same class of particulars that resemble each other in a certain respect). Another is to claim that what we say is true, but analyse away the apparent appeal to shared properties (what we really say is that things have resembling tropes, or that they belong to the same class). I suspect that both strategies could be applied throughout the book, making only slight alterations to my central claims and arguments [...] But at the moment, I have no more than that suspicion to offer to the nominalist. (29)

My goal is to scrutinize Vetter’s suspicion, and whether any familiar account of properties is consistent with her theory of potentialities.

3.2. Nominalism

According to Nominalists, either properties can be accounted for without appealing to universals, or properties need not be accounted for at all. According to Vetter, Nominalists say that claims about objects sharing properties are ways to talk about something else – the talk of shared properties is, as she says, “analyzed away”. So, if potentialities are properties, Nominalists must analyze away talk of shared potentialities. It is not clear how this could be consistent with Vetter’s claim: “I assume non-reductive realism about potentiality [...]. dispositions, or potentialities, are metaphysically basic, primitive, irreducible” (24), and giving up on this assumption strikes me as more than just a slight alteration of her central claims. Let’s look at a few varieties of Nominalism in more detail.¹⁰

According to Predicate Nominalism, two objects share the same property if the same predicate applies to them. According to Concept Nominalism, two

¹⁰ For a survey of varieties of nominalism, see Armstrong 1978 and Rodriguez-Pereyra 2016.

objects share the same property if they fall under the same concept. On either view, there is nothing about the objects in virtue of which this is so, since that would suggest that the objects share a property, and such claims are to be reduced to claims about predicates or concepts. One problem for Vetter's realist approach to metaphysics is that concepts and predicates are part of contingent human psychological and linguistic practices which vary across time and place. Talk of "merely possible" predicates or concepts might seem to do some work, but remember that Vetter wants to ground possibility in potentialities of actual objects. On Vetter's view, for a predicate to be possible is for something to have a potentiality for that predicate to exist. If potentialities are properties, and properties are analyzed in terms of possible predicates, and possible predicates are analyzed in terms of potentialities, then the analysis might be problematically circular. Realism about potentialities is difficult to square with Predicate or Concept Nominalism.

According to Class Nominalism, properties are classes of objects. For an object to have a property is for it to be a member of a certain class. Again, there is nothing about the objects in virtue of which they are classed together, for that would suggest that they share a property, but that just means they are in the same class. According to David Lewis (1983), any class of possible objects, no matter how heterogeneous its members, is a property. Some properties are special ("natural") because the predicate "__is a natural class" applies to them. But since this predicate of classes cannot be analyzed in terms of shared properties, it is taken as primitive.

Vetter suggests that Class Nominalism is consistent with her views. However, there are problems with taking Vetter's potentialities to be natural classes of objects. If we take the Lewisian approach, classes are sets. Sets necessarily have the members that they do, and set membership is all or nothing, not a matter of degree. A wine glass is more fragile than a coffee mug, but it makes no sense to say that it has a greater degree of membership in the set of fragile things than the coffee mug does.

How could a Class Nominalist interpret Vetter's claim that "Like height, potentiality comes in degrees" (95)? Perhaps matters of degree can be explained in terms of subsets. Suppose that a determinable potentiality 'breakability' is a large set of all-but-unbreakable objects, and different determinate breakabilities are subsets of this large set. This doesn't get us gradability, since being in a set with other things that are equally breakable does not entail anything about a thing's breakability with respect to anything else. More work needs to be done by the Nominalist fan of potentialities to cash this out. One suggestion is that the super-set partitions naturally into certain subsets, and those subsets are ordered. This ordering of the subsets licenses a loose manner of talk of

ordered membership in their union (which is identical to the determinable property, on this suggestion).¹¹ However, while this sounds like a promising approach for a nominalist account of determinable quantities, it is in tension with Vetter's claim that potentialities are fundamental. One of the defining characteristics of potentialities, gradability, would turn out to be a merely loose manner of speaking about a relations between a potentiality's subsets. Alternatively, quantities can be grounded in proportionality relations, or explained in terms of certain relational predicates (Eddon 2013). But according to Maya Eddon, on such accounts "all facts about quantity are ultimately grounded in relations among objects" (Eddon 2013: 12). So, if potentialities were nominalist quantities, they would be grounded in relations among objects, and this would make those relations more fundamental than potentialities. This is inconsistent with Vetter's claim that potentialities are fundamental.

