

This is the penultimate version of a chapter in the „Routledge Handbook of Properties“, eds. A.R.J. Fisher & Anna-Sofia Maurin, published as „Powers, potentialities and modality“. Please cite the published version: <https://www.routledge.com/The-Routledge-Handbook-of-Properties/Fisher-Maurin/p/book/9781032158761>

28

POWERS, POTENTIALITY, AND MODALITY

Barbara Vetter

1 Introduction

According to David Lewis, we can understand properties (at least in some sense of ‘property’) in terms of possibilities, more precisely, as sets of possible individuals (Lewis 1986a: 50-69, see also Lewis 1983). On a different approach, we can understand modality (possibility and necessity) in terms of properties. This chapter is dedicated to the latter kind of project, which shares with the Lewisian approach merely the persuasion that there is some intimate connection between properties and modality, but reverses the order of explanation. (See Allen 2017 for a detailed comparison between the two projects.)

While there are different ways of accounting for modality in terms of properties (see, e.g., ch. 27, this volume), my focus here will be on *dispositionalist* theories, which account for modality in terms of dispositional properties or powers (I use the two terms interchangeably here; for more on dispositions, see ch. 24, this volume).

Motivations for such views come from two sides. On the property side, dispositionalists have argued that our scientific understanding of the world gives us reasons to adopt the view that many or all of the properties that play a role in science are powers (see Shoemaker 1980, Shoemaker 1998, Ellis and Lierse 1994, Ellis 2001, Bird 2007); and once this explanatory resource is at our disposal, we might as well make use of it in a theory of modality. On the modality side, dispositionalism provides an account of modality that is *hardcore actualist* (Contessa 2009, see also Vetter 2011): it locates the grounds of modal facts entirely in the actual world and has no need to appeal to merely possible worlds.

Much of contemporary metaphysics has been shaped by Lewis’s credo of ‘Humean supervenience’. In negative terms, Humean supervenience is the denial of necessary

connections between distinct existences (see Wilson 2010 for a detailed discussion); positively put, it is the thesis that the world consists of ‘a vast mosaic of local matters of particular fact, just one little thing and then another. ... All else supervenes on that’ (Lewis 1986b: ix f.). Dispositionalism, on a contrary, is a species of *anti-Humean* metaphysics, which holds that our world is a deeply connected place, and locates these connections in properties.

Dispositionalist views come in many varieties. In section 2, I outline a set of questions whose answers determine the shape of a dispositionalist theory. Section 3 introduces, as representative examples, two versions of dispositionalism that give different answers to those questions. In the remaining two sections, 4–5, I discuss problems that are shared by dispositionalist theories regardless of these differences.

2 Questions

If we want to account for modality in terms of properties, there are three groups of questions: (1) which modality do we account for; (2) in terms of what kinds of properties; and (3) what form is the ‘account’ to take?

2.1 Which modality?

It will be helpful to use a distinction from the semantics of modal terms, between the *force* and *flavour* of modals. Modality comes in different forces, the weaker force being that of possibility (what *can* happen) and the stronger that of necessity (what *must* happen); some more complicated cases such as the counterfactual conditional (what *would* happen if ...) may or may not be subsumed under them. Modality also comes in different flavours (see Kratzer 1977). Epistemic modality concerns what must or can be the case given what is known; deontic modality concerns what must or can happen given certain rules and norms. The flavour of interest to us here is objective, sometimes also called dynamic or circumstantial, modality: what must or can be the case given how things are.

Objective modality appears to allow for further differentiation, such as practical, nomological, or metaphysical. The kinds of modality philosophers have been trying to account for in terms of properties are nomological and metaphysical modality. Nomological modality is the kind of modality associated with laws of nature, such as the necessity that objects with like charges repel each other. Metaphysical modality is the modality typically at stake in philosophical debates and is often characterized as the ‘broadest’ or ‘absolute’ type of modality.

