

Monism and Statespace Structure*

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Exotic ontologies are all the rage. Distant from common sense and often science as well, views like mereological essentialism, nihilism, and four-dimensionalism appeal to our desire to avoid arbitrariness, anthropocentrism, and metaphysical conundrums.¹

It is crucial to the appeal of such views that they be *materially adequate*, that they contain the resources to “reconstruct” the world of common sense and science. In the world of common sense and science, bicycles survive changes in their parts, billiard balls strike one another, and nothing travels faster than light. The mereological essentialist denies the first, but offers this replacement: “there exist successions of numerically distinct, but appropriately related, bicycles with different parts” (Chisholm, 1976, chapter 3). The nihilist denies the second, but offers this replacement: “it sometimes happens that there exist some X s and some Y s such that the X s are arranged billiard-ball-wise, the Y s are also arranged billiard-ball-wise, and the X s strike the Y s”.² The four-dimensionalist denies the third, but offers this replacement: “no sequences of matter-stages that are related by genidentity travel faster than light”.³ There is room for disagreement over what exactly we require of “reconstruction”, but at a minimum: when a metaphysical theory reconstructs ordinary sentences $\phi_1 \dots$ as replacement sentences $\psi_1 \dots$, ordinary and scientific evidence must not refute the view that, strictly speaking, it is $\psi_1 \dots$ rather than $\phi_1 \dots$ that are true. Reconstruction must enable the metaphysician to successfully face the tribunal of experience.

An intriguing newcomer to the contemporary scene is the ancient doctrine of monism: the claim that “reality is one”.⁴ I will argue that, contrary to

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¹See Sider (2001, chapter 5) for a survey.

²Peter van Inwagen (1990) develops this strategy to defend a close relative of nihilism.

³See Hudson (2002) for the argument that four-dimensionalists must accept this; see Sider (2001, section 6.5) on genidentity.

⁴Related recent work includes: Hawthorne and Cortens (1995); Horgan and Potrč (2000, 2002); Parsons (2004, MS); Schaffer (2007, Forthcoming); Sider (2007*a*). Monism seems to be taken less seriously than mereological essentialism, nihilism, and the rest, but this attitude is unjustified if monism is materially adequate. Furthermore, (existence) monism is simply a

initial appearances, monism can be made materially adequate. But the monist's reconstruction of common sense and science will reveal some troublesome commitments.

1 Existence and priority monism

Let's follow Jonathan Schaffer in distinguishing two sorts of monism:⁵

Existence monism Only one (particular) exists: the world-object

Priority monism The world-object may not be the only object, but it is "prior to" all other objects

There are various ways of making sense of "priority", and of related notions such as metaphysical fundamentality and basicness. On my favored conception, the central notion is (a generalization of⁶) David Lewis's notion of *naturalness* (1983; 1986, pp. 59-69). According to this conception, there is an objective distinction between those features (properties, relations, or quantities) that are natural (fundamental, basic) and those which are not. The fundamental facts consist of the facts about which objects have which natural features. All facts in some sense reduce to or supervene on these fundamental facts. Given this conception, priority monism may be stated thus: *no natural features are had by any object other than the world-object*.

Schaffer (Forthcoming) thinks of priority (fundamentality, etc.), and therefore priority monism, a bit differently. For him, the fundamental locution for talking about priority is a predicate of objects, the predicate 'x is prior to y'. Accordingly, he formulates priority monism as the claim that *the world-object is prior to every other object*. It should not be assumed that everything I say carries over to what Schaffer calls "priority monism".

more extreme version of other doctrines taken seriously (by some): endurance and extended simples.

⁵It is only existence monism that is an "exotic ontology": priority monism isn't really an ontology at all (its distinctive claim isn't a claim about what exists), and it isn't so clearly "distant from common sense and science" in the way that existence monism is.

⁶Naturalness should, I think, be generalized to apply to expressions other than predicates, including logical expressions (Sider, 2007*b*). In a forthcoming book I hope to compare this approach to fundamentality with other approaches (for example Schaffer's) in some detail.

2 Saving the appearances

As we will see, priority monism poses a threat to material adequacy. Existence monism entails priority monism—if no objects other than the world-object exist, then no objects other than the world-object can have natural features—and so poses the threat as well. Since this threat will be our main focus, and is posed by each version of monism, I will generally speak simply of “monism”.

