

The Modal Dimension*

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ABSTRACT

Space and time are two obvious candidates as dimensions of reality. Yet, are they the only two dimensions of reality? Famously, David Lewis maintained the doctrine of “modal realism”, the thesis that possible worlds exist and are entities as concrete as the actual world that we live in. In this paper, I will explore the idea that modality can be construed as a dimension along with space and time. However, although Lewis’ modal realism is the main source of inspiration for this construal of modality, I will argue that something else is required for having a modal dimension.

1. The Many Dimensions of Reality

Space and time are often thought of as two *dimensions* in the “arena” that contains all *material entities*.¹ Material entities can be thought of as existing in reality by being located in both the temporal dimension and the spatial dimension. If an entity exists in a certain dimension *d*, then it has (proper or improper) *d*-parts *located* in or along *d*. This notion of dimension – to be made more precise in what follows – is not to be confused with the notion of an

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¹ All and only? Space and time may be inhabited by physical entities that are not material (e.g. fields, forces, powers, vectors, tropes). Besides, there may be immaterial entities existing in time (e.g. souls). In what follows, I shall not consider immaterial entities and non-material physical entities, but I will not rely on the “and only” assumption either. Roughly, I assume that having causal efficacy is a necessary but not sufficient condition for being material and that possessing ordinary causal efficacy is sufficient for not being immaterial.

entity *having* a spatial dimension or a temporal dimension. For a material entity to have a spatial dimension or a temporal dimension in a non-trivial sense it must have spatial *proper parts* or temporal *proper parts* respectively (any entity that exists in space has a spatial dimension in a trivial sense, since it has an improper spatial part – viz. itself – and *mutatis mutandis* for other dimensions). However, if an entity exists in a dimension d , it does not follow (at least not analytically) that it possesses a d -dimension in a non-trivial sense – viz. that it has proper d -parts. For instance, an entity may exist in the temporal dimension but lack proper temporal parts because point-like (e.g. instantaneous events), or because it is multi-located at different points in the dimension (e.g. enduring objects), or because it is temporally extended but simple.

Are space and time the only two dimensions of reality? Roughly, to take seriously the talk of a dimension d is to consider the *fact that d is a dimension* as a fundamental fact – something that cannot be explained by means of anything else. Contrariwise, to deny that d is a dimension of reality is to consider talk of d as a dimension as derivative on other facts (for instance, although this is not the only option, on facts concerning the way we conceptualise things).² Famously, David Lewis maintained the doctrine of “modal realism”, the thesis that possible worlds exist and are entities as concrete as the actual world that we live in. In what follows, I will explore the idea that modality can be construed as a dimension along with space and time. In fact, although Lewis’ modal realism is the main source of inspiration for this construal of modality, I will argue that something else is required for having a modal dimension.

² I am using a sense of the derivative/fundamental pair that implies some form of anti-realism with respect to what is derivative (and, as we shall see, there are at least two construals of it). Of course there are other interesting senses of derivative/fundamental (e.g. composite and structured vs. simple and unstructured, less natural vs. more natural) that do not have anti-realist connotations, but these need not concern us here. See also (Williams, 2010). Moreover, the issue of the reality of a dimension is distinct from the traditional debate of the relationism vs. substantivism of space and time (or spacetime). In particular, space, time and modality may all turn out to be dimensions of reality in the same sense, even if it is not the case that for all of them either relationism or substantivism only is true.

2. Dimensions, Points, Entities

The arena of reality is a ‘space’, in the mathematical sense of an order of elements along a certain number of ‘dimensions’. A dimension of reality can be a grouping of more ‘dimensions’ in this mathematical sense. For instance, we usually consider space to be a dimension that has three ‘dimensions’, while time is a dimension that has only one. I call the characteristic ordered elements of a dimension d the points of d . Generally speaking, the material entities that occupy a dimension d exist or are located at its points. In a sense, along a dimension d we find the points of d , but in another sense we find the entities that are located at them. How material entities behave with respect to d will depend on the specific features of d itself. For instance, if points of the spatial dimension are unextended, then we cannot find two distinct proper parts of the same thing at the same point (if they are extended then they are “regions”, and of course the same object can have different spatial parts in the same region of space).