Among the dispositionalist accounts of modality, some start with possibility (Borghini and Williams 2008, Vetter 2015), some with necessity (Ellis and Lierse 1994, Ellis 2001, Bird 2007), and some with counterfactuals (Bird 2007 again and Jacobs 2010). These different starting points, however, do not indicate a difference in scope: necessity and possibility are interdefinable, so giving an account of one automatically yields an account of the other, and counterfactuals too are systematically related to possibility and necessity. But accounts also differ in terms of the flavour of modality that they aim to account for: metaphysical (Borghini and Williams 2008, Jacobs 2010, Vetter 2015), nomological (Ellis and Lierse 1994, Ellis 2001, Bird 2007), or a specific flavour called ‘dispositional’ (Anjum and Mumford 2018).

2.2 Which properties?

We are focusing on accounts that begin with *powers* in the widest sense: properties that can manifest; that are imbued with an irreducibly modal character; that concern what their bearers can, must, or would do. This leaves open a great deal of detail.

First, how are we to understand the modal character of powers or dispositions? According to orthodoxy, they come with a pair of individuating conditions, a stimulus and a manifestation, such that bearers of the disposition would exhibit the manifestation when subject to the stimulus, if nothing interferes. Thus fragility is the disposition to break (manifestation) when struck (stimulus), and fragile things would break when struck and nothing interferes. (Some expressions of the orthodox view can be found in Molnar 2003,

Martin 1994, and Bird 2007.)

Alternatively (see Vetter 2014, Aimar 2019), dispositions or powers have been conceived as potentialities, individuated only by a manifestation (and the strength of the disposition), such that bearers of the disposition *can* exhibit that manifestation (more or less easily). Thus fragility is the disposition to break, and fragile things are those that can break (sufficiently easily).

Second, what is the ontology of powers? They have been taken to be Platonic universals, existing independently of their instances (Bird 2007: 15-18, Tugby 2013); roughly Aristotelian universals whose existence depends on their (at least potential) instantiation (Vetter 2015: 269-273); tropes (Molnar 2003, Heil 2012; see ch. 19, this volume); or even no reified properties at all, yielding a nominalist version of dispositionalism (Whittle 2009, Vogt 2022).

Another issue of ontology concerns the status of the properties that are invoked in an account of modality. Some appeal only to sparse, natural, even fundamental properties in their account of modality (see especially Bird 2007); some allow for less-than-fundamental, but not gerrymandered, properties (Anjum and Mumford 2018, Bird 2018); and maximally liberal views allow abundant properties into their account (see Vetter 2015, Vetter 2020).

2.3 What form of account?

In accounting for modality in terms of properties, we can formulate a *reductive definition* of the form: ‘it is metaphysically/nomologically possible/necessary that *p* iff ...’. This is perhaps the most straightforward approach, and we will see it at work in section 3. A different approach in metaphysics has been to identify, not reductive definitions of phenomena to be accounted for, but *truthmakers* for the sentences expressing them. On this approach, we are looking not primarily for necessary and sufficient conditions, but for the kinds of entities that make true modal statements; and we can find those truthmakers, in every case, in powers (Borghini and Williams 2008, Jacobs 2010). A third approach

that has recently gained some currency takes modal facts to be distinct from but *grounded in* properties. We will return to issues about grounding in section 4.

Dispositionalist theories, then, account for metaphysical or nomological modality; starting with possibility, necessity, or counterfactual conditionals; in terms of properties that are characterized in terms of stimulus and manifestation or manifestation alone; Platonist or Aristotelian universals, tropes, or even nominalistically construed, and more or less sparse or abundant; by either reducing the former to the latter, providing truthmakers for the corresponding statements, or making grounding claims. In the next section, we will look at two accounts from the dispositionalist literature that take different choices on most of the questions that have been listed here. We will see how those different answers are connected to each other, and how they lead to some issues that are specific to these combinations of answers.

3 Two theories

In this section, I outline two different dispositionalist views. The first accounts for nomological modality, starting with counterfactuals and necessity, in terms of sparse, stimulus-manifestation dispositions tentatively taken to be Platonic universals. The second accounts for metaphysical modality, starting with possibility, in terms of abundant potentialities tentatively taken to be Aristotelian universals. Both views proceed by reductive definition.