I seem to observe a balloon being filled with gas. On the one hand, I am no skeptic; I have no desire to wholly reject what I seem to see. On the other hand, I am a metaphysician; some theories I take seriously say that there really is no balloon. I resolve this tension by taking seriously only those metaphysical theories that allow that *it's as if there is a balloon*.⁷

The fact that it's as if there is a balloon is surely not fundamental, but is rather grounded in other facts that are themselves fundamental. So any metaphysical theory we are to take seriously must satisfy the following constraint of material adequacy: facts that the theory claims to be fundamental must be capable of grounding this and other “as-if facts”.

At a very high level of abstraction, it's easy for a monist to satisfy this constraint. The monist can simply say: “As-if facts are grounded in the natural features of the world-object.” But suppose we press the monist for more details. *How* do the world object's natural features ground as-if facts? All we have been given so far is a *sketchy grounding story*; surely the monist ought to be able to tell a (more) *detailed grounding story*.⁸

Can the monist simply refuse to tell a detailed grounding story? This would place him on shaky ground. When doing fundamental metaphysics, the point of attempting to fill in grounding details is to convince fence-sitters that worrisome phenomena *can* be grounded. One reason for sketching functionalist accounts of the mind, for example, is to convince doubters that mentality has a place within an ultimately physical world. “The mind is grounded in the physical, somehow” won't reassure anyone who doubts that a grounding story for the mental *can* be told; in such a dialectical context, a more detailed story is

⁷Let's understand this phrase as being consistent with there really being a balloon.

⁸And the detailed story cannot appeal to natural features of the world-object like these: “being positively charged at location l_1 and negatively charged at location l_2 ”. For what are these “locations”? They are either regions of space-time or concrete objects located at such regions, but either way, the monist would be appealing to fundamental facts involving subworld entities (on the face of it, the holding of fundamental relations—*positively-charged-at*, *negatively-charged-at*—between the world-object and locations.)

needed.

Of course, it would be unfair to demand a more detailed story than one can tell oneself. And what opponent of monism can provide a fully detailed grounding of facts about inflating balloons? On my own view, the fundamental facts involve the natural features of subatomic particles (or their time-slices); but I do not know exactly how those facts ground the facts about balloons. If I myself can do no better than gesture toward “the natural features of subatomic particles”, then my grounding story is no less sketchy than the monist’s.

Nevertheless, further reflection shows that the monist faces a special challenge. For by “piggybacking” on scientific explanations, pluralists (i.e., monism’s opponents) can give a detailed grounding story in a way that monists cannot.

Imagine trying to give as detailed an explanation as you can, of how the fundamental facts ground the fact that it’s as if the balloon inflated to a certain size. You will, surely, proceed in two stages, one informed by science, the other informed by your views about fundamental metaphysics. The first stage is essential, for what good source of details other than science is there? Almost by definition, your views in metaphysics will provide only very abstract information. So, in stage one you will appeal to science. You may appeal to the ideal gas law, the balloon’s elasticity, the temperature and atmospheric pressure in your surroundings, and the amount of gas pumped into the balloon. Given a bit more time on Wikipedia, you may bring in the statistical-mechanical explanation of the ideal gas law, and even attempt to explain the balloon’s elasticity in chemical or physical terms.

At the end of stage one, you will have explained the size of the balloon in terms of certain “scientifically ultimate facts”: whatever scientific facts you cited but did not further explained. But your task is to explain the size of the balloon in *fundamental* terms. This calls for metaphysics. So in stage two, you will show how the scientifically ultimate facts are grounded in the facts that you take to be fundamental.

If you are a pluralist, stage two will be relatively straightforward.⁹ For you will be free to simply say that the scientifically ultimate facts are themselves fundamental.¹⁰ In naturalness-theoretic terms: you can simply say that “scientifically ultimate features”—the features expressed by the core undefined

⁹Not that it’s smooth sailing for *all* pluralists. Nihilists, for example, have a more difficult time than do other pluralists in grounding scientifically ultimate features of complex systems that resist decomposition into features of individual subatomic particles.

¹⁰To be sure, there remain some open questions—are the special sciences metaphysically fundamental, or only physics?

expressions used to state the scientifically ultimate facts—are in fact natural features.¹¹ For example, if the scientifically ultimate facts consist of points of spacetime having certain field values, then you could say that those field values are natural features.

