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Super-Relationism:
Combining Eliminativism about Objects and Relationism about Spacetime

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Abstract: *I will introduce and motivate eliminativist super-relationism. This is the conjunction of relationism about spacetime and eliminativism about material objects. According to the view, the universe is a big collection of spatio-temporal relations and natural properties, and no substance (material or spatio-temporal) exists in it. The view is original since eliminativism about material objects, when understood as including not only ordinary objects like tables or chairs but also physical particles, is generally taken to imply substantivalism about spacetime: if properties are directly instantiated by spacetime without the mediation of material objects, then, surely, spacetime has to be a substance. After introducing briefly the two debates about spacetime (§1) and material objects (§2), I will present Schaffer's super-substantivalism (§3), the conjunction of substantivalism about spacetime and eliminativism about material objects at the fundamental level. I shall then expose and discuss the assumption from which the implication from eliminativism to substantivalism is drawn, and discuss the compatibility of eliminativism with relationism: if spacetime is not a substance, and if material objects are not real, how are we to understand the instantiation of properties (4§)? And what are the relata of spatio-temporal relations (5§)? I then show that each argument in favor of super-substantivalism offered by Schaffer also holds for super-relationism (§6) and examine several metaphysical consequences of the view (§7). I conclude that both super-substantivalism and super-relationism are compatible with Schaffer's priority monism (§8).*

Keywords: spacetime; material objects; eliminativism; substantivalism; relationism; super-substantivalism; super-relationism; priority monism.

§1

I will introduce and motivate *eliminativist super-relationism*. This is the conjunction of *relationism about spacetime* and *eliminativism about material objects*. According to the view, the universe is a big collection of spatio-temporal relations and natural properties, and no substance (material or spatio-temporal) exists in it. The view is original since eliminativism about material objects, when understood as including not only ordinary objects like tables or chairs, but also physical particles, is

generally taken to imply substantivalism about spacetime: if properties are directly instantiated by spacetime without the mediation of material objects, then, surely, spacetime has to be a *substance*. After introducing briefly the two debates about spacetime (§1) and material objects (§2), I will present Schaffer's super-substantivalism (§3), the conjunction of substantivalism about spacetime and eliminativism about material objects at the fundamental level. I shall then expose and discuss the assumption from which the implication from eliminativism to substantivalism is drawn, and discuss the compatibility of eliminativism with relationism regarding two problems: first, if spacetime is not a substance, and if material objects are not real, how are we to understand the *instantiation* of properties? I propose a new theory of instantiation according to which property instantiation is nothing but *property location*: properties are not instantiated by being owned by 'something' but only by being somewhere in the spacetime network (4§). Second, what are the *relata* of spatio-temporal relations (5§)? I will claim that there is room for spatio-temporal relations holding directly between natural properties. I will then show that each argument in favor of super-substantivalism offered by Schaffer also holds for super-relationism (§6) and conclude that both super-substantivalism and super-relationism are compatible with Schaffer's priority monism (§7).

I will rely hereafter on the notion of *spacetime*. I follow Mellor (2001) here in believing that we have two independent reasons to take the notion of spacetime seriously. First, special and general relativity posit an ontology in which it is natural to understand space and time as abstractions from a more fundamental concept of spacetime. For instance, according to relativistic physics, both spatial and temporal lengths between two events are frame-dependent, when *spatio-temporal intervals* are not. Secondly, time and space share important conceptual features. One of them is that the two dimensions make contact possible: for two entities to meet, they have to share spatial and temporal locations. But all of what I will say is neutral with respect to this choice. Feel free to read space and time where I refer to spacetime.

Let us begin with a presentation of substantivalism and relationism about spacetime before turning to the debate about material objects. According to substantivalism, spacetime is a *substance*. This substantiality mainly means two things. First, material entities (understood as a neutral category including objects and/or properties, for instance) are *contained* in spacetime. Let us call this the 'metaphorical feature' of substantivalism. It is metaphorical because any container, in the proper sense, is a material object that is located *in* spacetime. In a more precise sense, substantivalism posits a *relation of occupation* connecting material objects to volumes of spacetime. Secondly, spacetime exists independently of the material things that inhabit it. Were the material things to cease to exist, that spacetime would still be real. Let us call this second idea the 'modal feature' of substantivalism. It is worth noticing that the modal feature follows directly from the attribution of substantiality to spacetime. Indeed, independent existence is generally construed as a defining feature of substance. Relationism construes spacetime very differently. Spacetime is *not* a substance, says the relationist. It is a *collection of relations holding between material objects* (or events, more will be said on this later, see §5). Symmetrically, it means two things. First, spacetime is not a container. It is completely misleading to construe material objects as occupying spacetime: there is no relation of occupation holding between material objects and a spatio-temporal substance. It also means that spacetime does not exist independently of the material objects it is connected with.

What reasons is there to favor one view over the other? One of the main arguments in favor of substantialism about spacetime is the *possibility of empty spacetime*: one can conceive of

spacetimes that are absolutely empty. When dealing with time instead of spacetime, another famous argument is the *time without change argument* (Shoemaker 1969). The two arguments are deeply connected. With respect to time, the possibility of time without change comes in two versions. A lack of change can be associated with an existant that does not change, or on the contrary, to the absence of any existant (empty time). Empty time is, therefore, a particular case of time without change, and a possibility of empty time is a particular case of a possibility of time without change. Let us focus here on the possibility of empty spacetime. According to the substantivalist, one can conceive of an empty spacetime. If one believes conceivability (mind-dependent possibility) to be a reliable guide towards genuine possibility (mind-independent possibility), then an empty spacetime is genuinely possible. If spacetime and material objects can be separated, it means these are different entities: spacetime is distinct from material objects. What about *relationism*? Relationism might be construed as being committed to the impossibility of time without change and the impossibility of empty spacetime - at least if, first, relations are construed as having to obtain between material entities (like objects or events), as opposed to, say, primitive times, and, second, one wants to avoid perduring but qualitatively unchanging objects[1]. However, relationism is largely superior to substantivalism with respect to *ontological parsimony*. The main line of argument goes as follows: it is useless to posit a substantial spacetime when dealing with philosophical and scientific problems. Relations between material objects are *enough*. I do not want to discuss or assess the two views, though[2]. I am only interested at providing a short presentation of the views that will ease the introduction of super-relationism later on. Let us now turn to the second debate about material objects.