3.1 Dispositional essentialism

Dispositional essentialism (DE) begins with the claim that '[a]t least some sparse, fundamental properties have dispositional essences' (Bird 2007: 45). Electric charge (a popular toy example), for instance, is associated with certain dispositions: the disposition to attract positively charged objects, and to repel negatively charged ones, in ways that correspond precisely to the other object's charge and distance, as formulated in Coulomb's Law. According to DE, this is more than association: electric charge, by its very nature, is

the disposition to attract positively charged objects and repel negatively charged objects, in this particular way.

The second core claim of DE is that these dispositional essences are the source of nomological necessity: the laws are ‘those regularities whose truth is guaranteed by the essentially dispositional nature of one or more of the constituent properties’ (Bird 2007: 47). Thus, to stick with our example, Coulomb’s Law is a law because its truth is guaranteed by the essence of charge.

DE accounts for *nomological* necessity, the modality associated with laws of nature. Given that it derives this necessity from the essences of properties, it yields the result that the laws are indeed not only nomologically, but metaphysically necessary, and in this sense collapses the nomological necessities into (a subset of) the metaphysical necessities. Nevertheless, what it is an account of is the modality associated with laws, and so we will continue to treat it as an account of nomological necessity.

It is part of the dispositional essentialist project to rehabilitate the ‘necessary connections’ in nature that have been shunned by Humeans (see section 1). According to DE, our world abounds in nomologically necessary connections, and it is essentially dispositional properties that give rise to them. It is important for the dispositional essentialist project, then, that those properties really do the connecting work needed for non-Humean laws. So it is unsurprising that DE starts with a conception of dispositions that conforms to the standard model where a disposition links a stimulus condition (being struck, or being in the vicinity of a negative charge) to a manifestation (breaking, or exerting a repulsive force).

Given its focus on laws of nature more generally, DE naturally focusses on those properties that play a role in those laws. In Bird 2007, the focus is on the *fundamental* properties (of physics) alone. Others (Ellis 2001; Bird 2018) apply DE to *sparse* or *natural* properties as we find them in biology, chemistry and so on. Still, there is no room for mere abundant properties that have no scientific role to play. In fact, DE does best to exclude that there are abundant properties with dispositional essences, for else it would

be difficult to tell the difference between the laws of nature and the more accidental generalizations that those dispositions would give rise to.

Finally, dispositional essentialism makes crucial appeal to the essences of properties. *Prima facie*, this commits it to some form of realism about the bearers of those essences. Dispositional essentialists have indeed tended to prefer an ontology of Platonist universals or tropes, though Vogt (2022) has recently argued that DE is compatible even with a nominalist approach, as long as it makes use of some resources of recent debates on grounding and essence.

DE is an attractive and explanatorily powerful account of the laws of nature; but it is not, of course, without its problems. Some have argued that it collapses into one or another of its competitors (Barker 2013, see also Barker and Smart 2012, Tugby 2012). Others object to its assimilation of nomological to metaphysical necessities (Lange 2009), or argue that DE has problems accounting for certain types of laws, such as functional laws (Vetter 2012, French 2014). But we will set these worries aside for now, and turn to another dispositionalist theory.

3.2 Potentialism

Potentialism accounts for metaphysical possibility in terms of potentialities: it is metaphysically possible that p just in case ‘something has, had, or will have an iterated potentiality for it to be the case that p ’ (Vetter 2015: 199; for a historical predecessor, see Fisher forthcoming). Generalization over times is needed since potentialities, being properties, are possessed at times and can be lost or gained (a child, when growing up, loses the potentiality to fit through some small openings, but gains many others), while metaphysical modality is insensitive to changes over time. Iterated potentialities are potentialities whose manifestation consists in something having a potentiality; thus liquid water, while lacking the potentiality to break, can be frozen to acquire that potentiality, and accordingly has an iterated potentiality to break. Iterated potentiality helps account for some more remote possibilities, such as the possibility that my granddaughter (who, as

yet, does not exist) be a painter (Vetter 2015: 201). Necessity can be defined as the dual of possibility: it is metaphysically necessary that p iff nothing has, had, or will have a potentiality for it to be the case that not- p .