A central question to ask with respect to each dimension is whether the *same* entity can exist at more than one point along that dimension. There are two senses in which the same entity can be at more than one point along a dimension. The first one is the *strict* identity sense, and I take it to be primitive: at two different points of the dimension we find the *very same* entity. The second sense is the *loose* identity sense; it is a kind of similarity, that is, it does not imply strict identity, but only the sharing of a relevant property. The property that the entities must share in order to be identical in this loose sense is *being part of the same whole* (where “sameness” is identity in the strict sense). Hence loose identity can be defined in term of the part-whole relation (plus strict identity, and existing / being located at a point):

(LI) The same (in the loose sense) entity is located at more than one point of d if and only if different parts of it are located at those points.

Typically, the spatial dimension is such that a material entity can be at more than one spatial point only in the loose sense, i.e. only by having distinct parts at different spatial points. I take this “Lockean” principle to be on the whole quite unproblematic.³ The temporal dimension, to the contrary, is usually

³ I am taking the principle for granted only because the spatial dimension is not the main focus of the paper: I am using it only as a clear case. However, at a macro-level of material objects at least the

taken to be such that the very same entity can be at different temporal points (viz. instants) in the strict sense (and at different temporal points it can be at different spatial points or it can “come back” at the same spatial point) – or at least, that is the construal of it that the so-called “three-dimensionalists” give. “Four-dimensionalists”, in contrast, think that the restriction on the spatial dimension applies to the temporal dimension too, and that an entity can be at different instants only in the loose sense, or at least that physical entities can have different parts at different times also along the temporal dimension (and this is how entities persist in time) (Lewis, 1986; Heller, 1999; Sider, 2001; Hawley, 2001). Let us generalise the talk of “spatial parts” and “temporal parts” to other dimensions, as follows: for any dimension d and entity x that exist in d , call the “ d -parts” of x those proper parts of x that exist at points of d , compose x , and are specific to d (hence s -parts are spatial parts and t -parts are temporal parts).

Along with the two senses of being the same at different point of a dimension d , I shall define the notion of “entirely existing at a point p ” in terms of existing / being located at a point p of d and mereological notions:

(EE) An entity entirely-exists at a point p of dimension d (or it is entirely located at p) if and only if all its d -parts exist at p .

Existing or being located at a point p does not imply entirely-existing or being entirely located at p . With respect to the spatial dimension, it may be the case that a spatially extended whole exists at a spatial point p , even if it is “larger” than p – namely even if it is not entirely located at p . With respect to the temporal dimension, again, we find philosophical disagreement. Three-dimensionalists maintain that, at least with respect to the kind of entities that are material *objects*, if an object exists at a certain instant t , then it also entirely exists at t (since the only temporal part that it has is itself). Four-dimensionalists maintain that there are many material objects that have

principle is appealing. It may be questioned whether micro physical entities at the quantum level still obey this restriction (French, 2011), or whether it holds for bundle theories of individuals (Rodríguez-Pereira, 2004). This is not to say that alleged counterexamples, even at the macro-level, are not discussed in the literature: see Fine (2000). A related though distinct issue is the possibility of co-location.

temporal parts, and thus they fail to entirely exist at the points at which they exist.⁴

Now, the spatial dimension and the temporal dimension “intersect” in the sense that the same (at least in the loose sense) entity that exists at a point *l* of the spatial dimension can also exist at a point *i* of the temporal dimension (and vice versa) – although the details will depend on the constraints that different metaphysical theories put on the relation between entities and points. This holds for any dimensions of reality in general – the idea behind being that dimensions have to be somehow connected to each other to be dimensions of the *same* reality. But what about further dimensions of reality beside space and time? Can there be any?

3. Can Modality Be a Dimension?

To anyone acquainted with modal logic, it is obvious that modality can be thought of as a dimension of reality whose points are *possible worlds*. What is less clear is whether the concept of modality is that of a dimension only in a metaphorical sense, in that its similarities with time and space are merely superficial, or whether there is a cogent sense in which it can be thought of as dimension of reality alongside time and space. Any framework *d* in which we talk of points of a dimension and entities existing at them, or being located at them, represents a dimension of reality in a *conceptually cogent* sense (and not in a merely *metaphorical* sense) if and only if it satisfies the following conditions:

- (I) material entities exist / are located at least at some points of *d*;
- (II) *d* intersects with other dimensions.