§2

Eliminativism about material objects is the view that material objects like tables or clouds are not real (van Inwagen 1990; Merricks 2001)[3]. By ‘real’ I mean here 'real *simpliciter'*. Indeed, as we shall see, there might be various ways to be real. In particular, there is conceptual room for entities that are mind-dependently real, yet not mind-independently real. And it might be that some entities are fundamentally real while others are only derivately real. This last distinction will play a certain role hereafter, but for now, it is enough to rely on the notion of ‘real simpliciter’. By contrast, realism about material objects is the more intuitive view that the material objects of daily life are real. Realism is then the *common sense position* while eliminativism is a revisionary view that has *theoretical virtues*. For example, eliminativism can solve the puzzle of *material constitution* (the relation between a statue and the clay it is made of) or the *vagueness problem* (what is the ontological status of the boundaries of vague objects like a cloud?) The puzzle of material

1 Perduring but qualitatively unchanging objects are material objects that persist through time by having temporal parts. Such objects are qualitatively unchanging iff the considered temporal parts are qualitatively identical. Perduring but qualitatively identical objects require then that one accepts entities (the temporal parts) that are qualitatively identical but numerically distinct, something one might be ready or not to accept, depending on one’s philosophical principles.

2 It might be the case, however, that the two views are explanatory equivalent (see Benovsky 2011a). If so, it is worth noting that Schaffer’s super-substantivalism and super-relationism are probably equivalent, too.

3 Van Inwagen and Merricks acknowledge that the composition of objects sometimes occurs and may then be classified as species of quasi-eliminativism. Van Inwagen claims that objects arise when there is an activity of life. For Merricks, composition occurs when there is consciousness. All I say about eliminativism is compatible with quasi-eliminativism and remains neutral on the exceptional conditions needed for composition to occur.

constitution focuses on the connection between an entity and other entities it is made from. We have a strong belief that objects cannot be co-located: each ordinary object has its own bit of spacetime. Hence, we should construe the statue as being identical to the lump of clay it is made from. But we also believe that a piece of clay can survive a radical reshape while a statue cannot. Indeed, the statue and the piece of clay are taken to have distinct modal properties. Surely, then, the statue cannot be identical to the lump of clay since to be identical, two apparent distinct entities have to share all of their properties (including modal properties). The problem is then to understand which part of our conception of ordinary objects we should overhaul to solve the difficulty. The problem of vagueness is about the boundaries of vague objects like clouds or mountains. A cloud is conceived of as a material object having vague boundaries. How are we to construe these vague boundaries? Should we take them at face value, positing ontological vagueness in the world (see van Inwagen 1990 and Williams 2008)? Is there a definite boundary we are not aware of, as claims the epistemicist (see for instance Williamson 1994; Benovsky 2011b)? Or is it a definite boundary, fixed by linguistic conventions, as claims the supervaluationist?

Regarding these two problems, the eliminativist strategy consists in denying the reality of the objects that give rise to the paradoxes. Neither the statue nor the clay is real. There are no modal properties specific to statues or clay. Statues and pieces of clay are concepts we use to categorize the world. But really, we are never in front of statues and no more in front of pieces of clay. In the same way, when we are looking at a cloud and thinking about its boundaries, we are not really looking at an object with vague boundaries. We are looking at a part of the world, a part inhabited by a heterogeneous density of water particles; but properly speaking, there is no thing that is a cloud. Eliminativism comes here as a particular kind of linguistic approach about vagueness: the fact that boundaries of particular material objects are language-dependent is simply one consequence, among others, of the fact that material objects, in general, are also language-dependent. In both cases we are only contemplating entities that are not mind-independent material objects. As we shall see, regarding what there is instead of these material objects, many options are on the table. But what is common to all of these species of eliminativism is a refusal to classify these entities as material objects.

Eliminativism about ordinary objects can be an aspect of a top-down view of the universe in which what is real is the cosmos, or the stuff. Here, ordinary objects are substituted by proper parts of the cosmos, the stuff or spacetime, resulting from a mereological *relation of decomposition* (Schaffer 2009; 2010). Let us call this position '*top-down eliminativism*'. Eliminativism can also be construed as a bottom-up approach. According to *bottom-up eliminativism*, objects are substituted by collections of mereological simple entities, resulting from a *relation of composition*. These entities can be either mereological atoms (mereologically simple material objects) or natural properties directly instantiated in spacetime (Le Bihan 2013; 2015). This last version of bottom-up eliminativism is better according to Le Bihan (2013), for it offers an answer to Sider's argument against eliminativism based on the possibility of gunk (Sider 1993)[4]. I will therefore accept that we have strong reasons to believe that if material objects are not real, then what there is instead are natural properties directly instantiated by spacetime (bottom-up eliminativism) or proper parts of

4 Sider's argument goes as follows: the world might be gunky (that is, be infinitely divisible into smaller and smaller proper parts with no simple particles). But a gunk world is a world in which there cannot be mereological simples to substitute for material objects. Then, it might be that eliminativism is false; and if it can be false, then it is false. There are various responses to the argument. See for instance Le Bihan (2013): if spacetime were gunky, *natural properties* could act as the mereological simples and be instantiated by gunky spacetime.

the cosmos (top-down eliminativism). Actually, I believe that bottom-up and top-down eliminativisms are two faces of the same coin: the two views are different descriptions of the very same universe. This is true if one drops both the view that the whole is more fundamental than the parts (as in some versions of top-down eliminativism, see §3) and the view that the parts are more fundamental than the whole (as is often assumed in atomistic ontologies). But it does not matter if you do not agree with me on this. What matters here is that, in both top-down and some versions of bottom-up eliminativisms, no physical particles are to be found in the bottom world. If entities inhabiting the bottom world are not particles, then, the considered view might not only be eliminativist about ordinary objects, but also about *physical particles*.

This shows that one can be eliminativist about several related but distinct notions of material objects. Let us define *ordinary objects* as tables, chairs, and mountains, and *material objects* as a broader notion including both ordinary objects and non-ordinary concrete objects like physical particles. In what follows, I want to endorse a version of eliminativism that denies reality not only to ordinary objects, but also to physical particles. By physical particles, I mean both *mereologically complex particles* (atoms like *H* or *O* and molecules like H_2O) and *mereologically simple particles* (for instance electrons and quarks). The reason to do that is quite obvious if one reminds oneself that the whole paper is about developing a view that is both relationist and eliminativist. If physical particles were to be real, this kind of weak eliminativism would not pose any problem to relationism: spatio-temporal relations would hold between physical particles (instead of ordinary objects) and natural properties would be instantiated by physical particles. My goal is to develop a more radical relationist view that is eliminativist about both ordinary objects and physical particles. I will call this view 'eliminativism about material objects'.