For potentialism, powers are *potentialities*, individuated only by their manifestation. This is not strictly necessary for the account of modality, but it is a natural fit with the focus on *possibility* as the modality to be accounted for. If we thought of powers along stimulus-manifestation lines, it might seem more promising to start with an account of counterfactual conditionals and derive other modal claims from them (as in Jacobs 2010). Metaphysical necessity does not appear to be a suitable starting point for a powers theorist: powers just don't yield enough necessities (see Schrenk 2010).

Since potentialism is phrased as a reductive definition, it requires that for every possibility, there is a corresponding potentiality. (It does not require that distinct possibilities always correspond to distinct potentialities. One potentiality may give rise to many possibilities.) This makes an abundant view of properties a natural fit for potentialism. Consider the possibility that I am in Berlin or I am in Gothenburg. By potentialism, this entails that something – presumably I – have an iterated potentiality with a disjunctive manifestation condition: the potentiality to be-in-Berlin-or-be-in-Gothenburg. Perhaps that potentiality can be identified with something a little less strange-looking. But the easiest route for the potentialist is to embrace a liberal view of potentiality and be done with it. (Alternatively, the potentialist can turn to truthmaking instead of reductive definition and claim merely that for every true possibility claim there is *some* combination of potentialities that makes it true.)

Finally, note that potentialism as formulated above accounts for possibilities in terms of *instantiated* properties. Objects are as central as properties – in fact, potentialism is intended to also work in nominalist terms (Vetter 2015: 29; but see Giannini and Tugby 2020). However, there are alternative versions of potentialism that define possibility in terms not of instantiation, but the existence of properties (Borghini and Williams 2008, Yates 2015), leading to a dialectic similar to what we saw for DE above.

Potentialism provides an attractively actualist and down-to-earth view of metaphysical modality, but of course it, too, is not without its problems. Being focussed on *de re* possibility, it has been argued to have problems with both necessity (Yates 2015, Yates 2020; see also Vetter 2018) and with *de dicto* modality (Wang 2015); and since it bases all modality on the potentialities of actually existing objects, its account of possibilities for the non-existence of those very objects has been put into question (Leech 2017, see also Kimpton-Nye 2018, Giannini 2020).

In what follows, however, we will focus on concerns that are shared by any dispositional theory of (any) modality.

4 Problems of circularity

On the views discussed here, powers are the metaphysical underpinning of modal facts; and powers are properties that are imbued with an irreducibly modal character. In short, modal properties give rise to modality. This has a ring of circularity to it; let us spell it out in some more detail. (The problem was, to my knowledge, first raised against DE by Jaag 2014, whose presentation I roughly follow. It is further discussed in Coates 2020, Kimpton-Nye 2021 and Tugby 2021.)

Both DE and potentialism account for modal facts in terms of properties. According to DE, what makes a regularity a law, what endows it with nomological necessity, is the dispositional nature of the properties involved; according to potentialism, metaphysical possibilities are nothing but a certain generalization over the potentialities of objects, and in this way derived from potentialities. Either way, we have an ordering of priority: properties are prior, in the order of explanation, to modality.

Now let us look at powers. On both views, powers are essentially modal: a power's *modal profile* – what an object would or can do in virtue of having the property – is essential to the power. Essentiality, too, imposes an order of priority: if A is essential to B, then B essentially depends on A, for B could not be what it is without A (see Fine

1995). Since (the relevant kind of) modality is essential to powers, powers essentially depend on (this kind of) modality. So in at least one sense, the essential-dependence sense, the modal facts are *prior* to the properties.

