

# Building and Modal Recombination

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## 1. Introduction

In *Making Things Up*, Karen Bennett introduces and defends the view that there is a unified class of *building relations* that are in her words directed (asymmetric), necessitating, and generative. These include more familiar relations, such as composition, constitution, set formation, realization, grounding, and (more controversially) causation.<sup>1</sup> Yet there are still differences between individual building relations: what the relata are and the number of relata on each side of the relation. These and other considerations lead Bennett to reject building monism, the thesis that the building relations are all versions of a “general building relation”.<sup>2</sup>

While the plurality of building relations is undoubtedly one of the most novel and interesting aspects of Bennett’s view, I wish to focus on another issue: Bennett’s reliance on modal recombination principles in some of her key arguments. Specifically, Bennett uses the principle that contingent fundamental entities are freely recombinable. She recognizes that she has not addressed doubts about such principles (p.190 FN 5). I have argued that such principles are motivated by mere intuition, and that we have other reasons to reject them.<sup>3</sup> I take up the task of showing how her arguments are affected (or not) by worries about modal recombination.

In section 2, I introduce the notions of fundamentality and modal recombination in play. There are three places where modal recombination principles figure in *Making Things Up*: §3.3, §6.2, and §7.2. I examine them sequentially in sections 3-5, suggesting revisions to Bennett’s arguments along the way. Note that this paper is rather limited in scope, as I will not generally be challenging claims or assumptions that are not directly related to Bennett’s use of modal recombination principles.

## 2. Fundamentality and modal recombination

The notion of fundamentality is crucial to Bennett’s project. In her introduction, she writes (p.2): “All building talk makes, and is intended by its users to make, claims about relative fundamentality.” Building relations connect the less fundamental to the more fundamental. This, Bennett argues, helps to demystify the notion of relative fundamentality, which she regards as an underexplored topic (p.138). In fact, building relations may be used to define both relative fundamentality and absolute fundamentality.<sup>4</sup> I will address some of her arguments for these claims below. My initial concern will be with the absolute notion, as it is the one that figures in modal recombination principles.

Bennett examines three notions of absolute fundamentality in chapter 5: two defined in terms of building (*independence* and *completeness*), and the Lewisian notion of *perfect naturalness*. She eventually settles on independence as the primary notion: to be fundamental is to be independent, and to be independent is to be unbuilt. Since Bennett

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<sup>1</sup> See Bennett (chapter 2) for a catalogue of these relations.

<sup>2</sup> See Bennett (§2.5).

<sup>3</sup> See Wang (2016).

<sup>4</sup> Some claim that the absolute notion is primitive; Bennett addresses such views in §5.10.

believes in a plurality of building relations, being unbuilt must be, in the first place, relativized to specific building relations: for any building relation  $R$ , there is a notion of being unbuilt relative to  $R$  (“unbuilt $_R$ ”). But we can then define a general notion of unbuiltness: to be unbuilt is to be unbuilt $_R$ , for any building relation  $R$ . This is the sense of unbuiltness invoked in the notion of independence.

This notion of fundamentality—*independence*—seems to be the one needed for modal recombination principles. In general, modal recombination principles say that some combination of entities is metaphysically possible. For instance, for any plurality of fundamental objects, it is possible that exactly those fundamental objects exist (alongside the entities that they build).<sup>5</sup> The intuition behind this principle is that if these objects are independent of each other, then the existence or nonexistence of each one is insensitive to the existence or nonexistence of any other. The resulting view is one on which independent entities are like building blocks, which may be stacked together in any configuration.

There is no corresponding intuition with fundamentality understood as completeness or perfect naturalness. First, consider completeness. The idea behind completeness is that a complete plurality of entities builds everything else (or more carefully, form the bottom of building chains that build everything else). As in the case of independence, it is possible to distinguish between a notion of completeness relativized to specific building relations, and a more general notion—the latter is the relevant one. There is no guarantee that a complete plurality of entities is freely recombinable. For one thing, the entities in a complete plurality may overlap with each other. Perhaps my hand belongs to a complete plurality, but so too do each of my fingers. Or take any complete plurality, and add to that plurality some entity that is built from members of the plurality; the resulting plurality is also complete, but the built entity cannot exist on its own.