§3

Eliminativism of the radical kind I just described above seems to lead to a substantivalist view of spacetime. Indeed, if there is not a single object to instantiate properties, and if properties are directly instantiated by spacetime, it seems that spacetime has to be a substance. A famous example of an account that combines substantivalism about spacetime with a view very similar to eliminativism about material objects is offered by Schaffer (2009; 2010)[5]. This is a kind of top-down eliminativism, since material objects are substituted by proper parts of the cosmos, understood as spacetime. Schaffer's view *relates closely* only to eliminativism, however. He departs from classical eliminativism in two important ways. First, he acknowledges the reality of material objects. Indeed, one particularity of Schaffer's view is that material objects exist, albeit in a *derivative way*. This relates to the view that there are distinct levels of reality. In his view, there are no material objects at the *fundamental* level of reality. Material objects are identified with proper parts of one substance only: spacetime. Since in Schaffer's account proper parts are derivative with respect to the whole they are parts of, material objects have derivative existence. So Schaffer is not eliminativist about material objects. He is only eliminativist about material objects at the fundamental level of reality. Second, he is eliminativist about fundamental material objects but realist about *one and only one fundamental object*. Hereafter, I will opt to characterize Schaffer as

5 For another example, see Horgan and Potrč's blobjectivism (2000): according to the ontological part of the view, what there is is just a concrete particular, the cosmos. The main feature of this existence monist view is that the cosmos is a complex entity that does not admit of proper parts.

an eliminativist at the fundamental level, given that I take a realist to be committed to the reality of a *plurality* of objects. But one could, equivalently, also characterize the view as a kind of realism, if one takes the reality of only one fundamental object to be enough to establish a kind of realism. I favor this terminological choice because I take common sense to construe 'material objects' as amounting to more than one object - but nothing important depends here on this convention[6]. Let us call this position *fundamental eliminativism about material objects*: there is only one fundamental object and all the other objects are only derivately real. Schaffer's broad view, called *priority monism*, can then be construed as the conjunction of:

1. a stratified ontology with different levels of reality,
2. the priority-of-the-whole view,
3. fundamental eliminativism about material object*s*,
4. derivative realism about material objects, and
5. substantivalism about spacetime.

Super-substantivalism[7] may then be defined as the conjunction of 3. and 5.: fundamentally, material objects are not real, and spacetime is a substance. Spacetime is a super-substance, meaning it is the only fundamental substance.1. and 2. should not be confused. Claiming that the world is layered in distinct levels of reality is one thing, and claiming that there is a priority of one level over the other is another. 2. implies 1., because positing a relation of hierarchy between levels of fundamentality requires first positing levels. But positing levels of reality leaves open the question about the connection between the levels. The priority-of-the-whole view is, therefore, a further claim about the *relation* between the cosmos (spacetime) and its proper parts (spacetime regions). Either it is a real mind-independent ontological relation, or it is not. If it is, as is believed by Schaffer, then one can ask about priority. Is there a metaphysical priority of the whole over its parts? Or on the contrary, are parts more fundamental than the whole? So, there are three competitive views on this matter: an *anti-realism about (de)composition*, a *priority-of-the-parts view*, and Schaffer's *priority-of-the-whole view*. What about 3.? Fundamental eliminativism about objects draws its specificity from 1. and 2.. In a flat ontology, fundamental eliminativism just is eliminativism about material objects since there is no level of reality permitting an ontological reading of the term 'fundamental'.

4. describes a specific kind of super-substantivalism. If Schaffer (2009) argues in favor of *identity super-substantivalism,* he acknowledges that his arguments are compatible with *constitution super-substantivalism* and *eliminativist super-substantivalism*. Identity super-substantivalism is the view that spacetime parts are identical to material objects. Constitution super-substantivalism is the view that material objects are real, but are not identical to spacetime parts:

6 One could argue that the common view that there are many objects is accounted for in Schaffer's view by both the fundamental object *and* the plurality of derivative objects, and that it makes more sense to construe Schaffer's view as realist about material objects. And true enough: it all depends on how heavily we want to weigh derivative existence. But once again, inasmuch as the depicted ontology is clear enough, this terminological problem does not matter too much.

7 Schaffer uses the expression 'monistic substantivalism' in this context. I will stick to Sklar's original expression 'super-substantivalism' (Sklar 1974, 214), assuming that the two expressions are synonyms.

material objects hold in a relation of constitution with spacetime parts, assuming that the relation of constitution is not the relation of identity. Eliminativist super-substantivalism is the view that material objects are not real. What there is instead are spacetime parts that are not material objects. As Schaffer explains:

> I will defend the identity view, which identifies material objects with spacetime regions. I believe this to be the view of Descartes and the other advocates of monistic substantivalism above. But the monist need not hold the identity view. She might hold the eliminative view, which denies the existence of material objects altogether. I consider this view extremely radical. As I will argue below (§3), spacetime regions can play the main role of material objects, in serving as the pincushions for properties. So I consider the eliminative view to be unwarranted. In any case I will not discuss the eliminative view any further in what follows. The monist might also hold the constitution view, which accepts the existence of material objects and does not identify them with spacetime regions, but rather takes material objects to be constituted by—and in that sense derivative from—spacetime regions. (Schaffer, 2009, 133-134)

It is worth noting that Schaffer does not provide a strong argument against eliminativist super-substantivalism, but instead offers a reason for ignoring the view: eliminativist super-substantivalist is a radical view, so identity super-substantivalism is preferable. Indeed, because 'spacetime regions can play the main role of material objects, in serving as the pincushions for properties', we should exploit the possibility that spacetime regions offer for endorsing realism. I do not concur with him on this point because, even though I acknowledge that the view is fairly radical, I am receptive to its theoretical virtues. Besides, spacetime regions are usually not conceived of as common sense material objects. Thus, such a *revisionary view* also has its share of counter-intuitivity and it is not obvious, at least to me, why an eliminativist view is supposed to be necessarily more radical than a very revisionary view about material objects. And even if the eliminativist view were slightly more radical than any revisionary view, why exactly should we take this as a reason for favoring the revisionary view over the eliminativist one? Let us assume, then, that eliminativist super-substantivalism deserves as much consideration as identity super-substantivalism.

Another interesting matter is 5. and the relation between 5. and priority monism. When granted that natural properties are directly instantiated by spacetime, what consequences should we draw about the nature of spacetime? A natural move is to understand spacetime as a substance that bears the properties. To put it differently, eliminativism about material objects seems to imply a substantivalist view about spacetime. Is substantivalism an essential aspect of priority monism? That is, since super-substantivalism is defined as the conjunction of substantivalism and the priority-of the whole view, is super-substantivalism an essential aspect of priority monism? I believe it is not: 5. can be substituted by 5*.: relationism about spacetime. Relationism about spacetime is compatible with fundamental eliminativism (3.) resulting in a super-relationist view: properties can be instantiated by spacetime, even if spacetime is not a substance. For now, I want to describe super-relationism in more detail. In the next sections, I will show that super-relationism is coherent by discussing two problems for an ontology without natural substance (material or spatio-temporal): the instantiation of properties (§4) and the nature of the relata of spatio-temporal relations (§5). I will then sum up Schaffer's seven arguments in favor of super-substantivalism, showing that they hold in the same way in favor of super-relationism (§6). I will conclude this study

by drawing consequences for priority monism (§8).