Now we have what looks like a circle: properties are prior to modality (because modality derives from them), but modality is prior to properties (because properties essentially depend on modality). Cutting out the middleman, properties, we seem to have accounted for modality in terms of modality.

There are a number of strategies for responding to this circularity worry.

One strategy is to simply revise the theory: if properties are prior to modality, then it cannot be that modality is also prior to properties. And if the claim that properties are essentially modal entails that modality is prior to properties, then that claim must be rejected. This leads us into *grounding theories* of powers, which have become increasingly popular in the recent literature (see Tugby 2021, Tugby 2022, Kimpton-Nye 2021): the view that properties, while not themselves essentially modal, ground and thereby necessitate modal facts. How do they do that? They just do: this is a primitive fact, one which we are entitled to stipulate because of its explanatory powers. In this way, problems of circularity lead powers theorists to adopt a view of properties that is closest to (a grounding-based version of) the powerful qualities view.

Another strategy tries to uphold both of the claims that seemed to lead into a circle, but disambiguate them so as to avoid circularity. One target for disambiguation is the two uses of ‘modality’ in the problematic statements.¹ We saw above that distinguishing different *flavours* of modality is not a promising strategy. But the powers theorist has other distinctions at her disposal (see Vetter 2015: 5). In particular, she can distinguish between the *localized* modality of a power, a property that depends on how things stand with one particular object, and the *non-localized* modalities that philosophers have often focused on: possibility and necessity. The dispositionalist’s claim, then, is not that

¹ Alternatively, we might disambiguate ‘priority’: perhaps essential dependence and explanatory priority may go in different directions without circularity (thanks to Alex Skiles and Lisa Vogt).

modality quite generally reduces to properties which are not themselves modal. It is rather that non-localized modalities, possibility and necessity, reduce to the localized modality of potentiality. Thus the circle is avoided: non-localized modality derives from properties; properties essentially involve localized modality.

Circularity, then, can be avoided, but avoiding it comes at a price. Grounding dispositionalism has the price of giving up the idea of full-fledged powers and having to stipulate a primitive grounding link between non-modal properties and modal facts. Localization avoids it by stipulating a special kind of modality, localized modality, and giving up the idea of reducing the modal to the non-modal. Either price may well be worth paying, and each provides an interesting new way of looking at powers.

5 Problems of locality

The localization strategy in the previous section appealed to an important feature of powers: as modal *properties*, they come with a localized kind of modality, in the sense that they depend, typically, on how things stand with a given object, not on how things stand with the world in general.² The modal facts that are to be accounted for appear to lack that kind of localization. The nomological necessity of a law concerns how things must be anywhere in the world; metaphysical possibilities concern not just how this or that thing, but how things generally could have turned out. The dispositionalist claim is precisely that the non-localized modalities are to be accounted for in terms of localized ones. However, there are some problems in getting from the localized to the non-localized.

One worry concerns modal facts that are so global that it seems difficult to find a localized basis for them in powers of objects. For DE, the objection concerns conservation laws and symmetries (see Livanios 2010), which seem to have a more general

² I am assuming, for simplicity, that powers are typically intrinsic properties of individual objects (see ch. 8, this volume). In fact, there are powers possessed jointly by multiple objects, as well as extrinsic powers. See McKittrick 2003, Vetter 2015: ch.4, Contessa 2012.

status, governing not this property or that but how the world develops quite generally. For potentialism, an analogous worry concerns how it might account for such global possibilities as the possibility that the laws of nature should have been different, or that there should always have been different objects than there actually are. It seems that no properties of any actual objects give rise to such possibilities.

The dispositionalist has two general strategies for responding to such worries. One strategy is to argue that there are after all powers of the right kind to give rise to such global modal facts. In both cases, it will be tempting to think of them as powers of *the world*, as opposed to any particular objects in it (see Bigelow et al. 1992, Vetter 2015: 257-267). A second strategy is to deny the alleged modal fact (suggested in Bird 2007: 214). For potentialism, this may mean that the scope of metaphysical possibilities is narrower than philosophers have been prone to think; for DE, it may involve some revisionism with respect to scientific practice, making symmetry principles mere ‘pseudo-laws’ (Bird 2007: 214; see also Livanios 2010: 304).