The notion of *minimal* completeness gets us closer to what we need in modal recombination principles. A plurality is minimally complete iff (i) it is complete, and (ii) no subplurality of it is complete. But again, there is no guarantee that such a plurality is freely recombinable, unless we build in the assumption that the members of a minimally complete plurality are wholly distinct, and therefore independent of each other.<sup>6</sup>

Second, consider Lewis’s (1983) notion of perfect naturalness, which was introduced as a notion that applies to properties, and extended by Sider (2011) to other kinds of entities. The perfectly natural properties are those that “carve nature at its joints”. They are used to characterize notions such as duplication, similarity, intrinsicity, and supervenience. Furthermore, the perfectly natural properties are minimally complete. Bennett worries about whether one notion can play all of the roles ascribed to it, and for this and other reasons rejects it as a way to characterize fundamentality.<sup>7</sup> I merely acknowledge that the notion or notions required to play these roles don’t seem connected to the recombination intuition.

I will thus accept Bennett’s claim that fundamentality is independence, which is (happily) an assumption that I also made in “Fundamentality and Modal Freedom”. In this paper, I argued that we need separate recombination principles for different categories of

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<sup>5</sup> The assumption throughout is that we are only concerned with contingent fundamental entities.

<sup>6</sup> Bennett argues in §5.4 that a plurality of minimally complete entities contains *only* independent entities only if building is transitive.

<sup>7</sup> For critical discussion of the notion of naturalness, see Dorr and Hawthorne (2013) and Eddon (2013).

fundamental entities. In the case of objects, the principle looks something like this: for any plurality of fundamental objects, it is possible that exactly those fundamental objects exist (alongside whatever they build). However, co-existence does not seem enough for free recombination—no fundamental object should be constrained the way that another fundamental object could be. It would thus be useful to have a precise definition of the notion of *modal freedom*.<sup>8</sup> In my paper, I argued that for the case of fundamental objects, it should be formulated as follows:

For any objects *xx*, the *xx* are *modally free* iff for any ways that any objects among the *xx* can be, they may respectively be those ways.<sup>9</sup>

We may then state the relevant recombination principle for objects as:

MR<sub>o</sub>: The fundamental objects are modally free.

Following Schaffer (2010a), let “ways an object can be” range over the intrinsic properties an object may have, in addition to existence or non-existence. We don’t want to let in extrinsic properties, since these impose requirements on other objects. MR<sub>o</sub> additionally takes into account that there may be other limits to ways that fundamental objects can individually be. It might not be possible for an electron, for instance, to be positively charged instead of negatively charged. Thus, MR<sub>o</sub> only requires that recombination be possible when it respects individual possibilities.

Next, consider the case of properties and relations; what does it mean for the fundamental properties and relations to be modally free? It is not clear that there are interesting contingent intrinsic properties of properties and relations. It would thus be useful to say:

For any properties and relations *xx*, the *xx* are *modally free* iff any pattern of instantiation of the properties or relations among the *xx* is possible.

And:

MR<sub>pr</sub>: The fundamental properties and relations are modally free.

More will be said about MR<sub>pr</sub> in section 5.

There may be other categories of fundamental entities, such as facts or states of affairs, in which case we should define what it means for these entities to be modally free. The recombination principle may be stated like this:

MR: The fundamental entities are modally free.

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<sup>8</sup> “Modal freedom” is the locution used by Schaffer (2010a), whom Bennett cites approvingly in her discussions of free recombination.

<sup>9</sup> The principles are slightly reformulated for ease of presentation. Note also that I argued for removing certain constraints that appeared in Schaffer’s definition of modal freedom.

I argued that there are strong *prima facie* counterexamples to MR. For instance, the phenomenon of non-separability of entangled states in quantum mechanics suggests that there may be necessary connections between fundamental objects.<sup>10</sup> And the fundamental properties countenanced in fundamental physics include determinates of the same determinable (such as determinate charges), which are understood to exclude each other in the sense that the same object cannot instantiate more than one. Such examples have led philosophers to rethink what sorts of entities are fundamental. For instance, Schaffer concludes that the objects studied by particle physicists aren't fundamental after all; rather, the single fundamental entity is the entire "cosmos", the mereological fusion of all concrete entities. Schaffer's argument for his monism relies on MR (as he acknowledges). Others, like me, choose to reject MR instead.

Another source of counterexamples stems from the possibility of fundamental entities of different categories. If there are fundamental properties and relations in addition to fundamental objects, they must interact in certain ways. For example, properties and relations have instances and adicities, so they cannot be "stacked" together in any way with the fundamental objects or each other, as is implied in the building block metaphor of MR. Some defend one-category ontologies, but Bennett does not, and hence she must face the question of whether there are modal constraints on the interaction of fundamental entities. One thing she could say is that while fundamental entities of the same category are modally free, their interactions are not—but this is because their interactions are not fundamental. For instance, the fact that a two-place relation must have two relata is not a fundamental fact. But I would like to see a positive argument, if she opts for this strategy.