§4

If spacetime is not a substance, if material objects are not real, how are we to understand the instantiation of properties? Can eliminativist super-relationism make sense of instantiation? At first sight, it seems it cannot. I will proceed in two steps in this section. First, I will briefly present two reasons to take the notion of instantiation by spacetime seriously (further arguments will be provided in §6 when I will examine the extension of Schaffer's arguments in favor of super-substantivalism to super-relationism). Second, I will argue that instantiation by spacetime does not entail a substantivalist conception of spacetime.

Empirically, physicists posit in *quantum field theory*, through the concept of *field*, properties that are not properties of objects. For instance, an electromagnetic field is a distribution of electromagnetic magnitudes in a space, these magnitudes partially explaining the behavior of charged particles like electrons. These properties are, therefore, not properties of objects since they are distributed across space[8]. But one might be tempted to counter that since properties are properties *of* a field, then a field *is* an object. However, this objection involves an explanatory circularity of the worst kind. A field is *defined* as a distribution of quantitative properties in a space. If a field were what instantiates properties, then it would imply that a distribution of properties in a space instantiates these properties. This is surely a weird way to present things[9]. The correct move here is, on the contrary, to describe *space* as instantiating properties. I will assume therefore that it is common in contemporary physics to posit properties instantiated by spacetime itself. Another way to make instantiation by spacetime a respectable notion is through the *bundle theory*. In metaphysics, the *bundle theory about objects* is the view that material objects are bundles of natural properties. There is no *substratum* under the properties. What there is instead is a bundling relation. Hence, the *unifying device* (Benovsky 2011) that holds the properties together belongs to the category of *relation*, not of substance. If such a view is coherent, then it is coherent to construe objects as lacking a substratum instantiating properties. Properties are tied together by a relation, not instantiated by a substance.

Let us move on to the second step of the presentation. I have emphasized that we have both empirical and a priori reasons to find the notion of instantiation of properties by spacetime deserving of consideration. But it does not show that a *relational spacetime* may instantiate properties. Instantiation by spacetime could be interpreted on the contrary as supporting the claim that *spacetime is a substance*. It may even give more credit to the bundle theory by offering an ersatz theory of material substance through the notion of substantial spacetime. If fields are real entities, then spacetime is a substance. If objects are bundles of properties, then spacetime is a substance. Properties have to be properties of something, this something being a substance. It might be substantial spacetime, substratum or something else, but it has to be *something*. If this something

8 Within the scope of this paper, I do not want to explore speculative physics like geometrodynamics (the idea that no natural properties are to be found at the fundamental level of reality) or loop quantum gravity (the idea that spacetime is not real at the fundamental level of reality) and will restrict myself to considerations arising from widely accepted physical theories.

9 One might be tempted to argue that natural properties are instantiated *because* they are parts of fields. Granted, but it then remains to be explained how the field-made-of-properties is connected to spacetime, and another notion of instantiation is required to fill the gap between fields and spacetime.

is not a substratum or another kind of material substance, then it has to be substantial spacetime. The very coherence of eliminativist super-relationism relies, then, on the plausibility of the notion of instantiation of natural properties by nothing (no substance) in a relational spacetime. This move is quite revisionary since properties are almost always presented as properties of something. Let us call this matter the 'problem of instantiation' for eliminativist super-relationism. It is worthy of attention that physicists do not always seem to see a problem. Strawson, for instance, sums up the situation as follows:

> If there is a process, there must be something – an object or substance – in which it goes on. If something happens, there must be something to which it happens, something which is not just the happening itself. This expresses our ordinary understanding of things, but physicists are increasingly content with the view that physical reality is itself a kind of pure process – even if it remains hard to know exactly what this idea amounts to. The view that there is some ultimate stuff to which things happen has increasingly ceded to the idea that the existence of anything worthy of the name 'ultimate stuff ' consists in the existence of fields of energy – consists, in other words, in the existence of a kind of pure process which is not usefully thought of as something which is happening to a thing distinct from it. (Strawson 1997: 427)

I take physicists to be right on this, and I will argue that a good description of what is going on here is that properties are instantiated by spacetime, or exist in spacetime, even though spacetime is *not* a substance. However, I believe there is a genuine problem of instantiation that we have to address: what does it mean that properties are instantiated by nothing in spacetime?

'The problem of instantiation' is a name for the incompatibility of super-relationism with classical views of instantiation. By 'classical views of instantiation' I mean the views that take instantiation to require an *instantiating entity*. Take for instance the supervenience view (Armstrong 1978) and the operator view (Forrest 2006). According to the supervenience view, instantiation supervenes on the existence of properties and particulars. In the operator view, properties are operating on particulars to create state of affairs. These views have in common a definition of instantiation in terms of an instantiating entity (the particular). I propose on the contrary to adopt a *relational view of instantiation* in which there is no instantiating entity. This is the view that for a property to be instantiated is just for it to be *located* in the network of spatio-temporal relations. Or to put it differently, to be instantiated is to *exist* as the relatum of a collection of spatio-temporal relations. To be sure, I am not arguing here for the relational view of instantiation on independent grounds. Remember that the objection against super-relationism is not that it engages a particular view of instantiation, but that it *does not make sense* to construe properties as being instantiated by nothing. I argue here that it *does* make sense. The argument that the relational view of instantiation is not intuitive or grounded in common sense is a very different, weaker objection. Indeed, someone who does not care much about what folks believe about ontology will not feel particularly concerned by a revision of the notion of instantiation.

The relational view of instantiation may be better understood as the view that *there is no instantiation in the classical sense*, though. What there is *instead* is a local existence of natural properties, that is, field values, spins, and similar physical properties. Whether we should interpret this claim as eliminativist or revisionary about instantiation is, to my mind, merely a terminological matter. We can describe eliminativist super-relationism as claiming that properties are not instantiated entities since there is no genuine instantiation. Alternatively, we can describe the view

as presenting us with a world inhabited by an exotic form of instantiation very different from what we thought it was. But it does not matter much to choose to describe the situation in one way or the other, assuming that we have a clear picture of what is substituted to the classical view of instantiation. The picture is quite clear: reality is a collection of spatio-temporal relations obtaining between concrete values. These values are properties instantiated in the sense that they exist as relata of spatio-temporal relations. Reality is a collection of spatio-temporal relations obtaining between properties *floating in the void*, if one wants to use a metaphor. But this metaphor should not confuse us: this void should not be understood as a substantial spacetime. The void arises from the collections of spatio-temporal relations and natural properties, this is merely the *configuration* of spatio-temporal relations and natural properties that constitutes the parts of spacetime that we categorize as being empty.