A second type of worry can be described, with an apt phrase of Williams (2010), as ‘problems of fit’. We assume that there is a coherent set of possibilities and necessities, be they nomological or metaphysical; how is that coherent set produced by the many different and intrinsic powers that objects have? Why should we expect that the essences of the various sparse properties (on DE) combine into a coherent set of laws; or that the various potentialities (on potentialism) combine into a coherent set of metaphysical possibilities? Let me spell out the problem for each view in turn.

Given DE, the essences of properties give rise to nomological necessities. Nomological necessities generally concern more than one property, but each property has its own essence. How can it be that the different essences – say, that of mass and that of gravitational force – happen to fit together so as to produce a coherent set of laws? DE solves this problem by way of adopting a view of properties that connects their essences from the start: a form of structuralism (Hawthorne 2001, Shoemaker 1980) or ‘holism’ (Williams 2010). On this view, a power is no longer characterized just by its

manifestation(s) or a set of stimulus and manifestation condition(s). Instead, there is a network of properties, each of which is individuated by its place within the network as a whole. If we think of properties in this structuralist or holist way, then it is no wonder they fit together: each property's nature is, as it were, given by how it fits with the others. The nomological necessities are best thought of as derived not from the nature of this or that property, but from some portion of the overall network of powers. Some have objected that this leads into a regress, but defenders of DE have developed sophisticated ways of responding to that objection (see Lowe 2010, Bird 2007: ch. 6).

According to potentialism, each potentiality that an object has gives rise to a possibility. Even so, potentialities of different objects ought to be coordinated to provide a coherent picture. If I had a potentiality to sing a duet with you, but you had no potentiality to sing a duet with me, what should we say about the possibility of our singing a duet together? In such cases, potentialism does provide some coordination (Vetter 2015: ch. 4). My potentiality to sing a duet with you, as well as your potentiality to sing a duet with me, are *extrinsic*: they depend on how things stand not just with the one object that has the potentiality (say, you), but also with other portions of the world (me). We can think of such extrinsic potentialities as arising from potentialities that are intrinsic to a collection of individuals (in this case, our shared potential to sing a duet together); and it is through this shared basis that our potentialities are coordinated.

However, there is still a problem. For all that potentialism says, an object might have an intrinsic potentiality (say, to sing) and yet be necessarily prevented from manifesting it (say, by a necessarily existing and necessarily benign and omnipotent deity who cannot but recognize how much worse the world would be if I ever sang). Given the localized, intrinsic nature of the potentiality, such necessary prevention should not remove my potentiality to sing. And given the intrinsic potentiality, potentialism yields the possibility that I sing. But given the necessary prevention (which, we assume, nothing has any potentiality to remove), it should be impossible that I sing. (See Vetter and Busse; Werner 2021; Werner forthcoming; Spencer 2017.) Again, we are facing a problem of fit:

how do individual, localized potentialities fit with each other and into the more general structure of the world, so as to provide a coherent set of possibilities? Potentialism may need to adjust its account of metaphysical modality to accommodate the latter's more holistic nature (Werner forthcoming makes one suggestion for how to do so).

In general, the tension between the localized nature of powers, and the more global, holistic nature of the modalities to be accounted for may require some adjustments in a theory of dispositions. But there is hope that such adjustments are available.³

References

- Aimar, S. (2019) Disposition Ascriptions. *Philosophical Studies* 176(7):1667–1692.
- Allen, S. (2017) From Possibility to Properties? Or from Properties to Possibility? *Philosophy* 92(1): 21–49.
- Anjum, R. L. and Mumford, S. (2018) *What Tends to Be: The Philosophy of Dispositional Modality*. London/New York: Routledge.
- Barker, S. (2013) The Emperor's New Metaphysics of Powers. *Mind* 122(487): 605–653.
- Barker, S. and Smart, B. (2012) The ultimate argument against dispositional monist accounts of laws. *Analysis* 72(4): 714–722.
- Bigelow, J., Ellis, B., and Lierse, C. (1992) The World as One of a Kind: Natural Necessity and Laws of Nature. *British Journal for the Philosophy of Science* 43(3): 371–388.
- Bird, A. (2007) *Nature's Metaphysics*. Oxford: Oxford University Press.
- Bird, A. 2018. Fundamental Powers, Evolved Powers, and Mental Powers. *Aristotelian Society Supplementary Volume* 92(1): 247–275.