Furthermore, if Vetter adopted Class Nominalism, she would confront the challenge of distinguishing co-extensive properties. For example, if it turns out that everything that can possibly be broken is the same set as everything that can possibly burn, then breakability and inflammability would be the same potentiality. This familiar problem for Class Nominalism is especially salient for Vetter because a great many potentialities have extremely inclusive extensions: The only particulars that are outside of the extension of the 'potentiality to be F' are those particulars that are necessarily not-F. Furthermore, on Vetter's view, everything has the potential to be self-identical, to be such that triangles have three sides – to have any property that everything necessarily has. If Vetter embraced Class Nominalism as well, there would be but one necessarily possessed potentiality – the class of everything. So, 'the potentiality to be self-identical' would be identical to 'the potentiality to be such that triangles have three sides,' as well as all of the rest.

Some philosophers differentiate contingently co-extensive properties by appeal to merely possible objects (Lewis 1983). On this Lewisian approach, even if two properties happen to have the same extension in the actual world, they have different extensions across possible worlds, and this differentiates the properties. However, taking this approach would be problematic for Vetter. If a potentiality is a property, and a property is a set of possibilia, then potentialities are not well-suited to ground all of modality. Furthermore, Class Nominalism has trouble explaining causal powers. Having a potentiality means that an object can do things – that it is powerful. I doubt that a fan of potentialities would endorse the idea that being a member of class could enable an object to do anything that it couldn't already do.

¹¹ I owe this suggestion to Nick Jones.

Vetter also suggests that her view is compatible with Resemblance Nominalism – the view according to which properties are classes of objects that resemble one another. This view is similar to Class Nominalism in that it identifies properties with classes. Consequently, Vetter’s difficulties for adopting Class Nominalism noted above apply here as well: It is unclear what it would mean for a class to come in degrees; there could be no distinct co-extensive potentialities, and class membership is a problematic source of causal power. To these problems, Resemblance Nominalism adds a few more. Famously, the Resemblance Nominalist cannot define resemblance in terms of shared properties, and thus has difficulty explaining what it means for objects to resemble each other “in a certain respect”. Lacking an account of resemblance, Resemblance Nominalism cannot explain how determinate degrees of the same potentiality *imperfectly* resemble each other.

Another nominalist position that Vetter entertains is Trope Nominalism. Tropes are particular property instances, such as this page’s whiteness. General properties are classes of similar tropes, such as the class of all particular whitenesses of the same shade. Similarity must be taken as primitive for reasons which should be familiar by now. Applying this theory to potentialities, there is no obvious problem with saying that a glass’s specific degree of fragility is a determinate degree-of-potentiality trope. But recall, potentialities are determinable. If Vetter were to adopt Trope Nominalism, would she say that the same potentiality trope is both a determinate fragility trope and a determinable breakability trope? Or does the glass have determinable breakability in addition to its specific fragility? A single trope is not the kind of thing that comes in degrees, and for reasons similar to those raised above, it is not clear what it would mean for a set of tropes to come in degrees.

One possibility is that a set of similar fragility tropes is a property which is a determinate degree of breakability and a subset of determinable breakability. Then the glass’s fragility trope would be both an instance of a determinate fragility and determinable breakability in virtue of being a member of both sets of tropes. But it is not clear what other tropes would be included in a determinable set, since Trope Theory does not explain imperfect resemblance. By analogy, we might want to include a scarlet trope and a crimson trope in the set of tropes that is the determinable general property ‘redness,’ but it is difficult to say what it is about the nature of the tropes that justifies this preference. In addition to “resemblance”, perhaps the Trope Nominalist must take “imperfect resemblance” and “degrees of resemblance” as primitive as well. Finally, recall that determinable potentialities are supposed to be more fundamental than determinate degrees of potentiality. If determinable potentialities are sets of determinate potentialities tropes, then applying Trope Nominalism

to Vetter's theory of potentialities has the consequence that some sets are more fundamental than their members. Since Vetter assumes "that which grounds is more fundamental than that which is grounded in it" (27) she would be committed to the view that some sets ground their members. This runs counter to a common supposition that sets are grounded by their members (Correia and Schneider 2012: 1, 20).