As I wrote above, I take the relational theory of instantiation and the view that spatio-temporal relations hold between natural properties to be *two faces of the same coin*. So a possible difficulty for the view is that it implies a kind of circularity[10]. By its relationist essence, super-relationism implies that spatio-temporality is understood in terms of relations between natural property instances: spacetime is a collection of spatio-temporal relations between *natural property instances*. Hence, a relation is spatio-temporal *in virtue of* being connected to natural properties instances. On the other hand, according to the relational theory of instantiation, a natural property is instantiated by being located in the network of *spatio-temporal relations*. A natural property is instantiated *in virtue of* being connected to spatio-temporal relations. So spatio-temporality depends ontologically on the existence of natural property instances, while instantiated properties depend ontologically on the existence of spatio-temporal relations. The view carries therefore implicit definitions involving a kind of circularity. One could therefore infer that, since circularity is bad, the view should be rejected. I agree that there is a kind of circularity here, but it is not necessarily problematic. This view implies *metaphysical coherentism*, the view that there are 'grounding loops' (Bliss, 2014): for instance, *x*'s existence depends on *y*'s existence and *y*'s existence depends on *x*'s existence, *x* and *y* being two distinct entities. Here, naturalness (natural properties) grounds spatio-temporality (spatio-temporal relations), and spatio-temporality grounds naturalness. Regarding this matter, then, there is no *fundamentalia*, that is, an independent entity that is not grounded by something else. Actually, I take this consequence to be a good thing, since super-relationism is a no-substance ontology and, as I wrote above, independent existence is generally construed as a defining feature of substance. We therefore end up with an ontology of natural properties and spatio-temporal relations, each category ontologically depending on the other one, none of them being substances.

The relational view of instantiation is, therefore, at least coherent. At worst, the view suggests that there is no instantiation of properties, strictly speaking, but it is not contradictory to posit an ontology of fields values and spatio-temporal relations holding between them. So let us assume that the view is coherent. But why should we believe this view to be true? I will be brief

10 I want to thank Akiko Frischhut and Jonathan Schaffer for raising this issue. It is worth noting that ontological interdependence is not only an issue for super-relationism (if it is an issue at all), since both the bundle view and the substratum view also have to posit ontological dependence between properties and the unifying device that joins them together. A bundling relation is generally construed as ontologically depending (in order to be instantiated) on the existence of the properties it ties together. And the very existence of these properties depends ontologically on the existence of the bundling relation. Similarly, substrates and properties instantiated by it are generally construed as being ontologically interdependent: there is no bare substrate (it does not make sense to conceive of a substrate that does not have any property), and properties of the substrate depend ontologically on the existence of the substrate.

here: the relational view of instantiation is parsimonious in denying reality to a *sui generis* mind-independent relation of instantiation holding between objects and their properties. And parsimony just is the main reason to find eliminativist super-relationism attractive, as we will see in section §6: in this framework, there is no object and no relation of instantiation. In an ontology in which there is no substance at all (material or spatio-temporal), is it really surprising to end up with an ontology in which there is no instantiation in the classical sense?

§5

Another possible problem for eliminativist super-relationism is the nature of the relata of spatio-temporal relations. Usually, relationism about spacetime construes spatio-temporal relations as obtaining between material objects or events. In eliminativist super-relationism, neither ordinary objects nor physical particles are real: material objects are, therefore, not an option for serving as relata for spatio-temporal relations. Should we then endorse the view that spatio-temporal relations obtain between *events*? I believe we should not because the very notion of an event is not *analytically simple*. An event can be defined as the instantiation of a property by a substance at a time t and at a location $<x,y,z>$. I find hard to believe then, that event could be a *primitive ontological category* when it is not an analytically primitive notion. When we say that spatio-temporal relations hold between events, we have to specify between which part of the complex category of event the relations obtain between. Since an event is made of a *material object*, a s*patio-temporal location* and a *property* we have three options. In the framework of eliminativist super-relationism, once again, the category of material object is not an option. What about spatio-temporal locations? Could we endorse the view that spatio-temporal relations hold between spatio-temporal locations (that can define as couples $<<x, y, z>, <t>>$)? Spacetime regions are either infinitely divisible into smaller and smaller spacetime regions or made of points. In the last case, then spacetime relations primarily hold between points, and only derivately between spacetime regions (because regions are just collections of points, here the distinction between primary and derivately corresponds merely to a difference of scale, not of ontological fundamentality). On the contrary, if spacetime is gunky (any spacetime time region divides infinitely into smaller and smaller proper parts), then spacetime relations may obtain between spacetime regions.

I am concerned with a super-relationist view, though: assimilating reality to points and/or spacetime regions is already taking a step towards substantivalism. If spacetime is made of spatio-temporal relations between spacetime points, then points are real and exist independently of material entities (objects or properties). Independent existence is a criterion of substantiality, though. This view should be classified as a kind of substantivalism, not relationism. In the same way, if spacetime is made of spatio-temporal relations between spacetime regions all the way down, then it is hard to see why these spacetime regions could not exist without the material objects existing within them and would not qualify as substantial spacetime. This reasoning shows that any proper relationist view of spacetime needs to posit relata that do not belong to the category of spacetime. If relations hold between spacetime regions or points, the resultant view is that spacetime is independent from the existence of natural properties.

The only viable eliminativist super-relationist option is therefore to construe spatio-temporal relata as natural properties. *Eliminativist super-relationists should claim that spatio-temporal relations hold between natural properties*. The view is eliminativist since there is no material object

and no independent spacetime points or regions. It describes a world made of natural properties and spatio-temporal relations holding between them.

One may ask about the connection between spatio-temporal relations and natural properties. Does it make sense to claim that relations are holding between properties instead of substances? I do not see why it could not be so. It is quite common to posit *second-order relations* between first-order properties. For instance, take Armstrong's view (1978) that laws of nature are identical to relations of necessitation (second-order relation) between universals (first-order properties). Besides, there is no reason why connecting a property to a relation (another way to describe a property acting as the relata of a relation) should be more difficult than connecting it to a substrate. The *problem of connection* is a more general problem and is known as *Bradley's regress* (Bradley 1893; for discussion, see Maurin 2012). If the connection between a property and a substrate is described as a *brute fact*, then I fail to see why the connection between a property and a relation could not also be construed as a brute fact. If, alternatively, one seeks refuge in a *theory x* (an object is connected to a property because *x*), I again fail to see why the same could not hold for properties and relations (a relation is connected to a property because *x*). Any general account about the problem of connection covers both particular problems.