If modality is a dimension, according to (I), we should possibly find material entities located at different points of it. As we will see in the next paragraph, the two main metaphysical theories about modality disagree on how to construe the notion of existing or being located in a possible world. However, it is clear that if we cannot make sense of the idea of having material entities

⁴ I am simplifying since I do not need to go into the details. In the literature, the notions of being entirely located at and being precisely located at a spatio(temporal) region are often taken as more primitive (e.g. Casati and Varzi, 1994; Calosi 2010). Besides, I am not considering four-dimensional relativistic spacetimes (Balashov, 2010), because they are immaterial to my main point.

located in possible worlds the whole business of modality would not be of much worth. As for (II), it appears more problematic. Often, possible worlds are thought of as containing entities that are connected to each other by spatial and temporal relations, but which are not connected by *any* spatial or temporal relation with things in other possible worlds. In other words, I am *not* very, very far in space and time from any of the things that could have existed; rather, there are no spatial or temporal relations whatsoever between things that exist in distinct possible worlds. However, as we noted for (I), if we could not make sense of the idea of a material object being at the same point of time and space but in a different possible world, the whole construal of modality in terms of possible worlds would be useless. Again, different metaphysics will be likely to give different construals of the intersection, but modality on the whole can be a dimension in a conceptually cogent sense.⁵

4. Is Modality a Dimension?

Once we have granted that a certain framework represents a dimension in a conceptually cogent sense, we should then ask what it takes for the represented dimension to be real. This is the working hypothesis: a dimension d is real if and only if both of the following obtain

- (i) all its points are real in the same sense, and
- (ii) its points ground truths concerning attribution of the relevant “dimensional” properties (to be specified below).

Let us first concentrate on (i). As we said in Section 1, realism with respect to a dimension d is tantamount to taking d to be a fundamental, not reducible, feature of reality. However, that does *not* imply that the points of d must be real in some irreducible sense too. Typically, metaphysical theories of modality disagree on what possible worlds are. David Lewis argued at length that all possible worlds are *concrete*, *material* entities composed of many other material entities as their parts (Lewis, 1986). Many philosophers disagree with Lewis and argue that there is an important difference between the world that we inhabit – the actual world – and the merely possible worlds. According to the so-called “actualist”, the actual world is material and concrete, but possible

⁵ The question whether a purported “dimension” should be an order in some precise sense to be a dimension in a proper sense will not be addressed here. See (Over, 1986; Lowe 1986).

worlds other than the actual one are abstract entities – usually sets of propositions or sets of sentences. Actualists do not deny that possible worlds exist, but claim that they are constituted by elements of the actual world, such as primitive modal properties, or sentences that represent how things might have been. Thus, actualism fails to meet (i), because possible worlds other than the actual one existentially depend on the actual world and are not on a par with it. For the actualist, modality is at best a limiting case of a dimension, namely a dimension containing only *one* point – the actual world.

The actualist also fails to satisfy condition (ii) for realism with respect to modal dimension. The idea behind (ii) is that if a dimension d is real, the points of d will play a crucial role in explaining why attributions of dimensional properties to (elements of) reality turn out to be – in the right circumstances – true. In order to outline this notion of “dimensional properties”, it is important to distinguish between three kinds of properties that entities can have with respect to a dimension.

There are *simple properties* with respect to a dimension d . I take this to be a primitive notion. Roughly, a simple property P with respect to d does not make any “reference” to points of d , and whether an entity x has or does not have P is something that can be settled only relative to points of d . For instance, *being red* can be seen as a simple property with respect to time (incidentally, also with respect to space and modality), because there is nothing in *being red* that “points” toward one instant or other, and something may be red at certain times and not red at others.

A *d -indexed-property* $P-p$ is constituted by a simple property P and a point p of a dimension d . The constituent p of $P-p$ determines the conditions for possessing $P-p$. More precisely, an entity x possesses a d -indexed-property $P-p$ if and only if x has P relative to p . Possession of a d -indexed-property is not something that varies across the dimension. For instance, consider the t -indexed-property *being red-at- t_0* . Something is *red-at- t_0* if and only if it is red (simple property) at t_0 , and the fact that something has or does not have such a property does not vary through time.