One type of Nominalism that Vetter does not consider is Causal Nominalism, due to Ann Whittle (2009). Causal Nominalism might appear to be the variety of Nominalism most suited for potentialities, for it is the view that a property is a set of particulars that are similar with respect to causal role. As Whittle puts it, the property of F-ness is "the set of particulars all of which realize the functional role definitive of F-ness" (Whittle 2012: 248). F-ness, so defined, seems like a good candidate for being a potentiality. However, upon closer examination, Whittle's Causal Nominalism is not a good fit with Vetter's potentialities. As Whittle uses the term, "Nominalism" is the view that "everything that exists is particular" and "there are no basic property instances or tropes" (244). For Whittle, properties of any kind are reducible to particulars, and thus she provides "deflationary account of powers" (268). Consequently, this view is not compatible with Vetter's view that potentialities are fundamental and irreducible. Furthermore, Whittle's picture includes irreducible modal facts, specifically conditional or functional facts. In particular, when an object *a* has a disposition *F* "all there is to *a*'s being *F* is that a particular cluster of causal conditionals holds true of *a*" (280). Whittle also writes:

there are irreducible functional facts about what particulars can do. [...] at the level of [perfectly] natural properties, *a* is *F* iff it could do *X* in circumstances *C*1 etc. – there is nothing further we can appeal to which accounts for the behaviour of the particulars in question. (Whittle: 2012: 283)

In other words, a set of particulars is a property if and only if certain irreducible modal facts hold of members of that set. The problem with applying Causal Nominalism to Vetter's view is that, if such sets of particulars were to constitute potentialities, then potentialities could not ground all of modality. This is because it would be viciously circular to use potentialities to ground the modal facts which determine which sets of objects constitute potentialities in the first place. While Whittle's particularly austere version of Nominalism is not central to Causal Nominalism (McKitrick 2018: 98-99), the essence of the view is that objects share the same property in virtue of their causal similarity. Insofar as causation is a modal notion, a potentiality cannot be a more fundamental modality if it is a property as defined by Causal Nominalism.

I do not claim to have conclusively shown that no version of Nominalism could be devised to be compatible with Vetter's claims about potentialities. However, I do hope to have shown that the most familiar forms of Nominalism are difficult to square with the claim that all of modality is grounded by properties which are irreducible potentialities.

3.3. Realism

Perhaps Vetter's suspicion that Nominalists could get on board with her project were too optimistic, and the theory of properties that she implicitly assumes throughout the work is more promising. Vetter writes:

my preferred view of properties is what is often labelled the 'Aristotelian' view. I hold that there are properties, but that they are *in rebus*: their existence derives from how things are. The opposed, Platonist, picture has it that properties exist independently, and that objects are as they are in virtue of partaking in, or instantiating, the relevant universals. [...] Perhaps the best known contemporary defender of an Aristotelian approach to universals is David Armstrong (271).

There are several things to note about this passage. First, in saying that properties are "*in rebus*", I take Vetter to be saying a property is "in the thing", and hence located where the thing – its instance – is. Since the same property can be shared by distinct particulars, it follows that properties are multiply-located. Second, she says that the view that she favors is defended by Armstrong, so I assume that Armstrong's work on properties is a relevant touchstone. Third, in saying that the existence of properties "derives from how things are" I take Vetter to be asserting the Immanent Realist's instantiation condition, according to which properties cannot exist without things that potentially instantiate them, not the Nominalist position that potentialities are mere derivative entities.

However, Vetter's preference for Immanent Realism runs up against her view that potentialities come in different degrees. It is not clear what it means for a universal to come in different degrees. A universal cannot have a greater or lesser degree than it does. So, it must be that a particular token or instance of the potentiality "has" more of the potentiality universal than another token of that potentiality. But if a universal is wholly present wherever it is instantiated, it cannot possibly differ across instances. If two things are similar because they literally share one thing, they must be perfectly similar in that respect. So if the fragile glass is highly breakable and the sturdy crowbar is less breakable, it is hard to see how that is explained in terms of their literally sharing one and the same 'breakability.'

Maybe the fragile glass and sturdy crowbar don't literally share the same 'breakability', but each have specific degrees of breakability, each of which are determinates of the determinable breakability. Analogously, a color comes in different shades, and particulars instantiate that color by instantiating one of the specific shades. This would cohere with Vetter's claim that potentialities are determinable, and specific degrees of potentiality are their determinates. If breakability is a potentiality universal, saying that it comes in degrees is a way of saying that there is an ordered set of universals, with the different "degrees" falling under the determinable potentiality. Vetter indicates this when she writes:

I will sometimes speak of that potentiality as being possessed to a certain degree [...] This is merely a more idiomatic way of expressing that an object has the determinable potentiality by having a given (degree-) determinate (95).

But saying that an object has a determinable property "by having a given (degree-) determinate" suggests that its having a determinable property *is grounded by* its having a certain determinate property. Given Vetter's acceptance of the idea that grounds are more fundamental than that which is grounded, if the determinate property grounds the determinable property, then the determinate property is more fundamental. This is inconsistent with Vetter's view that the determinable potentiality is more fundamental than its determinates.