This only scratches at the surface of considerations surrounding MR. In light of apparent counterexamples, proponents of MR have the burden of proof in these discussions. In "Fundamentality and Modal Freedom", I examined in considerable detail the positive reasons that a defender of MR may give in favor of their thesis. I will not restate the arguments here, except where they are relevant to Bennett's arguments. But suffice it to say, the reasons in favor of MR come down to intuitions about a fundamental entity's "self-sufficiency" and inability to "look outside of itself". These intuitions are not nearly enough to justify acceptance of MR. On the contrary, the distinction between metaphysical and modal independence is valuable and should be preserved.

### 3. Indeterministic Building

The first appearance of modal recombination principles comes in chapter 3 of *Making Things Up*, where Bennett argues for three necessary and jointly sufficient features of building relations. One is that building relations are *necessitating*, with some qualifications. The rough idea behind *building necessitation* is that if *a* fully builds *b*, then necessarily, if *a* exists, then *b* exists.<sup>11</sup> Bennett weakens this to necessitation-in-the-circumstances, so that *a* only necessitates *b* given certain background circumstances. For instance, if composition is a building relation, and if it is restricted so that it only occurs

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<sup>10</sup> See Schaffer (2010a) for a discussion of this.

<sup>11</sup> This is only a one-one instance of building, where there is only one relatum on each side. The following discussion may be generalized to one-many, many-one, and many-many instances of building, if there are any.

given other constraints on the parts, then the existence of the parts only necessitate the existence of the whole in certain circumstances. Bennett holds that the difference between necessitation and necessitation-in-the-circumstances is only a matter of “bookkeeping”. If she is right, then the use of the recombination principle affects both versions.

In any case, my main concern is with the argument for building necessitation, which proceeds via an argument against the possibility of “genuinely indeterministic” building: cases where some object is built in a world, but does not globally supervene upon the rest of that world. Consider two worlds,  $w_1$  and  $w_2$ , which are exactly alike except that  $w_2$  fails to contain some entity  $b$  that exists in  $w_1$ . Let  $a$  be any entity that exists in both worlds. Bennett writes (p.50):

The joint possibility of  $w_1$  and  $w_2$  indicates that  $b$  is recombinable with  $a$ , and indeed with the rest of reality. But such modal recombinability is frequently taken as a mark of fundamentality: if nothing else modally constrains  $b$ , then  $b$  is fundamental (e.g. Schaffer 2010a, 40). But if something is fundamental, it is not in any way built! ... In short: if something fails to supervene on the rest of reality, it is recombinable with the rest of reality; if it is recombinable in that way, it is fundamental; if it is fundamental, it is unbuilt. So  $b$  is not built by  $a$ , or by anything else for that matter.

In this passage, Bennett states that if nothing modally constrains  $b$ , then  $b$  is fundamental. This cannot be exactly what Bennett means. After all, if she is right that building occurs, and if some entities are fundamental, then some fundamental entities will necessitate the existence of nonfundamental entities.<sup>12</sup> They are thus modally constrained by these nonfundamental entities in the sense that they cannot exist without them. The relevant claim is not that nothing modally constraints  $b$ , but that no fundamental entities modally constrain  $b$ . This is not actually MR, which says that the fundamental entities are modally free, but something close to its converse:

Converse-MR: If the fundamental entities plus  $x$  are modally free, then  $x$  is fundamental.

Notice that this principle is only useful if we accept MR as well. For if the fundamental things are not modally free, then the addition of an entity to their ranks will also fail to be modally free.

In any case, Bennett has not actually shown that  $b$  plus the fundamental entities are modally free. Failure of supervenience is a consequence of modal freedom, but does not entail modal freedom. Suppose that some fundamental entity  $a$  in  $w_1$  does build  $b$ . The fact that  $a$  exists in  $w_2$  does not show that  $a$  and  $b$  belong to a modally free plurality. For it does not follow that for any way that  $a$  and  $b$  may individually be, they may jointly be those ways. Even restricting the “ways” to existence and non-existence, it could be still be true that while  $a$  can exist without  $b$ ,  $b$  cannot exist without  $a$ . Bennett’s example shows only that  $b$  does not supervene upon the entities in  $w_2$ , including  $a$ . But for one who rejects building necessitation, this is not surprising.