A *d -tensed-property* $P-tens$ is constituted by a simple property P and a tensed element *tens*. As for simple properties, d -tensed-properties are possessed or not only relative to points of d . But as with d -indexed-properties, conditions for possessing them involve reference to points of the dimension. However, such a reference is only contextually determined by the tensed element *tens* of the property. More specifically, an entity x has $P-tens$ relative

to a point p if and only if x has P relative to one or more points p' of d , which are related to p in a certain way determined by *tens*. The most common type of d -tensed properties are the t -tensed properties (aka “tensed properties” without further qualifications). An example of a tensed property is *having been green*. Let us suppose that there is a red apple in front of us. To this apple we can attribute *now* the property of having been green, and we would be right if and only if in the past the apple had had the simple property *being green*.⁶

d -tensed-properties are the “dimensional” properties we were looking for. They can, and usually do, encode a sort of *perspective* on a dimension d : they are exemplified only with respect to points of d , but they “tell” us something about what is going on in other points of the perspective. That is why there can be a trade off between the reality of d -tensed-properties and that of the (points of the) dimension d , and they are interesting with respect to the issue of the reality of the dimensions that *prima facie* we attribute to reality. We can take a d -tensed property to be nothing over and above a point of view on a dimension that is otherwise real *per se*, or we can take the dimension to be a sort of “illusion” induced by the instantiation of the d -tensed property, which is then seen as a genuine element of reality.⁷

Consider the case of t -tensed-properties, i.e. tensed properties. A so-called “tense realist” is a realist with respect to tensed properties.⁸ Not surprisingly, tense realists are often anti-realist with respect to the temporal *dimension*, and they do not attribute reality to all temporal points in the same sense. For instance, the presentist maintains that only the present instant exist, while the growing block theorist maintains that only the instants up to the present exist. For the growing block theorist the temporal dimension does not spread into

⁶ I am not the first to advance an analysis of tensed properties in terms of a simple “radical” and a tensed element (see Salmon, 2003; Crisp, 2007; Correia & Rosenkranz, 2011). I am sketching here a generalization from the case of time to those of other dimensions.

⁷ Since any tensed property is constituted by a “P” element and a “tens” element, one might think that the latter are genuine elements of reality – the idea being that what is composed cannot be fundamental (thanks to Giorgio Lando for pointing this out to me). If we have a problem with that, we can either take “P” and “tens” to determine the tensed properties rather than being its constituents, or insist that the fundamental facts of which the dimension is only a reflection are facts about the instantiation of tensed properties (whether they are fundamental or not).

⁸ See Fine (2005). Beware the possibility of terminological confusion: while “modal realist” is a realist with respect to the points of the modal dimension (possible world), a “tense realist” is a realist with respect to tensed properties (and possibly an anti-realist with respect to the temporal dimension, as we shall see shortly).

the future, and for the presentist it does not spread into the past either: we can only metaphorically talk of a “complete” temporal dimension. However, tensed properties can play the theoretical role that instants play depending on who considers the temporal dimension real. In particular, truths about what happens at non-existing locations of the dimension can be grounded in tensed properties exemplified at existing points of the dimension. And the grounding will be explanatorily felicitous precisely because of the realist stance towards tensed properties: they are the *part of reality* that does the grounding. For example, according to the “Lucretian” version of presentism, the ground of all what was and all what will be the case is the present instantiation of past- and future-tensed properties.⁹

To the contrary, tense anti-realists are usually realists with respect to the temporal dimension. Attributions of tensed properties relative to a certain instant *i* should not be taken at face value because what grounds tensed truths is the exemplification of simple properties relative to instants that are possibly distinct from *i* (alternatively, it is the atemporal exemplification of the relevant *t*-indexed-properties). Thus, the fact that this apple in front of me now possesses the property *having been green* is nothing over and above the fact that it possesses the simple property of *being green* at some other earlier instant.

What about *m*-tensed properties? They are quite often simply called modal properties: *being possibly red* is an example. Should we take talk of modal truths as grounded on exemplification of modal properties in the actual world, or rather as grounded on exemplification of simple properties along the whole modal dimension? The modal realist is likely to choose the second option. How to spell out exactly the relation between modal truths and the modal dimension depends on other details: in particular, it will depend on how seriously the modal realist takes modal properties. According to the more radical position, modal talk is merely a reflection of the fact that we are “perspectively” located in the modal dimension. But there are less radical positions as well. Modal properties can be thought of as real, but not fundamental, because they are

⁹ See (Bigelow, 1996). Of course, if the tense realist does not think that there are truths concerning certain non-existing parts of a dimension, she can do away with grounding altogether. For instance, according to a certain conception of the open future, there are no (contingent) truths about the future precisely because there is no ground for them (and necessary truths about the future may be seen as grounded in atemporal logical necessities). See, for instance, (Markosian, forthcoming).

metaphysically or conceptually reducible to non-modal ones. I will say some more about these options for the modal realist in the next paragraph. Here I wish to stress that in so far as the ground for the attribution of modal properties will be what happens at other points of the modal dimension, the modal realist takes modality as a real dimension.