But if you are a monist you cannot not say this; and as a result, stage two looks problematic. For by inspection, scientifically ultimate features are not features of the world-object; they are subworld features. (Indeed, the most powerful scientific explanations seem to appeal to features of very small entities.¹²) Biology posits features of organisms; chemistry, features of atoms and molecules; and physics, features of subatomic particles and points and subregions of spacetime. This is not to assume an ultimate metaphysics of particles—perhaps we learn from physics that the world ultimately consists of fields distributed over spacetime. Nor is it to deny the holism that quantum mechanics suggests. The point is merely that the undefined expressions of even particle-less and holistic physical theories apply to subworld objects (such as points or subregions of spacetime).¹³ If, for example, the scientifically ultimate

¹¹Not that you would *have* to say this; my point is simply that this simple grounding story would be open to you.

¹²It's unsurprising that this strategy is so successful. Explanations are powerful when a small number of posits can explain a wide variety of phenomena. A small number of posited constraints on the behavior of small things generates, by combinatorial means, a large number of constraints on the behavior of large systems of small things. Thanks to Jason Turner here.

¹³Let me mention just two cases, to illustrate the inevitability of undefined expressions that apply to subworld entities. (There are of course many others to consider, especially given the open questions about how to interpret the formalism of quantum mechanics.) First consider general relativity. Here one specifies the geometry of spacetime using such expressions as 'open set' and 'metric tensor', which apply to subworld regions and points, respectively; and one appeals to a further basic expression for the stress-energy tensor, which attributes values to points of spacetime. Second consider what might seem at first to be a monist-friendly theory: a Bohmian interpretation of quantum mechanics in which configuration space is *not* taken to be a mere abstract object whose points represent possibilities for three-space, but is rather taken to be a *sui generis* "concrete space". In fact, to make things as monist-friendly as possible, let our Bohmian interpretation do away with three-space: the picture is that reality consists of configuration space, on which the wave function is defined, plus a single partless "world-particle", whose motion is guided by the wave function (Albert, 1996). We *still* have undefined subworld predicates, for on this interpretation points of configuration space and the world particle are subworld entities. (It is important not to shift between thinking of configuration space as metaphysically ultimate—in which case its points are subworld objects—and thinking of it as merely abstract or representational—in which case its points represent possibilities for the entire world.) The subworld expressions are those which describe the location of the world-particle in configuration space, those which give the geometry of configuration space

facts consist of points of spacetime having certain field values, you *cannot* tell the straight story that the pluralist can tell. You cannot say that the field values are natural features, for that would be to apply natural features to subworld objects, in violation of monism. You can of course always say: “scientifically ultimate features (such as field values) are grounded—somehow!—in the natural features of the world-object”, but that would be to revert to a sketchy grounding story.

The basic worry, then, is that only pluralists can give detailed (nonsketchy) grounding explanations, because only pluralists can piggyback on science to give detailed descriptions of the fundamental facts. A pluralist can say: “the fundamental facts consist of natural features $F_1 \dots$ distributed *thus*” (the inventory of natural features and the “thus” comes from science); but the monist, apparently, can say only: “the natural features of the world-object are such as to—somehow!—ground the fact that (it’s as if): there are features $F_1 \dots$ distributed *thus*”.

If the worry is genuine, then the monist would be placed in an awkward position. He would be unable to say in any detail what the world is fundamentally like, and he would be unable to reassure a doubter that scientific or ordinary talk *can* be grounded in natural features of the world-object. For to do that, the monist would have to show us *how* such talk can be grounded in the natural features of the world-object, but the the only thing the monist could say about the natural features of the world-object (“they are such as to ground such and such a scientific theory”) would presuppose that there is a way to ground scientific talk in them.