Bennett’s first argument for building necessitation, which she calls the argument “from luck”, fares better, as it does not rely on MR or Converse-MR (p.50):

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<sup>12</sup> See chapter 8 for the defense of the occurrence of building.

If both  $w_1$  and  $w_2$  are possible, it's a matter of chance whether or not  $b$  exists (or obtains, etc.). It just does or it doesn't. Certainly, nothing  $a$  is doing (as it were) makes the difference between worlds where it exists and worlds where it doesn't exist. Neither  $a$  nor anything else is really *accounting for*  $b$ , or *making*  $b$  exist. So  $b$  just isn't accounted for or made to exist—it isn't built at all.

While Bennett does not successfully argue from modal recombination principles to building necessitation, there is something uncomfortable about indeterministic building. Her argument from luck better captures that discomfort. It is not a decisive consideration for those who reject building necessitation, and in any case, may come down to mere intuition.<sup>13</sup>

#### 4. Relative fundamentality

The second place where modal recombination appears is in Bennett's arguments against primitivism about relative fundamentality. Bennett holds that there is an intimate connection between relative fundamentality and building; in fact, she requires that all building relations are antisymmetric and irreflexive so that she can define relative fundamentality in terms of building.<sup>14</sup> When one endorses reductionism over primitivism about some entity or phenomena, the main advantage is theoretical simplicity. Yet, Bennett says, primitivism about relative fundamentality is implicit in the literature (see p.139).

She argues first against extreme primitivism, the view that "relative fundamentality has nothing to do with building. There is nothing in virtue of which the relative fundamentality facts obtain, and the relative fundamentality facts are entirely unconstrained by the building facts." Here is the argument (140-1):

First, if extreme primitivism is true, the building facts and the relative fundamentality facts are modally recombinable (cf. Schaffer 2010a, 40). That is, there are possible worlds that are just alike in what builds what, but that differ in what is more fundamental than what. There are also possible worlds that are just alike in what is more fundamental than what, but that differ in what builds what. This is implausible on its face: there cannot be three worlds with the same building structure, but such that priority monism is true in one, atomism is true in another, and everything is equally fundamental in the third. Perhaps, though, my claim here is more bald statement than argument.

It is built into extreme primitivism that the relative fundamentality facts are not modally constrained by the building facts. Hence, the argument should work, insofar as one is convinced that it is implausible that there are three such worlds.

But Bennett acknowledges that this is not the most attractive version of primitivism about relative fundamentality. There is a "more sophisticated primitivism" (p.143):

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<sup>13</sup> In the case of grounding, those who reject necessitation include Schaffer (2010b), Schnieder (2006), and Skiles (2015)

<sup>14</sup> See p.40 for the introduction of her principle  $B \rightarrow MFT$ : for all  $x$  and  $y$ , and all building relations  $B$ , if  $x$  at least partially  $Bs$   $y$  then  $x$  is more fundamental than  $y$ .

[T]here is room for a different, less extreme version of primitivism about relative fundamentality: a view according to which there is nothing in virtue of which the relative fundamentality facts obtain, and yet the relative fundamentality facts *are* systematically constrained by the building facts...

Sophisticated primitivism requires the rejection of MR, for relative fundamentality facts are modally constrained, yet fundamental. But Bennett does not find it plausible, and spends the rest of the chapter articulating her preferred alternative, what she calls *deflationism* about relative fundamentality, on which relative fundamentality is reduced to complex patterns of building relations.

For my purposes, what's interesting about this discussion is the appeal to the theoretical virtue of simplicity, which is explicitly used in §6.8 to weigh deflationism and sophisticated primitivism against each other. Bennett is clear that the cost-benefit considerations should not be a mere comparison of number of primitives. Deflationism has its own complexity costs—though Bennett holds that these arise due to independent commitments rather than as a result of the view itself.<sup>15</sup> However, Bennett says, sophisticated primitivism requires the adoption of a “mysterious, arbitrary constraint on fundamentality” (p.184). Given that deflationism explains a constraint that sophisticated primitivism cannot, it is all things considered preferable.