The actualist, too, can correlate modal truths in terms of what happens at different points of the modal dimension, but since all points of the modal dimension depend on the actual world, the grounding of modal truths will be on some aspect or things in the actual world. If the actualist is also a realist with respect to modal properties (not to be confused with the “modal realist” above), she can ground modal truths on exemplification of modal properties, taken as primitive and irreducible (Forbes, 1985). However, this is not the only option; she may endorse a more deflationary stance towards modal properties and consider them as having a conceptual nature (Plantinga, 1974). In any case, the actualist is bound to deny modality the status of a real dimension, because none of its points other than the actual world can be the ground of the true attribution of modal properties.

5. Counterparts and Modal Wholes

If the concept of modality as a dimension of reality is conceptually cogent, material things can exist in different possible worlds (although maybe not in all of them). And if modality is a real dimension, possible worlds will all be ontologically on a par. Thus, at different points of the modal dimension, we will find material beings; but what about the possibility of finding the *same* material being at different points of the modal dimension? Famously, Lewis has argued that there is a crucial difference here between the modal realist and the actualist. According to the actualist, possible worlds are to be found in the actual world, and their material constituents (if they have any) will be part of the actual world. Hence, it is not problematic to think of the existence of an entity *x* in different possible worlds in terms of those worlds sharing *x* as a part. There is something metaphorical in such a notion of “existence in a possible world”, but it is precisely the aim of the whole actualist talk about the modal dimension and its points not to take them ontologically too seriously.

In contrast, modal realism takes them seriously, but this has problematic consequences for the idea that possible worlds overlap (i.e. share parts). Indeed, Lewis’s modal realism is characterized by the thesis that possible

individuals are world-bound, i.e. they cannot entirely-exist in more than one world – and hence possible worlds are mereologically disjoint. Indeed, possible individuals are concrete individuals, and there is nothing intrinsic distinguishing them from actual ones. At each point of the modal dimension, namely in each possible world, we can find a *counterpart* of an entity existing in some other world (Lewis, 1968). The counterpart relation is a relation of similarity: my counterpart in a possible world w different from the actual world $@$ that I inhabit is the individual who is most similar to me in w .¹⁰ If we assume a completely unrestricted principle of mereological composition, counterparts of each other will also compose a whole, and hence be parts of it. Lewis endorses unrestricted composition, and thereby acknowledges the existence of such “modal wholes”. Does it follow that the same material entities can exist in more than one world – at least in the loose sense of “the same”? Not quite. According to Lewis, modal wholes are *not* possible individuals, and thus (in so far as being a possible individual is a necessary condition for being a material entity), they are not material entities (although all their parts are material). Thus, there is no material entity that is partially located at different points of the modal dimension, and it cannot be the case that the same material entity – in the loose sense (and of course in the strict sense) – exists at more than one possible world.

It is not inconsistent to drop the restriction on possible individuals (to the effect that modal wholes are not possible individuals) and to maintain that modal wholes are material entities. By endorsing such a position we would be go a step further in taking modality seriously as a dimension. Material entities extend through m , and have m -parts at different points of m , and thus we can find the same entity at different points of the modal dimension. More to the point, if modal wholes are material entities along the modal dimension, modal properties can be construed as perspectival effects, in complete analogy to what happens in the spatial dimension (and in the temporal dimension, according to the four-dimensionalist). Lewis indeed discusses the possibility of accepting “modal continuants”.¹¹ However, he did not take this step, and here is his main argument against it:

¹⁰ For simplicity, I am assuming that any entity has one counterpart in each possible world. On that see Lewis 1968.

¹¹ See also (Varzi, 2001), (Schlesinger, 1984) and (Begolo, ms). In (Simons, 1987, p. 361), the possibility of having a fifth modal dimension in that sense is hinted at but then dismissed.