The problem of instantiation and the problem of relation's solutions are two faces of the same coin: natural properties are the relata of spatio-temporal relations, and this *is* the instantiation of properties. Eliminativist super-relationism is therefore both a coherent and parsimonious view of the natural world.

§6

Let us now examine Schaffer's seven arguments in favor of super-substantivalism. These are designed to support *identity super-substantivalism* against classical dualism (the standard view that material substances and spatio-temporal substances are real but distinct). Schaffer's arguments are not directed against other kinds of super-substantivalism (eliminativist and constitution super-substantivalism) or against super-relationism about spacetime. Schaffer does not say anything about this last position. So, to be crystal clear, I am in no way arguing against Schaffer in this section. Rather, I am extending the scope of his arguments in order to show that they support both super-substantivalism and super-relationism. Since his arguments are put forward with identity super-substantivalism in mind, I will show how they support both identity super-substantivalism and eliminativist super-substantivalism. I will then show that each argument also supports eliminativist (and identity) super-relationism. I hope that at the close I will have convinced you that eliminativist super-relationism, by inheriting of the advantages of super-substantivalism, relationism, and eliminativism, is a powerful and elegant view. I will conclude the article (§7) with a brief remark on the connection between super-relationism and Schaffer's priority monism.

The first argument that Schaffer offers in favor of super-substantivalism is an *argument from parsimony* (2009, 137). It relies on the idea that we should prefer the ontology that posits as few *types of entities* as possible. More precisely, Schaffer's construes these types of entities as kinds of *substances*: if two accounts can explain the same things, we should favor the one that posits the fewer substance types. By substance 'types', Schaffer means *spacetime substance* and *material substances*. If spacetime regions can do the explanatory work that material substances are typically

invoked for, then there is no need to posit material substances. Material substances and spacetime regions do the same explanatory work since both types of entities are construed as instantiating properties. As Schaffer writes:

> Material objects are supposed to provide the pincushions for the properties. (…) Substantival spacetime regions bear properties. So they do what objects should do. Thus there is no need for a second sort of substance to do what has already been done. Spacetime is pincushion enough to support a propertied world. It is as if the dualist has not just pins (properties) and pincushions (material objects), but also a sewing table (the spacetime manifold) on which the pincushions sit. But once one has the sewing table, the pincushions seem superfluous. Why not push the pins directly into the table? (2009, 137-138)

So once we get a substantivalist spacetime able to directly instantiate properties, without intermediary material objects, there is no further explanatory work to be done by material substances. This argument relies on the fact that properties are directly instantiated by spacetime understood as a substance. This argument does not engage with a substantivalist conception of spacetime and its regions *per se*, though. In fact, there is no bar to construe both spacetime and material objects as being *not* substances. All that matters for the parsimony argument to get off the ground is that two kinds of entities (material objects and spacetime parts) should not be construed as distinct entities if they belong to the *same ontological kind* (here substance). The main point here is belonging to a very *same ontological kind*, not belonging to the particular substance kind. This ontological kind can be construed as substance, but this move is in no way mandatory. Identity super-relationism, for instance, construes both spacetime (and its parts) and material objects (and their parts) as relational. Spacetime is a collection of spatio-temporal relations, and material objects are identical to spacetime parts. Since spacetime is a collection of spatio-temporal relations, spacetime regions are proper parts of the maximal collection of spatio-temporal relations, that is, collections of spatio-temporal relations. It follows that material objects also are collections of spatio-temporal relations. Here, it is easy to see that both spacetime regions and material objects are of the same ontological kind since *both of them* are collections of relations. We can therefore conclude that there is no need to posit that material objects exist in a distinct way: they just are collections of spacetime relations. To be more accurate, material objects are collections of spatio-temporal relations and *natural properties*. Since material relations between natural properties are identical to spatio-temporal relations between natural properties, we end up with a parsimonious ontology as in Schaffer's original argument. Now, since the argument does not only support identity super-substantivalism, but also eliminativist super-substantivalism, we can claim parsimony by claiming that there are no material objects, and that what there is instead are spacetime regions understood as collections of spatio-temporal relations. In a nutshell, in the same way that Schaffer's parsimony argument supports both *identity and eliminativist super-substantivalism*, it also supports both *identity and eliminativist super-relationism*. Instead of being identified with substantial spacetime regions or of being eliminated in favor of *substantial spacetime regions*, material objects can be identified with, or be eliminated in favor of *relational spacetime regions*: the gain of parsimony is exactly the same, independent of a relationist or a substantivalist reading of spacetime regions[11].

11 There is even a gain of parsimony if one believes that substantial regions are not required if spatio-temporal relations are already posited.

The second argument is the *argument from mereological harmony* (2009, 138). It begins by giving thought to the mereological parallel between material objects and spacetime regions. Both material objects and spacetime regions have dimensions and proper parts. And, material proper parts of material objects always occupy spatio-temporal proper parts of spacetime regions. This kind of geometrical redundancy might be understood as a *brute fact*. But it is always good to avoid positing brute facts wherever possible. Super-substantivalism makes this move possible. If material objects are just identical to spacetime regions, then we have an informative explanation of mereological harmony: the mereological features of spacetime regions and material objects are identical for the very reason that spacetime regions and material objects themselves are identical. Alternatively, and utilizing the eliminativist version of super-substantivalism, there is mereological harmony because material objects are eliminated in favor of spacetime regions. But here again, there is no need to construe spacetime regions as substantial. Spacetime regions can perfectly well be construed as collections of spatio-temporal relations. The explanation of mereological harmony will be the same: material objects are just identical to collections of spatio-temporal relations (identity super-relationism) or are eliminated in favor of collections of spatio-temporal relations (eliminativist super-relationism).

The third argument is the *monopolization argument* (2009, 140-141). It starts from the principle that each material object occupies *only one* spacetime region. Again, this could be understood as an inexplicable brute fact. But identity super-substantivalism provides an explanation of this fact: a material object occupies only one region because it is identical to the region. Equivalently, eliminativist super-substantivalism explains monopolization in the following way: there are no material objects, and what we misconstrue as material objects just are spacetime regions. The fourth argument works in a similar way. According to the *materialization argument* (2009, 141), a material object cannot exist without occupying one spacetime region. The obvious reason for this fact, according to the identity super-substantivalist, is again that a material object is *nothing other* than a spacetime region. Symmetrically, according to the eliminativist super-substantivalist the explanation is that we misconstrue spacetime regions as material objects: we cannot therefore conceive of a material object that would not be located somewhere in spacetime. Now, both the monopolization and the materialization arguments remain neutral on the exact nature of a spacetime region. Whether a spacetime region is substantial or is a collection of spatio-temporal relations does not change anything to the explanation about the connection between spacetime regions and material objects: the two arguments, therefore, also support identity and eliminativist super-relationisms.