Everyone, of course, recognizes that appeals to simplicity do not on their own justify the rejection of a theory. Rather, they license the preference of one theory over another with respect to simplicity. An appeal to simplicity will thus only be as persuasive as the theory to be preferred. In “Fundamentality and Modal Freedom”, I considered the use of simplicity against primitive modality, and cautioned against trying to avoid primitive modality at all costs. Specifically, avoidance of primitive modality should not be used as a premise in an argument against a theory.<sup>16</sup> In her discussion of sophisticated primitivism, Bennett is appropriately cautious. She argues that deflationism is to be preferred, without making the stronger claim that sophisticated primitivism, on its own, fails. This seems to me to be the right attitude, even though I disagree that primitive modal constraints on fundamentality must be mysterious or arbitrary.<sup>17</sup>

## 5. Is building fundamental?

In chapter 7, Bennett examines the question of whether building is fundamental. As building is a relation (or rather, many relations), we need to disambiguate between ways in which a property or relation may be fundamental. Bennett considers three:

- (1) There is nothing in virtue of which the property or relation exists.
- (2) There is nothing in virtue of which the property or relation is instantiated on particular occasions.
- (3) Only fundamental entities instantiate the property or relation.

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<sup>15</sup> See p.183.

<sup>16</sup> I say something along these lines in §5.3.

<sup>17</sup> I discuss this in Wang (2013, §9).

For Bennett, (3) is trivially false. It is simply part of her picture that least one relatum of an instance of a building relation is nonfundamental: the one that is built by the other. And Bennett claims that (1) is not relevant, as it concerns the nature of properties and relations generally. For example, certain nominalists will say that all properties and relations exist in virtue of sets or classes of objects. So she settles on (2) as the relevant understanding of the claim that building is fundamental. Bennett calls this thesis primitivism about building facts.<sup>18</sup> I will return to these different senses of building fundamentality below.

Bennett gives two arguments against primitivism about building facts. The first is based on Sider's purity principle, which says that fundamental facts involve only fundamental notions (Sider, p.106): "When God was creating the world, she was not required to think in terms of nonfundamental notions like city, smile, or candy." Since at least one relatum of an instance of a building relation is nonfundamental, purity entails that building facts are nonfundamental. Bennett worries that accepting purity here would be question-begging, and thus sets it aside.

Bennett's second argument appeals to modal recombination: If MR is true, and if building is fundamental, then there is a world *v* just like the actual world with respect to the fundamental entities, with the exception of instances of a building relation. In this world, no building occurs at all. There follows a dilemma—do the same built entities exist? If yes, then these entities are unbuilt, and hence fundamental, in *v*. This option is undesirable, since there could then be entities qualitatively indiscernible from built entities that are unbuilt. If no, then *v* is what Bennett calls an "extreme zombie world": a world in which all the same fundamental entities exist (minus a building relation), but none of the same built entities exist. This would involve indeterministic building, which Bennett argued against in §3.3. Bennett concludes by rejecting primitivism.

I argued above that Bennett's argument for building necessitation in §3.3, which relies on Converse-MR and perhaps MR, does not work. So if the second horn of the dilemma relies on it, this should not trouble one who rejects building necessitation. Such a person would simply accept that unbuilt entities are not necessitated by their builders. As for the first horn of the dilemma, Bennett herself acknowledges that she is relying on intuition. Thus the argument isn't as forceful as it may originally appear.

I suggest that Bennett's best move against primitivism about building is to advance an argument from simplicity, as she did in the case of primitivism about relative fundamentality. After all, she develops in considerable detail her alternative theory, what she calls upwards anti-primitivism. According to upwards anti-primitivism, if *a* builds *b*, then either *a* alone builds the fact that *a* builds *b*, or *a* alongside background circumstances builds the fact that *a* builds *b*. This parallels Bennett's views about building necessitation discussed in §3.3. Upwards anti-primitivism is not the only rival to primitivism. Reductionist views have also been defended by Fine (2012) and Dasgupta (2014). Accordingly, she must also defend her view against these rivals, which she does at length in chapter 7.

Bennett ends chapter 7 by offering her upwards anti-primitivism in the spirit of Humeanism. I don't think that the suggestion that the world is "entirely loose and separate"

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<sup>18</sup> See p.188-9 for her note on "building fact" talk.



can be quite right.<sup>19</sup> There must be some constraints that cannot be furthered explained, as in the case of the interaction of different categories of fundamental entity.

So where does this leave us? As I've said, I don't think that Bennett's appeals to MR are justified. However, as we've seen, whenever Bennett appeals to MR, she has another argument available to her that does not require that problematic premise. And so we might argue, optimistically, that while one of Bennett's premises is problematic, her conclusions stand. But for now, I leave this task to others.

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<sup>19</sup> See p.212 of Bennett.

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