Furthermore, this picture raises questions about property location. While it is reasonable for an Immanent Realist to say that the determinate properties are located in their instances, it is less clear where determinable properties are located. If the determinable 'breakability' were wholly present in each of its instances, it would have to be identical in each instance, but it is not clear that it is. Vetter seems implicitly aware of this issue when she writes:

[A] criterion for naturalness that is often used is this: the more natural a property is, the more perfect the resemblance for which it makes. Perfectly natural, fundamental properties make for perfect resemblance. (Lewis (1983) appeals to this criterion in delineating the perfectly natural properties.) This criterion simply cuts no ice between [general] electric charge and [specific] charge e^* . Both, I take it, make for perfect resemblance. The former makes for more resemblance, but it is unclear whether that is relevant to its comparative degree of naturalness. (58fn14)

However, the criterion does seem to cut some ice between determinable breakability and a determinate degree of breakability. Breakability, which a crowbar and a wine glass share, makes for less similarity than a specific degree of fragility which certain types of glassware share. If properties that make for

more similarity are more natural and thus more fundamental, then fragility is more fundamental than breakability, contrary to Vetter's claims.

It might be helpful to look to the best known defender of Immanent Realism, and his treatment of determinables and imperfect resemblance. While Armstrong's views shift over time (1978; 1997; 2010), one of his long-standing positions is that particulars instantiate only *determinate* universals, and those instantiations are the truth-makers for attributions of determinable predicates (1978: 61). In other words, determinable predicates such as "breakable" do not designate universals. Obviously, this version of Immanent Realism is not an option for Vetter, for she holds that potentialities are real, determinable properties. Another relevant Armstrongian suggestion is that imperfect resemblance is a matter of different combinations of coinstantiated universals (1989: 103-107). To use a simple analogy, suppose that "pure" colors are universals, and that an orange block imperfectly resembles a red block with respect to color. On this Armstrongian proposal, the explanation of their imperfect similarity is that they both instantiate the red universal, but that the orange block also instantiates a yellow universal which differentiates them. Analogously, two glasses being imperfectly similar in terms of their fragility could be explained by one of them instantiating some other property that strengthens it. A disjunction of conjunctions of imperfectly similar universals could arguably be considered a determinable, and each of its disjuncts its determinates.

However, Armstrong argues that disjunctions of universals are not themselves universals (*ibid.*: 82-83). He claims that if two objects both have 'M or C' because one has mass M and the other has charge C, they do not really share anything identical, as must be the case if they share the same universal. Armstrong also argues against disjunctive universals on the grounds that such universals would make no difference to an object's causal powers. If an object has a certain causal power in virtue of having charge C, the disjunctive property 'M or C' "adds nothing to its power" (*ibid.*: 83). So, even if Vetter could say that a determinable potentiality is a disjunction of determinate universals, there is reason not to regard such potentialities as universals. Moreover, even if a less austere Immanent Realist than Armstrong were to allow that determinable properties are real, albeit non-fundamental universals, they would still run afoul Vetter's claim that determinable potentialities are more fundamental than their determinate degrees.

Another possibility is that determinable potentialities are higher-order universals. Consider a color analogy again. If a red block and a blue block have different color universals, perhaps 'having a color' is a higher-order universal that the blocks have in virtue of having some color or other. However, if the expression "in virtue of" indicates a grounding relation, then the determinable

property is grounded by its determinates. Determinable potentialities would be less fundamental than their determinates, which runs counter to Vetter's view. A related suggestion is that a determinable potentiality like breakability is a higher-order universal instantiated not by particular objects, but by other universals which are determinate degrees of breakability. This suggestion amounts to positing a hierarchy of universals, the higher-level ones being universals had by lower-level universals. Higher-order determinable universals are not instantiated by particulars directly, but indirectly, in virtue of their lower-order determinate universals being instantiated. The red block doesn't instantiate 'being a color,' but it instantiates redness, which is a color.

But would this allow potentialities to be located in their instances? Suppose that 'being a color' is a higher-order universal had by red and blue, and 'being a color' is located where the red and blue universals are – such as in the red and blue blocks, among other places. If so, then the determinable 'being a color' universal in the red block must be identical to the determinable 'being a color' universal in the blue block. If it is not, then determinables are not located in their instances. It strikes me as strange to think that objects of every color of the rainbow are identical with respect to the universal 'being a color' being located in each one of them. Having something strike you as strange probably counts even less in a philosophical debate than giving an incredulous stare, but perhaps it is enough to motivate a reconsideration of the approach to properties known as "Platonic" or "Transcendent" Realism.¹²

According to Transcendent Realism, universals *can* exist without being present in objects. One motivation for this claim is the intuition that it is contingent which properties things happen to have – they could have had different properties. If there are any properties that could have been instantiated in this world but aren't, then they are uninstantiated universals, on this Platonic view. Another motivation for uninstantiated universals is our grasp of kinds of perfection that are never realized. For example, while no actual, concrete object is perfectly circular, we can understand the property of being perfectly circular as an uninstantiated universal.