The *argument from exhaustion* comes fifth (2009, 141-142). The idea is that a material object occupies *at most* one spacetime region. As Schaffer writes: 'multiple location is the prerogative of universals–material objects like tables do not enjoy such liberties'[12]. The dualist has no explanation of this fact since it should be possible for a material object to be connected to various spacetime regions with a relation of occupation. Again, this fact can be explained if we posit that the relation of occupation just is a relation of identity: material objects are identical to spacetime regions. Or in the eliminativist version, material objects are not real and exhaustion follows from our false assumption that material objects are real. What there is instead are spacetime regions instantiating properties. The story is the same here: exhaustion does not say anything about the nature of spacetime and its parts. If material objects are identical to collections of spatio-

12 Meaning here 'spatial location': in most of realist accounts of material objects, these have multiple *temporal* locations.

temporal relations, or are eliminated in favor of collections of spatio-temporal relations, we have a straightforward explanation of exhaustion.

The last two arguments are empirical: they show that both quantum field theory and general relativity suggest that natural properties are directly instantiated by spacetime. I have already presented a similar argument from quantum field theory in §4, so allow me to quote Schaffer on general relativity:

> General Relativistic models are triples <*M*, *g*, *T*> where *M* is a four-dimensional continuously differentiable point manifold, *g* is a metric-field tensor, and *T* is a stress-energy tensor (with both *g* and *T* defined at every point of *M*, and with *g* and *T* coupled by Einstein's field equations). *There are no material occupants* in <*M*, *g*, *T*> triples. That is, the distribution of matter in General Relativity is not given via a list of material objects in occupation relations to regions. Rather the distribution is given by the stress-energy tensor, which is a field, and thus naturally interpreted as a property of the spacetime. As Einstein notes: '[Lorentz's] discovery may be expressed as follows: physical space and the ether are only different terms for the same thing; fields are physical states of space' (1934, 274). (2009, 142)

Claiming that ether has not been eliminated in favor of spacetime, but is identical to spacetime is nothing other than the attribution of substantiality to spacetime. But once again, there is no bar to a relationist interpretation here. That we live in a world of fields does not point towards a substantivalist view of spacetime. The fields can be understood as a collection of magnitudes entertaining spatio-temporal relations. In §4 I have shown that instantiation of properties by spacetime does not analytically entail that spacetime is a substance.

I therefore conclude that all of the arguments exposed in favor of identity super-substantivalism also support eliminativist super-relationism. The moral to be drawn here is that there are not only three important positions to be considered when crossing the two debates about spacetime and material objects. Four candidates are in the run: relationism, substantivalism, super-substantivalism and super-relationism. I hope to have shown that since it inherits some of the advantages of both relationism and eliminativism about material objects, eliminativist super-relationism is an interesting and elegant view that deserves careful consideration.

§7

In this section, I want to examine three consequences of the view for general metaphysical matters: first, for the ontology of properties (tropes or universals); second, for possible similarities of the view with the classical bundling view; and, finally, for a possible inconsistency of the view as regards the definition of possible worlds. To begin with, let us address the question of whether properties should be construed as tropes or universals, or whether super-relationism may remain neutral on this matter. Entities are, usually, *individuated* by either *substrates* or *bundling relations*. So, in a no-substrate ontology, individuation cannot be assumed by substrates and, in a no-object ontology, it cannot be assumed by bundling relations, either. Since super-relationism, in its eliminativist version, is both a no-object and a no-substrate ontology, the individuation function has to be filled by entities belonging to other categories: properties or spatio-temporal relations. To

distinguish between two collections of qualitatively identical properties and relations, one of the two categories has to bear the function of individuation. It means that, in terms of a foundation for individuation, either properties or relations have to be construed as *tropes*. In the first case, the *trope view of properties*, *properties* individuate collections of properties and relations. In the second case, the *trope view of spatio-temporal relations*, *spatio-temporal relations* individuate collections of properties and relations[13].

In order to understand this point more clearly, let us consider the following objection. If super-relationism is true, then, how are we to understand situations in which the same F-ness property is connected to itself by one or more instances of the same spatio-temporal relation? Let us take the example of an equilateral triangle made of three instances of the relation 1 unit apart (r_1, r_2, r_3) and three instances (f_1, f_2 and f_3) of the F-ness property (at the three vertices)[14]. How are we to individuate the three states of affairs, if each of them connects the very same property to itself with the very same relation? In the case of the *trope view of properties*, f_1, f_2 and f_3 are three *distinct properties* enjoying a relation of exact resemblance while r_1, r_2 and r_3 are three names for just one relation R. We thus obtain the three following *distinct* states of affairs: f_1Rf_2, f_1Rf_3 and f_2Rf_3. In the case of the *trope view of relations*, f_1, f_2 and f_3 are three names for one and only one property F. But r_1, r_2 and r_3 are three *distinct* relations 1 unit apart, holding in a relation of exact resemblance. We thus obtain: Fr_1F, Fr_2F and Fr_3F, three *distinct* states of affairs. We can see that super-relationism should therefore individuate collections of properties and relations by endorsing either a trope view about properties or a trope view about spatio-temporal relations (or both).

Now, this objection could be pursued further by asking how we are to distinguish the triangle case from a tetrahedron case (in which four instances of the same property are connected by four instances of the relation 1 unit apart), granted that relations and properties are supposed to be the same in the two cases. In each case, each instance of the F-ness property is connected to itself by two instances of the relation R: how are we to distinguish the two cases? Once again, the function of individuation is assumed by assigning particularity to at least one of the two categories: either natural properties or spatio-temporal relations are tropes (or both). If properties are tropes, then the properties at the corners of the regular tetrahedron and at the vertices of the triangle are not the same. They may seem perfectly identical, but, in fact, these properties are *numerically distinct entities* holding in a relation of exact resemblance. This numerical distinctness ensures the distinction between the triangle case and the tetrahedron case. Alternatively, if spatio-temporal relations are tropes, then the relations ensure by themselves the numerical distinctness of the two situations: the relations are numerically distinct, even though qualitatively indistinguishable. Once again, the two cases show that super-relationists need to locate particularity inside one of the two primitive ontological categories.