The worry can be rephrased as follows. Any theory T of fundamental metaphysics generates a certain set \mathcal{F}_T of fundamental possibilities for the world. Each $p \in \mathcal{F}_T$ specifies a way the world might be, in terms that T takes to be fundamental. For the monist, \mathcal{F} is the statespace M —the set of the world-object’s possible natural features; for pluralists, \mathcal{F} consists of the various possible distributions of natural features over subworld objects. Now, if T is to be materially adequate, it must be capable of grounding the appearances. Let \mathcal{A} be the set of possible descriptions of the world stated in the language of ordinary experience and science; and think of the adequacy constraint as requiring the existence of a *grounding function*, g_T , mapping members of \mathcal{F}_T

itself, and those which attribute values for the wave function to points of configuration space. Of course, in either case, the ultimate metaphysical story might yet be monistic: facts stateable using these undefined subworld expressions might hold in virtue of natural features of the world-object. The present point is simply that only the pluralist can say that these expressions themselves express natural features.

to members of \mathcal{A} , such that whenever $g_T(p) = a$, the realization of possibility p would ground its being as if a were true.¹⁴ g_T allows the defender of T to describe the world in the language of \mathcal{A} —ordinary language. The grounding function may be regarded as the composition of two other functions, the *science function* and the *metaphysics function*. The science function, s , maps certain members of \mathcal{A} to other members of \mathcal{A} , such that when $s(a_1) = a_2$, science has provided a_1 as a reduction of (or realization of) a_2 . The metaphysics function m_T maps members of \mathcal{F}_T to certain members of \mathcal{A} , such that when $m_T(p) = a$, a is a scientifically ultimate¹⁵ description of the world, and the realization of p would ground its being as if a were true. Given m_T and s , we can define g_T : $g_T(p) = s(m_T(p))$. Here, then, is how to phrase the worry of this section in terms of this apparatus. If T is to be materially adequate, a grounding function g_T must exist; to *convince* us that T is materially adequate, its supporters must *convince* us that some g_T exists, presumably by (in part) constructing it. We'll spot the defender of T the s function (it comes from science); all that remains is to construct the m_T function, which specifies how the ultimate scientific story of the world is to be grounded in terms that T takes to be fundamental. Pluralists can easily specify m_T , since they can take the undefined expressions of science to express natural features. How can monists construct m_T ?

3 The monist's resource: statespace structure

To ground the appearances of subworld objects, the monist cannot appeal to natural features of subworld objects. What *can* the monist appeal to? The natural features of the world-object, obviously—the members of the statespace, M . But the monist can appeal to more than just the *members* of M (and the fact of which of its members is instantiated). The monist also has M 's *structure*.

Let me approach this idea of the structure of a set of features by starting with some simple examples. Think about the set of (determinate) mass properties. That set has a structure, the structure of the set of positive real numbers. Its members can be arranged continuously in a line, starting with the property *having zero mass* at one end and continuing infinitely. Moreover, that is a *special* way to line them up; that's the intrinsic *structure* of the mass properties. (If

¹⁴It should not be assumed that g_T 's domain is all of \mathcal{F}_T (perhaps some fundamental facts are \mathcal{A} -inexpressible), but its range should be all of \mathcal{A} : all appearances must be grounded.

¹⁵We might take a to be “scientifically ultimate” iff for no a' does $s(a') = a$

it weren't, then why would real numbers be apt for measuring masses?¹⁶) If someone didn't know that that's the right way to line up the mass properties, they'd be missing some information about mass.

Second, think about the various properties of *location*. (Relative to a given reference object, say.) These properties can also be arranged, but not in a line; they can be arranged in a three-dimensional volume. The property of *being located at 1,5,7* is located in one unit in one dimension of this space, 5 units in another dimension, and 7 units in another dimension, from the property *being located at 0,0,0*. Again, this is intrinsic to the structure of this set of properties.

One final example. Think of a two-particle system in which each particle can be located anywhere in three-dimensional space, and in which each particle can take on any mass value. The set of properties of the entire two-particle system is eight-dimensional: it's part of the structure of this set of properties that to specify one of its members, you give eight coordinates: three spatial coordinates for particle one, plus a value for its mass; and similarly, four coordinates for particle two.

Thus, a set of properties—and more generally, any set of features—can have an intrinsic structure. What the monist should say is that his statespace M has a certain structure. But this structure is vastly more complicated than the structure of any of the sets we've considered. It has many dimensions, perhaps infinitely many, and the nature of this structure may well be largely alien to those who are accustomed to thinking of the world in pluralist terms.