[...] even if Humphrey is a modal continuant, it doesn't take the whole of him to do such things as winning or thinking [that he might have won]. The continuant does them by having a world-stage that does them [...], just as a temporal continuant does this or that through its stages. But what good is that? If Humphrey yearns to think only of himself and nobody else, it is no use that he the thinker is part of the same mereological sum as some winner. That much is provided by the thisworldly sum of Humphrey and Nixon! No; what matters is that the modal continuant is counterpart-interrelated, so that the thinker of the thought has a winner for a counterpart. Then why not just say so, and leave the modal continuant out of it? (Lewis, 1983, p. 42)

I do not aim at an exegesis of Lewis's text here. He seems to claim that, assuming modal realism, in any account of modal properties the counterpart relation will be explanatorily more fundamental than the part-whole relation. If that is true, then the whole enterprise of reducing modal properties to "perspectival" effects on the modal dimension looks hopeless (which might not have worried Lewis). Modal realism can provide the framework for various kinds of "reductions" of modal properties. A metaphysical reduction is carried about by considering modal properties as "hidden" relational properties along the following lines: attributing a modal property *P-tens* is tantamount to attributing any of certain related *m*-indexed properties. For instance, an entity *x* is *possibly red* in the actual world if and only if *x* exemplifies any of the properties of the form *being-red-at-w* for some world *w*. This metaphysical reduction does not require counterpart theory. With counterpart theory we can go a step further and reduce *m*-indexed properties to simple properties. An entity *x* in a world *w*' has the *P-w* if and only if it has a counterpart in *w* that has *P*. *M*-indexed properties can thus be construed as nothing over and above simple properties possessed by counterparts in the appropriate places of the modal dimension.¹² But why should the counterpart relation be *relevant* to accounting for the attributions of modal properties that we make in the actual

¹² Can this metaphysical reduction also be construed as a conceptual reduction? Namely, is it plausible to think that each piece of reasoning that involves modal concepts could be carried out in an entirely non-modal conceptual framework? David Lewis, at least at certain moments, seems to think so: "Modal reasoning can be replaced by non-modal, ordinary reasoning about possible things" (Lewis, 1970, p. 175). Of course, one may suspect that "possible things" in the above quote is indeed the essentially modal ingredient that spoils the reductionist project. But if the counterpart relation can be further exploited to reduce such a notion to clearly non-modal ones, then the objection misfires.

world?¹³ If what Lewis says against the theory of modal occurrents is correct, it is the *similarity* between counterparts that does the explanatory job.

Normally, we consider what happens to individuals similar to us as relevant to what *could happen* to us. Consider the role of statistics: if I know that a high percentage of people who smoke two packs of cigarettes every day, eat junk food and drink large amounts of alcohol will have heart attacks in their forties, and if I am in my forties and lead a similar lifestyle, I am justified in thinking that it is *possible* for me to have a heart attack, and indeed, I am justified in thinking that it is even likely. The similarity between the counterparts seems to play an extra role that the mere fact of being connected in a material whole cannot play. The idea, then, is that the modal continuant theory without counterpart theory just posits the existence of modal wholes as grounds of attributions of modal properties, while continuant theory *with* counterpart theory is just counterpart theory with an idle extra part. If we accept explanation of attribution of modal properties in terms of similarity to possible individuals, we do not need to accept modal continuants as well.

However, it is difficult to understand why similarity would be relevant for attributions of modal properties if modal properties did not depend on the actual simple properties of the object that we are considering. If possible objects are just concrete objects like the actual ones that we meet in ordinary life, and do not enjoy any peculiar status (in particular, no primitive modal property), the mere fact that there is a similarity relation between me and a possible individual cannot tell me anything about my modal status. In many cases, the fact that I stand in a similarity relation to something possessing certain (non-modal) properties will tell me something about my intrinsic constitution, and *if* that is relevant for what is possible or necessary for me, then it will also tell me something about my modal status – otherwise it will not. Hence, if we do not rely on some different project of reduction of modal properties to non-modal ones,¹⁴ it is not clear what the advantage of similarity over the part-whole relation that “sticks” concrete modal wholes together could ever be. Yet, if the alternative to grounding modality in similarity is

¹³ This is a version of the famous Humphrey objection.

¹⁴ Think about reductionist projects of modality that are compatible with actualism. For instance: the Diodorean reductionist project, pursued to a certain extent by Prior, which aims to reduce modal notions to temporal ones, or the statistic reductionist project, which aims to reduce modality to statistical distribution.

grounding it in brute facts about modal wholes, then it is not clear whether modal continuants can provide a ground for modal properties at all.

This situation may complicate the whole idea of construing modality as a dimension of reality. However, even if the project of construing modality as a real dimension turns out to be hopeless, it still merits investigation in order to clarify the general constraints for being a dimension of reality along space and time. Even if modality does not, we may discover that something else passes the test.¹⁵

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¹⁵ For instance, (Lockwood, 2005) has argued that the many-mind interpretation of quantum mechanics that he defends suggests the existence of a dimension of "actuality".

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