³ For helpful feedback and conversation, I would like to thank Anna-Sofia Maurin, Anthony Fisher and the participants of the Online Properties Workshop 16-18 May 2022, Lisa Vogt, and Lea Würtenberger. This work was supported by the Deutsche Forschungsgemeinschaft (DFG) within the Centre for Advanced Studies in the Humanities 'Human Abilities' (grant number 409272951).

- Borghini, A. and Williams, N. E. (2008) A Dispositional Theory of Possibility. *Dialectica* 62(1): 21–41.
- Coates, A. (2020) Tropes, Unmanifested Dispositions and Powerful Qualifies. *Erkenntnis* 87(5):2143-2160.
- Contessa, G. (2009) Modal Truthmakers and Two Varieties of Actualism. *Synthese* 174(3): 341–353.
- Contessa, G. (2012) Do Extrinsic Dispositions Need Extrinsic Causal Bases? *Philosophy and Phenomenological Research* 84(3): 622–638.
- Ellis, B. (2001) *Scientific Essentialism*. Cambridge: Cambridge University Press.
- Ellis, B. and Lierse, C. (1994) Dispositional Essentialism. *Australasian Journal of Philosophy* 72(1): 27–45.
- Fine, K. (1995) Ontological Dependence. *Proceedings of the Aristotelian Society* 95(1): 269–289.
- Fisher, A. (forthcoming) Grace A. de Laguna’s theory of universals: A powers ontology of properties and modality. *Australian Philosophical Review*.
- French, S. (2014) *The Structure of the World: Metaphysics and Representation*. Oxford: Oxford University Press.
- Giannini, G. (2020) New powers for dispositionalism. *Synthese* 200 (384):1-30.
- Giannini, G. and Tugby, M. (2020) Potentiality: actualism minus naturalism equals platonism. *Philosophical Inquiries* 1(8): 117–140.
- Hawthorne, J. (2001) Causal Structuralism. *Philosophical Perspectives* 15: 361–378.
- Heil, J. (2012) *The Universe as We Find It*. Oxford: Oxford University Press.
- Jaag, S. (2014) Dispositional essentialism and the grounding of natural modality. *Philosophers’ Imprint* 14 (34): 1–21.
- Jacobs, J. D. (2010) A powers theory of modality: or, how I learned to stop worrying and reject possible worlds. *Philosophical Studies* 151(2): 227–248.

- Jubien, M. (2009) *Possibility*. Oxford: Oxford University Press.
- Kimpton-Nye, S. (2018) Hardcore Actualism and Possible Non-Existence. *Thought* 7(2): 122–131.
- Kimpton-Nye, S. (2021) Reconsidering the Dispositional Essentialist Canon. *Philosophical Studies* 178(10): 3421–3441.
- Kratzer, A. (1977). What ‘must’ and ‘can’ must and can mean. *Linguistics and Philosophy* 1(3): 337–355
- Lange, M. (2009) *Laws and Lawmakers: Science, Metaphysics, and the Laws of Nature*. Oxford: Oxford University Press.
- Leech, J. (2017) Review of Barbara Vetter, *Potentiality*. *Analysis* 77(2): 457–467.
- Lewis, D. (1983) New Work for a Theory of Universals. *Australasian Journal of Philosophy* 61(4): 343–377.
- Lewis, D. (1986a). *On the Plurality of Worlds*. Oxford: Blackwell.
- Lewis, D. (1986b). *Philosophical Papers, Volume II*. Oxford: Oxford University Press.
- Livanios, V. (2010) Symmetries, dispositions and essences. *Philosophical Studies* 148(2): 295–305.
- Lowe, E.J. (2010) On the Individuation of Powers. In Anna Marmodoro (ed.), *The Metaphysics of Powers: Their Grounding and Their Manifestation*. London: Routledge: 8–26.
- Martin, C. B. (1994) Dispositions and Conditionals. *Philosophical Quarterly* 44(174):1–8.
- McKittrick, J. (2003) A Case for Extrinsic Dispositions. *Australasian Journal of Philosophy* 81(2): 155–174.
- Molnar, G. (2003) *Powers. A Study in Metaphysics*. Oxford: Oxford University Press.
- Schrenk, M. (2010) The Powerlessness of Necessity. *Nous* 44(4): 725–739.
- Shoemaker, S. (1980) Causality and properties. In Peter van Inwagen (ed.), *Time and Cause*. Dordrecht: Reidel: 109–135.