If we allow that there are uninstantiated universals, clearly these universals are not located in any actual, concrete object. Therefore, they must be elsewhere – outside of our actual space-time. But if that's the case, then maybe *instantiated* universals are outside of our space-time as well. Some uninstantiated universals differ from instantiated universals only contingently: One happens to be instantiated, while the other could have been, but isn't. These two otherwise similar universals exist in two different ways, in two different

¹² For an articulation of such a view, see Tugby 2013 and Giannini and Tugby (2020).

realms – that one is multiply located in actual concrete objects, while the other is not located in the actual, concrete world at all. What happens when a previously uninstantiated universal comes to be instantiated? Does its other-worldly existence cease once it acquires a worldly existence? If that seems problematic, it motivates the Platonist to “put” *all* universals where the uninstantiated ones are – outside of actual space-time (Armstrong 1989: 76). By the same reasoning, if determinable potentialities must be located somewhere other than their instantiations, then there is no bar to putting other universals there as well.

One advantage of Platonic Realism for Vetter is that some versions of the view already countenance the idea that universals are had in degrees, and so they can accommodate Vetter’s view that potentialities comes in degrees. This is because one of the motivations for Platonism, as discussed above, is to explain the existence of an ideal that is never perfectly instantiated, like the perfect circle. If such an ideal property is never fully instantiated, that must mean that it is instantiated to a lesser degree. Coming in degrees is explained in terms of degrees of instantiation. The circle I draw with a compass instantiates circularity to a higher degree than the one I draw freehand. By the same token, Vetter could say that a wine glass instantiates breakability to a higher degree than a crowbar. How instantiation can be a matter of degree is a question I will not tackle here, but it is a question some Platonists already countenance, and not a new problem for Vetter (see Lloyd 1990).

This Platonic view is not flagrantly incompatible with Vetter’s project. As higher-order universals, potentialities would be ultimately grounded in the ways that actual, concrete object are. However, they would not *be* ways that actual, concrete objects are. (Just as the red block doesn’t have the property ‘being a color,’ a fragile glass doesn’t have the property ‘being a degree of breakability’.) Furthermore, it is difficult to see how standing in a relation to a universal that is located elsewhere could make a particular object powerful. Moreover, if we were to go for a hybrid Platonic view in which the determinate degree of potentiality were located in the object but the determinable potentiality were located elsewhere, then it would appear that the determinate potentiality that is intrinsic to the object is a more plausible source of the object’s capabilities. This would make determinate degrees of potentiality better candidates for the source of modality than determinable potentialities – counter to Vetter’s claim that determinable potentialities are more fundamental.

4. *The Trouble with Determinables*

Two constraints to finding an account of properties that is suitable for Vetter’s project have emerged: 1. Conditions on property identity which employ

modal notions are problematic for Vetter's goal of grounding all of modality with potentialities; and 2. Theories of properties according to which properties are grounded in something else are inconsistent with Vetter's claim that nothing is more metaphysically fundamental than potentiality. In retrospect, the fact that the properties are supposed to be powerful plays a relatively minor role. The crux of the difficulty, from my point of view, is making sense of the idea that these relatively fundamental properties are determinables. Other philosophers argue against fundamental determinables on the grounds that determinables are asymmetrically necessitated or fixed by their determinates (Armstrong 2010: 50). Instantiation of a determinate, such as scarlet, entails that a determinable (red) is instantiated, but instantiation of redness does not entail that scarlet is instantiated. This asymmetry has implications for grounding relations. Since determinables do not determine their determinates, determinables cannot fully ground their determinates. Being red cannot fully ground being scarlet. Furthermore, as noted earlier (Lewis 1983), determinables are arguably less natural than their determinates, and this is reason to think that they are less fundamental. (I will consider arguments in favor of fundamental determinables below, in the context of assessing my positive proposal.)

The metaphysics of determinables remains unclear for Vetter. If they are sets, their status as fundamental is in doubt, for reasons discussed above.¹³ They can't be universals located in their instances because then they would have to be identical across instances. They could be Platonic entities which objects instantiated to a greater or lesser degree; however, this would place the source of causal power outside of particular powerful objects.