In what, generally, does the structure of a given set of features consist? That's a hard question, but one natural answer is that it consists in part of the set's members obeying certain formal constraints, as well as the holding of higher-order relations over its members.¹⁷ For example, the set of mass properties obeys the constraint that no object has more than one determinate mass; and we might think of it as being structured by higher-order relations such as these:

p_1 is *greater than* p_2

p_1 is the *concatenation of* p_2 and p_3

(The first relation would hold, for example, between *1g mass* and *17g mass*; the second relation would hold between *4g mass* and *3g mass* and *1g mass*.) The

¹⁶One cannot answer: "because there are continuum-many masses"; the set of location properties to be considered below has the same cardinality but has a different structure (it is appropriately measured by triples of real numbers rather than single real numbers).

¹⁷See Mundy (1987).

structure of M can be understood likewise: as emerging from formal constraints and a myriad of higher-order relations.

So: facts about the structure of M seem to be *in principle* available to monists. How might they characterize M 's structure in detail? I do not know. To be sure, a certain cheap account is directly available: the monist might exactly mirror the pluralist's ontology at the level of world-properties. Imagine a pluralistic pixel-physics in which reality consists solely of a spacetime in which each point may or may not bear a fundamental property of *being on*. A monist could mimic this as follows: i) there is a set, P , containing continuum-many world-properties (these are to be surrogates for points of spacetime; think intuitively of there being, for each spacetime point, p , a member of P that is the property of *being such that p is on*); ii) the members of P bear "geometric" features that are exactly isomorphic to the geometric features that the pluralist ascribes to points of spacetime; iii) there are laws of nature governing the instantiation by the world-object of the members of P , which exactly mirror the pluralist's laws of nature governing the pattern of pixelation. This cheap strategy could be extended to mimic more elaborate physical theories: one could simply invoke a set of new world-properties for each new posited set of entities. A more distinctive—less cheap—monist strategy would try to characterize M 's structure in a more alien way. It is this less cheap strategy of which I say: I do not know how the monist might pursue it. Still, monists will, I expect, opt for some non-cheap strategy. For modeling the monistic account of fundamental reality too closely on pluralism might forfeit any alleged advantages of monism over pluralism. Perhaps monists will say, simply, that M *has* some unknown alien structure, which may never be discovered by us.

4 Microfictionalism

So the monist has the structure of M to work with, in addition to its members (and the fact of which one is instantiated). How does that help?

It helps because it allows the monist to "reverse-engineer" a world of subworld entities. It allows the monist to say: it's *as if* there exist subworld entities with natural features ϕ , because natural features ϕ would give rise to the actual structure of M .

In slightly more detail: "microfictions" will be defined as fictional accounts of a world of subworld things and their natural features. The monist can use the structure of M to pick out one microfiction as being "apt". The apt microfiction

is, roughly, the one that would give rise to a statespace whose structure matches that of M , if statespace structure were generated combinatorially from the number and nature of natural subworld features. And finally, the monist can say that the world is *as if* the apt microfiction is true.

Now for more details (though at a few points the account will remain schematic). Let's begin with this definition:

Microfeature fiction: A fiction of the form: “there exist some natural subworld features f_1, f_2, \dots . These are all and only the natural features, and they fall into subgroups with structure as specified thus: Γ ”

Γ specifies the structure of $f_1 \dots$ in the sense of section 3 (recall how features fall into natural subgroups with distinctive structure: the mass properties, the location properties, and so on). Γ might specify the number of places each f_i has, and perhaps some other constraints (e.g., it might specify that one of f_i is a transitive relation); and it will specify the holding of higher-order structuring relations over $f_1 \dots$.

The next step is to construct, as a function of any given microfiction F , two further fictions:

Micropluriverse fiction for F : A fiction, PW_F , of the possible worlds that would result if F were true: one world for each pattern of arrangement of $f_1 \dots$ that meets the constraints in Γ

Microstatespace fiction for F : A fiction, M_F , of the structure of the statespace that would result if PW_F were true, constructed thus:

- i) Add to PW_F a description of one¹⁸ world-property P_w for each world w . P_w completely specifies the pattern of instantiation of $f_1 \dots$ over w 's objects.

¹⁸Or more—instead of constructing a single world-property for each world, a monist might instead construct a family of world-properties, one for each natural subgroup of micro-properties and relations as specified by Γ . (One member of the family might specify the world's charge-distribution, another its mass distribution, and so on.) The resulting fictional statespace M_F would then have a bit more structure. This would aid the monist's cause if the monist's real statespace M had corresponding structure—if, that is, the monist thinks that M has members describing distinct facets of the world-object (its charge distribution, its mass distribution, and so on.) Thanks to Jonathan Schaffer here.