- Shoemaker, S. (1998) Causal and Metaphysical Necessity. *Pacific Philosophical Quarterly* 79(1): 59–77.
- Spencer, J. (2017) Able to Do the Impossible. *Mind* 126(502): 466–497.
- Tugby, M. (2012) Rescuing dispositionalism from the ultimate argument: Reply to Barker and Smart. *Analysis* 72(4): 723–731.
- Tugby, M. (2013) Platonic Dispositionalism. *Mind* 122(486): 451–480.
- Tugby, M. (2021) Grounding theories of powers. *Synthese* 198(12): 11187–11216.
- Tugby, M. (2022) *Putting Properties First: A Platonic Metaphysics of Natural Modality*. Oxford: Oxford University Press.
- Vetter, B. (2011) Recent Work: Modality without Possible Worlds. *Analysis* 71(4): 742–754.
- Vetter, B. (2012) Dispositional Essentialism and the Laws of Nature. In Alexander Bird, Brian Ellis, and Howard Sankey (eds.), *Properties, Powers and Structures. Issues in the Metaphysics of Realism*. London: Routledge.
- Vetter, B. (2014) Dispositions without Conditionals. *Mind* 123(489): 129–156.
- Vetter, B. (2015) *Potentiality: From Dispositions to Modality*. Oxford: Oxford University Press.
- Vetter, B. (2018) A Plenitude of Powers. *Synthese* 198 (Suppl 6): 1365-1385.
- Vetter, B. (2020) Explanatory Dispositionalism: What the anti-Humean should say. *Synthese* 199(1-2): 2051-2075.
- Vetter, B. and Busse, R. (2022) Modal dispositionalism and necessary perfect masks. *Analysis* 82(1): 84-94.
- Vogt, L. (2022) Nominalist Dispositional Essentialism. *Synthese* 200 (2): 1–29.
- Wang, J. (2015) The Modal Limits of Dispositionalism. *Nous* 49(3): 454–469.
- Werner, J. (2021) Plenitude and Necessarily Unmanifested Dispositions. *Thought: A Journal of Philosophy* 10(3): 169–177.

- Werner, J. (forthcoming) Extended Dispositionalism and Determinism. *Ergo* .
- Whittle, A. (2009) Causal Nominalism. In Toby Handfield (ed.), *Dispositions and Causes*. Oxford: Oxford University Press: 242-285.
- Williams, N. E. (2010) Puzzling powers: the problem of fit. In Anna Marmodoro (ed.), *The Metaphysics of Powers: Their Grounding and Their Manifestation*. London: Routledge: 84-105.
- Wilson, J. (2010) What Hume's Dictum, and Why Believe It? *Philosophy and Phenomenological Research* 80(3): 595–637.
- Yates, D. (2015) Dispositionalism and the modal operators. *Philosophy and Phenomenological Research* 91(2): 411–424.
- Yates, D. (2020) A strange kind of power: Vetter on the formal adequacy of dispositionalism. *Philosophical Inquiries* 8(1): 97–116.