An option we have yet to consider is Jessica Wilson's "subset view" according to which instances of determinable properties "have a proper subset of the powers of their associated determinate instances" (1999: 48)¹⁴ This would solve some of the puzzles raised above, such as those regarding location, since a subset of properties is (at least partially) located where the set of properties is. Furthermore, since a set can be a subset of a great variety of different sets, including various ordered sets, we can make sense of the idea that potentialities come in degrees. However, it is not clear whether a view on which properties are sets of powers would work for Vetter's account of potentialities, for it would entail that potentialities are sets of powers. If the powers that are members of the sets are themselves potentialities, then potentialities are sets of potentialities *ad infinitum*. If these powers are *not* potentialities, then they

¹³ For a version of Nominalism specifically developed to account for determinables, see Denby 2001.

¹⁴ See also Shoemaker, Sydney, 2001, "Realization and Mental Causation", in Proceedings of the 20th World Congress in Philosophy, Cambridge: Philosophy Documentation Center, 23-33.

seem to be modal properties that are not grounded in potentialities, and thus Vetter's potentialities would fail to ground all of modality.

5. *Proposal: fundamental potentialities as necessarily manifesting*

I have been making the case that familiar approaches to properties are in tension with claims that Vetter makes about potentialities. Assuming that Vetter's project is worthwhile, this motivates making some adjustments, while attempting to preserve as much of her view as possible. One adjustment is to find or devise a new approach to properties (or lack-there-of) which would be more compatible with potentialities. Another way, the one I will explore here, is to revise some of Vetter's claims about potentiality so as to render them compatible with more familiar approaches to properties.

My proposal is to take up an idea that is suggested in *Potentiality*. On Vetter's view, some potentialities such as charge are nomological potentialities that are always possessed to the maximal degree. It is impossible for charge fail to manifest conformity with Coulomb's Law. She considers the option "to identify a nomological disposition such as electric charge with a determinate of the potentiality in question, namely its maximal determinate" (286). However, she rejects this option because it relies on what she regards as an unjustified assumption that determinate properties are more natural than their determinables (287). However, perhaps making this assumption would allow Vetter to solve some of the problems I have raised.

On this proposal, necessarily manifesting potentialities are the fundamental ground for determinable potentialities. Suppose that mass and charge are fundamental potentialities.¹⁵ These potentialities necessarily manifest – they are always warping space-time, emanating an electrical field, or what have you. Fundamental potentialities are cumulative, so that when the same potentialities are instantiated in conjunction, their effect is multiplied. Consider the smallest unit of mass as an instantiation of a fundamental potentiality to warp space-time a tiny bit. The mass of composite entities is determined by the masses of their constituents, as is their potentialities to significantly warp space-time. Large quantities of mass are the bundling of small, and ultimately fundamental quantities of mass. Likewise, a large electrical charge is the additive effect of the accumulation of entities with unit electrical charge. (Whether or not this picture is empirically accurate is another question which I will consider below.)

The point here is that it is compatible with Immanent Realism, and perhaps Trope Nominalism as well. If every instance of unit charge is identical in quan-

¹⁵ Vetter entertains this supposition as well (50).

tity, then the fundamental charge universal could be wholly located at each of its instances. (Alternatively, each instance could instantiate perfectly similar fundamental charge tropes.) Furthermore, this proposal accommodates Vetter's view that potentialities comes in degrees. There is a sense in which fundamental potentialities are at the extreme positive end of the spectrum in that they are necessarily manifesting. However, a single instantiation of a fundamental potentiality would be on the low end of the spectrum: Having only one unit of charge is the least charged anything could be. Higher degrees of charge are accounted for by multiple instantiations of unit charge.

On the view I am exploring, Vetter's determinable potentialities are not fundamental, but instead they are grounded by minimal, constantly manifesting potentialities. Much of the rest of Vetter's framework can be maintained. Nomological potentialities ultimately ground non-fundamental potentialities, including joint, extrinsic, and iterated potentialities. If determinable potentialities can ground all of modality as Vetter claims, then so could determinable potentialities grounded in determinate nomological potentialities. For example, if the mere possibility of someone being electrically shocked can be grounded by determinable potentialities, then it can be grounded in determinable potentialities which are in turn (partially) grounded by necessarily manifesting charge.

6. *Objections*

6.1. The fundamentality of the determinable

On the proposal sketched above, the potentialities that are possessed to the maximal degree are determinate, and they are more fundamental than determinable potentialities. Vetter holds that determinable potentialities are more fundamental than their determinate degrees. However, I have not found an argument for this claim in *Potentiality*.