- ii) Then construct a description, M_F , of the structure of the resulting set of world-properties $\{P_{w_1} \dots\}$. M_F will depend on the patterns of instantiation of $f_1 \dots$ within the various worlds, plus the higher-order structure of $f_1 \dots$ as specified in Γ .

The micropluriverse fiction PW_F of the space of possible worlds generated by F may be constructed combinatorially:¹⁹ given the $f_1 \dots$ and Γ specified by F , include a possible world for each choice of i) (fictional) particulars, and ii) a distribution of $f_1 \dots$ over those particulars that obeys Γ . Micropluriverse fictions might look like the pluriverse sentences of Sider (2002): they will specify how many possible worlds there are, how many objects are contained in each world, and how $f_1 \dots$ are distributed over each world's objects.

The microstatespace fiction M_F is to describe the structure of the set of world-properties $\{P_{w_1} \dots\}$. Constructing M_F as a function of PW_F and F seems *in principle* possible (although this is a place where the account is schematic), because the structure of $\{P_{w_1} \dots\}$ is presumably a function of what goes on in the possible worlds $w_1 \dots$ characterized by $P_{w_1} \dots$, together with the constraints Γ , and full information about those goings-on and Γ is contained in PW_F and F . Think first from a pluralist point of view. From that point of view, statespace structure is presumably some function, μ , of a) the distribution of natural features over subworld particulars throughout the space of possible worlds, and b) the higher-order structure of various sets of natural subworld features. The monist rejects this point of view since she rejects natural subworld features. But she can nevertheless make use of μ , and apply it to the fictional counterparts of a) and b). The fictional counterpart of a) is the distribution of $f_1 \dots$ over individuals throughout worlds as specified by PW_F ; the fictional counterpart of b) is the fictional structure of $f_1 \dots$ as specified by Γ . Of course, I have no idea what function μ is, and I doubt the monist has either. Still, it would seem that μ must exist, and so is in principle available to the monist.²⁰

So: taking as input a fiction, F , of natural subworld features, the monist can generate, as output, a corresponding fiction, M_F , of the structure of statespace.

¹⁹There is no deep commitment to combinatorialism about modality here, since only worlds obeying Γ are allowed. Given fixed $f_1 \dots$, the monist is free to consider various degrees of combinatorialism—various choices for what goes into Γ —in search of an apt microfiction.

²⁰The monist can view the practice of speaking of a microworld as resting on the existence of μ —as resting on there being a route to statespace structure from the structures of bits of the microworld. To the extent that it's indeterminate what μ is, the monist can regard microtalk as being correspondingly indeterminate.

The nature of the output fiction will depend on the nature of the input fiction. For instance, if F says that the only feature is a single monadic property, then M_F would have a lot less structure than it would if F describes a more complex set of features.

We can now introduce the idea of an *apt* microfeature fiction:

Apt microfeature fiction: a microfeature fiction, F , where the resulting microstatespace fiction M_F “accurately describes” the structure of the *real* statespace M

This definition is at present schematic: without a precise account of the nature of the “structure” of M , the monist cannot give a precise definition of what it is for M_F to “accurately describe” M ’s structure. The intuitive idea, though, is that M_F accurately describes M iff there is a one-to-one correspondence between M and the set of properties $\{P_{w_1} \dots\}$ described by M_F that is “structure-preserving”, in a sense that the monist might hope to fill in more fully.

Given the notion of an apt microfeature fiction, the monist can finally ground as-if talk:

Microworld fictions: For any $m \in M$, there is a *microworld fiction* for m , ϕ_m , which may be constructed as follows:

- i) Find some apt microfeature fiction, F
- ii) Find a one-one map ν between M and the fictional possible worlds described in PW_F as follows:
 - (a) Let η be a structure-preserving isomorphism between M and $\{P_{w_1} \dots\}$ (such a η exists because M_F accurately describes M ’s structure)
 - (b) For any $m \in M$, let $\nu(m) = w$, where $\eta(m) = P_w$
- iii) Let ϕ_m be the ramsey sentence of world $\nu(m)$: a complete description of $\nu(m)$ of the form: “there exist objects $x_1 \dots$, and there exist natural features $q_1 \dots$, distributed thus-and-so over $x_1 \dots$ ”.²¹ This ramsey sentence may be read off of PW_F ’s description of $\nu(m)$.