Let us now turn to the second point: how is super-relationism supposed to differ from the bundle theory? Super-relationists may endorse two versions of eliminativism about material objects: either *nihilism about composition*, the view that the world is only made of simples, mereological composites being unreal, and *un-restrictivism/universalism about composition*, the view that the world includes composite mereological sums[15]. In a way, the distinction between universalism and

13 I mean here the view that spatio-temporal relations are individuals that have, each, only one instance.

14 I want to thank an anonymous referee for raising this issue.

15 One may equivalently formulate this point along a top-down approach: according to the nihilist about decomposition, decomposition, as a mind-independent relation, that would give rise to proper parts, never obtains. According to the universalist about decomposition, decomposition always obtain, giving rise to proper parts which are not material objects.

nihilism relies on the interpretation of the notion of sum/collection/set/class: is this notion of plurality implying the existence of *collective classes* or only the existence of *distributional classes*? The universalist answers that collective classes are real, the nihilist that there are only distributional classes.

Either way, the resulting super-relationist view differs strongly from the classical bundle theory. Under the nihilist assumption, the situation is pretty clear: there are *no* composite objects, and then there is *no room for bundles* of properties. Under the universalist assumption, by contrast, composite objects are real because of universal composition, even though these objects/mereological sums are not identified with material objects (for instance because material objects should not include *monstrous objects* like the one resulting from the composition of the Eiffel Tower and the top of my nose). But one may be tempted, then, to ask where the difference really lies and argue that one must *identify* the mereological composition relation with the bundling relation. One could go on by claiming that super-relationism (in conjunction with universalism about composition) is just a particular kind of bundle theory: material objects are real since these are mereological sums of properties. However, against that, it is important to see that the bundling relation is generally construed as a *selective relation* (it does not allow for everything to be tied together blindly). For instance, L.A. Paul's mereological bundle theory (2002) relies on a *restrictive* relation of composition: composition sometimes occurs, sometimes not. Endorsing the reality of a universal composition relation is not enough, therefore, to cash out a bundling relation. Or, to put it slightly differently, the conjunction of super-relationism and universalism about composition may be construed as a new and particular kind of bundle view, one that is far *too liberal* to be equated with the classical bundle view.

Finally, one may object that super-relationism is forsaking the means for drawing a helpful distinction between merely possible worlds and the actual one. Indeed, one may construe a possible world as a recombination of the ingredients that make up the actual word. A possible world would therefore be a collection of properties which are related in a different way to how they are in the actual world. Here is a difficulty, however, for such a definition: it seems that the super-relationist cannot then claim that the actual world is just the world in which properties are instantiated since, for her, instantiation is just connection to spatio-temporal relations and the objector may argue that merely possible worlds are also made of spatio-temporal relations connected to natural properties. There are two ways to address this issue, depending on whether one is *realist* or *anti-realist* about abstract entities (abstract properties and abstract relations). If one is anti-realist about abstract entities, the question admits of an easy answer: a property is actual if and only if it exists (remember that a property exists if and only if it acts as the *relata* of at least one spatio-temporal relation). Similarly, a spatio-temporal relation is actual if and only if it exists. If one is realist about abstract entities, a further condition is required. A property is actual if and only if it exists *concretely*. We then need a criterion to distinguish between abstract and concrete existence. Happily, super-relationism has a natural criterion: a property exists concretely if and only if it is connected to *concrete spatio-temporal relations* (by contrast with abstract relations) and a spatio-temporal relation exists concretely if it is connected to *concrete natural properties*. Concreteness is a primitive aspect of the ingredients of the actual world, and concrete entities are primitively concrete. To put it differently, an individual is actual if and only if it is connected to the actual world. Here again, the obvious circularity is not necessarily problematic and must lead us to adopt a form of metaphysical coherentism, not only about the existence of natural entities, but also about

their actuality (see §4). We therefore distinguish the concreteness of any entity in respect of its relations to other parts of the actual world. Either way, what is required is a primitive distinction between *actual concrete entities* (concrete properties and concrete relations) and *merely possible abstract entities* (abstract properties and abstract relations). The latter category is *empty* for the anti-realist while it includes for the realist a lot of entities (belonging to a category distinct from concrete entities). The criterion for determining whether an entity *x* (property or relation) is concrete/actual is then the following for the realist: *x* is actual if and only if *x* is connected to concrete/actual entities. And for the anti-realist, the answer is simply that *x* is actual if and only if it is real.

§8

I have been arguing for eliminativist super-relationism, which I take to be the better kind of super-relationism. For the reader who does not feel particularly attracted by eliminativism, though, I want to emphasize that the existence of a super-relationist position bears interesting results for priority monism: *super-relationism is compatible with priority monism*. Indeed, the arguments in favor of eliminativist super-relationism also hold for identity super-relationism (with the exception, obviously, of the arguments supporting eliminativism about material objects), the view that material objects are identical to collections of spatio-temporal relations and natural properties.

As I wrote above, priority monism can be construed as the conjunction of fundamental eliminativism about material objects, derivative realism about material objects, substantivalism about spacetime, and the priority-of-the-whole view. But substantivalism is in no way a necessary component of priority monism. One may substitute relationism for substantivalism without losing the spirit of priority monism. In Schaffer's priority monism, the whole cosmos is more fundamental than spatio-temporal regions, and, spatio-temporal regions are construed as parts of the spatio-temporal substance. There is no need to buy into this last claim, though. Spatio-temporal regions can be construed as collections of spatio-temporal relations that are themselves derivative proper parts of the one fundamental and maximal collection of relations. In this mereological view, both spacetime parts and spatio-temporal relations are proper parts of the cosmos. To put it differently, the maximal collection of spatio-temporal relations (the cosmos) is more fundamental than each of individual spatio-temporal relations that make the maximal collection. Let us call this position '*relationist priority monism*' in order to contrast it from Schaffer's *substantivalist priority monism*. In relationist priority monism, monism describes not a fundamental substance, but a *fundamental collection*. Here, one may object that the ontological superiority of the whole in relationist priority monism would be a bit mysterious if the whole is not understood as a substance. Maybe. But it is at least a coherent position, and if one feels more attracted by relationism than by substantivalism, it is worth noticing that relationist priority monism is available. When granted that super-substantivalism and super-relationism are equivalent with respect to the seven arguments, and when observed that super-relationism is a component of relationist priority monism, we must conclude that *relationist priority monism* and *substantivalist priority monism* stand as equals for explaining the ultimate nature of the world. Super-relationism is, therefore, an interesting view that combines advantages of super-substantivalism, relationism and is both compatible with a flat ontology (through eliminativist super-relationism) and priority monism (through identity super-relationism)[16].

16 For comments on a previous version of the paper, I am indebted to Jiri Benovsky, Annabel Colas, Akiko Frischhut, Jasper Heaton, Thomas Jacobi, Quentin Ruyant, Jonathan Schaffer and an anonymous referee. For discussions and

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