Perhaps Vetter could avail herself of Jessica Wilson's arguments for fundamental determinables (Wilson 2012). Vetter writes

Wilson (2012) uses similar considerations to argue that determinable properties may be just as fundamental as their determinates. I sympathize with Wilson's argument, and my argument is partly inspired by hers. However, I think I can make an even stronger case concerning the specific single-track and the general multi-track dispositions than Wilson can concerning determinates and determinables: the general dispositions are not only equally fundamental as the specific ones, they are more fundamental. (57)

I will examine Vetter's "stronger case" for fundamental multi-track dispositions next. But concerning Wilson's argument for fundamental determinables, Vetter acknowledges it only shows that some determinables are as fundamental *as their determinates*, and that they are *part of* the fundamental base. On Wilson's view, some determinates are fundamental too. Wilson writes "it is not plausible [...] that [the fundamental] base will contain only determinable properties" (2012: 13). According to Wilson, determinate properties are needed to ground facts concerning how a given determinable instance is determined. Vetter's claims that potentialities are determinables and that "it's potentialities all the way down" entail the view that Wilson calls implausible.

In *Potentiality*, Vetter targets Alexander Bird's view that only maximally specific, "pure" dispositions are fundamental. According to Bird

all impure dispositions are non-fundamental. Fundamental properties cannot be impure dispositions, since such dispositions are really conjunctions of pure dispositions, in which case it would be the conjuncts that are closer to being fundamental. (Bird 2007: 22)

Bird's view is that pure, single-track dispositions – dispositions with exactly one stimulus and one manifestation – are more fundamental than impure multi-track dispositions – dispositions that have multiple stimulus and manifestation pairs. In the context of arguing against the standard conception of dispositions, Vetter presents an argument against Bird's view that single-track dispositions are more fundamental than multi-track dispositions:

1. Scientific laws mention natural properties of varying degrees of fundamentality.
2. The relative fundamentality of laws correlates with the relative fundamentality of the properties that they reference.
3. The general law describing charge in functional terms (Coulomb's Law) is more fundamental than a law relating a specific degree of charge to other variables, because
 - a. It holds a more central place in scientific practice;
 - b. It is more explanatory;
 - c. It is more parsimonious.
4. Coulomb's law references multi-track charge, not any specific single-track charge.
5. Therefore, multi-track charge is more fundamental than single-track charge. (50-58)

This lesson about charge extends to other nomological potentialities, and to potentiality in general.

Since Vetter argues from her claim that ordinary dispositions are massively multi-track to her view that fundamental potentialities are determinables, I believe that she would endorse an argument for her view that determinable potentialities are more fundamental than their determinates along the same lines.¹⁶ If this argument were successful, it would count against my proposal that determinable charge (having some degree of charge or other) is a conjunction of specific determinate charges, and the determinate charges are more fundamental. The argument against my proposal mirrors Vetter's argument against Bird's view, but for the last premise and the conclusion:

- 4*.Coulomb's law references determinable charge, not any specific determinate charge.
 5*.Therefore, determinable charge is more fundamental than determinate charge.

One way to challenge this argument is to deny premise (4*). One can distinguish between mentioning properties and quantifying over them without mentioning them. A different way to interpret Coulomb's Law is that it is not referencing determinables at all, but is instead referencing the determinates by quantifying over them. The same goes for other general scientific laws.

But suppose that Vetter is right that general laws such as Coulomb's law reference determinable or multi-track potentialities, and these laws are more fundamental than their specific instances. Even so, I wonder what notion of relative fundamentality is at work. Are the relative-fundamentality relations between laws isomorphic to the relative-fundamentality relations between properties? Maybe what makes one law more fundamental than another is something different than what makes one property more fundamental than another. For example, relative fundamentality of laws might have more to do with the practice of science and less to do with metaphysics. Vetter appeals to the relative fundamentality between different branches of science – physics and chemistry, for example (56). Granted, physics is more fundamental than chemistry and that is some reason to think that properties mentioned in physics are more fundamental than chemical properties. But the laws considered above (Coulomb's Law and a specific instance of it) are both laws of physics. Maybe the more general law is more useful in science, and the

¹⁶ Vetter clarifies the distinction between determinable and multi-track dispositions as follows: "the relation between the multi-track disposition and its many 'tracks' is not the same as that between a determinable (such as charge) and its determinates (such as electric charge, electric charge). Having a determinable property entails having one of its determinates, to the exclusion of all others. Having the multi-track disposition electric charge, on the contrary, entails having all the corresponding single-track dispositions". (53)

specific one is derivable. But if one thinks, as Vetter does, that laws are derived from potentialities¹⁷ then how fundamental a law is will depend on how fundamental the relevant potentialities are. To argue that one potentiality is more fundamental than another because it figures in a more fundamental law would be to argue in a circle.

If one regards laws as mind-independent features of the universe, then it is not obvious that these laws stand in relations of relative fundamentality that correspond to the role that representations of such laws play in scientific practice. If one is a constructivist about laws, then the way that we rank our constructed laws in terms of fundamentality might not tell us much about the properties we mention in those laws. Furthermore, Vetter seems to assume that science is unified, and this assumption has been challenged.¹⁸ If different sciences do not constitute one unified science, then a property may be fundamental in one science, but have no relative fundamentality relation to a property mentioned in another science. What's more, some sciences don't explain in terms of laws, but instead rely on context-based mechanistic explanations.¹⁹ In such cases, there are no laws to provide a basis for relative fundamentality judgments.

Vetter claims that one reason to think that general laws are more fundamental than specific laws is that general laws are more explanatory than specific laws. However, it is not clear what these judgments of relative explanatory power are based on. If explanatory power rests on pragmatic considerations, then it is an unreliable guide to relative fundamentality. For example, consider Putnam's explanation of why a square peg won't fit into a round whole (Putnam 1975). In many contexts, citing the peg's shape is more explanatory than a detailed explanation of the relationships among the micro-constituents, but this is consistent with molecular constitution being more fundamental than macroscopic shape.

Furthermore, it is not clear what to make of the considerations of parsimony. In some sense, it is much more parsimonious to make a universal generalization than it is to describe every positive instance of that generalization. Nevertheless, many philosophers think that some universal generalizations are grounded by their instances, and Vetter concedes that grounds are more fundamental than that which they ground (23; see also Bennet 2017: 208). Laws that are more general and inclusive may be simpler and more useful than de-

¹⁷ See also Bird 2007; Cartwright 2009; McKittrick 2005.

¹⁸ For arguments that science is disunified see Dupré 1993; Galison and Stump 1996; Cartwright 1999.

¹⁹ For example, see Lombrozo 2010; Woodward 2003.

scriptions of specific cases. But if laws are just certain kinds of generalizations, then they are less fundamental than what they are generalizing over. Hence I question premise 3. We should be wary of equating metaphysical fundamentality with being fundamental to scientific practice.

6.2. Empirical considerations

While I do not think that Vetter has a good argument against fundamental determinate potentialities, I have some remaining worries. In general, I worry that my proposal is incompatible with certain empirical possibilities. This would be a problem for Vetter adopting my proposal, since she wants to use potentialities to give an account of possibility. The proposal might have the consequence that something that seems possible turns out to be impossible. That might be a bullet worth biting, but if any of these possibilities turn out to be actual, the view would be falsified. One such possibility is that mass is fundamental, but there is no unit mass. Instead, there are multiple kinds of simple entities that have different masses. So, the mass of a more massive simple entity cannot be reduced to smaller units of mass. A related possibility is that some quantities, such as mass, are continuous. One could say that there are infinitely many fundamental mass properties of different quantities – different mass universals. These would be functionally similar potentialities differing only in degree, and so it would be impossible to explain, in terms of universals, what they have in common.

Perhaps these scenarios are possible or even actual, and my proposal to save Vetter's view does not work. On the other hand, Vetter wants to ground modality in the ways that actual objects are, and potentially are. So, I think that it is inevitable that her view has some empirical implications, and so it can be falsified by empirical facts. It follows that empirical facts constrain what is possible. This brings Vetter's view closer to that of Dispositional Essentialists such as Brian Ellis (2001: 203-257) and Alexander Bird (2007: 43-59) who dissolve the distinction between physical and metaphysical possibility.²⁰

7. *Conclusion*

In this chapter, I tried to show that it is difficult to find a metaphysics of properties that provides the kinds of properties that Vetter calls "potentialities". In the end, I think that Vetter should give up on the idea that fundamental potentialities are determinable, but instead embrace the idea that she

²⁰ Vetter notes that rejecting the view that the laws of nature of metaphysically contingent is "the natural move for the potentiality view" but she argues that she is not committed to doing so (282).

already entertains – that fundamental (nomological) potentialities are necessarily possessed to the maximal degree. The maximal degree is a determinate degree, not a determinable. The determinable property is grounded by cumulative instantiations of determinate properties. However, if this metaphysics clashes with our best scientific evidence, more radical rethinking of *Potentialities* may be required.²¹

Jennifer McKittrick
 jmckitrick2@unl.edu
 University of Nebraska-Lincoln

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