²¹One might also include some information from Γ in ϕ , specifying the structures of various subsets of $\{f_1 \dots\}$ whose members are instantiated in $\nu(m)$.

Actual microworld fiction: a microworld fiction, $\phi_{@}$, for $m_{@}$ (i.e., for the member of M that is instantiated by the world-object)²²

Microfictional truth: ψ is *microfictionally true* iff ψ is entailed by some actual microworld fiction $\phi_{@}$

The microworld fiction for a monistic world-property, m , is a description of a possible world that has m , but phrased in subworld terms, as if that world consisted of natural subworld features distributed over subworld objects. Thus, the actual microworld fiction is a description of the actual world, phrased in subworld terms; and the microfictional truths are those statements that are entailed by such a description of the actual world.

Think of the determination of the microworld fiction for m as follows. Imagine you are a monist. Fundamental reality for you consists of a structured statespace, M (a set of world-properties), one²³ of which, $m_{@}$, is in fact instantiated by the world-object. (If you are a mere priority monist you also believe in the existence of subworld objects, but you think that these instantiate no natural features.) But you have many nonmonist friends, who do not share your beliefs. For them, fundamental reality consists in the instantiation of natural features by subworld individuals. How will you speak to them about the actual world? First, look out over your statespace, M . It has a certain structure. Think now of that structure *as if it were generated by natural subworld features*, as if it were the structure that a set of world-properties would have, if they were properties of possible worlds containing individuals with natural subworld features. (These are worlds as described by a micropluriverse fiction based on an apt microfeature fiction.) Among these imagined possible worlds, find the imaginary world that instantiates $m_{@}$, and construct a description, $\phi_{@}$, of this world. Return now, to your nonmonist friends. You can speak to them of the actual world as being *as if* it contained subworld objects with natural features as described by $\phi_{@}$.

Monists, therefore, are justified in speaking of a given property m in M as being “the property of being as if ϕ_m ”. They are, moreover, justified in speaking of the actual world as being as if $\phi_{@}$. They are, moreover, justified in saying “it as if ψ ”, where ψ is any microfictional truth. And they can piggyback on science to give detailed grounding explanations: whenever the scientist

²²If the monist thinks of multiple members of M as being actually instantiated, then define the actual microworld fiction as the microworld fiction for each actually instantiated member of M ; see note 18.

²³Or more; see note 18.

says ψ , the monist can say instead: “ ψ is microfessionally true.” They have, therefore, answered the worry of section 2. In the terminology of the end of that section, they could define the “metaphysics function”, m_T , where $T = \text{monism}$, as follows: for any $p \in \mathcal{F}_T$ —i.e., for any $m \in M$ —we have: $m_T(m) = \phi_m$.

There is no guarantee that there will be a unique actual microworld fiction. A benign multiplicity might result from indeterminacy at various points in this section’s constructions. (There might, say, be slightly different, equally acceptable, functions μ for generating M_F as a function of PW_F and F .) But nothing seems to rule out a more drastic multiplicity: utterly different microfeature fictions F_1 and F_2 giving rise to microstatespace fictions M_{F_1} and M_{F_2} , each of which accurately describe M ’s structure. The microfessional truths according to F_1 might then differ drastically from the microfessional truths according to F_2 . The monist should, I think, embrace this possibility, and the resulting indeterminacy in the notion of microfessional truth. If the structure of M does not single out a single way of talking about subworld entities and their natural features, then there would simply be no fact of the matter about how one should talk in those terms.²⁴

The approach of this section has a limitation, albeit one that the monist can live with. Since microfessional truths must be entailed by an actual microworld fiction, and microworld fictions take the form of ramsey sentences, only sentences capable of being entailed by ramsey sentences will be microfessionally true. Ordinary sentences like ‘Ted is a philosopher’ will not count as microfessionally true, since the relevant sort of ramsey sentences do not contain ordinary names or predicates like ‘Ted’ and ‘philosopher’; they contain only quantifiers for objects and features. Ordinary sentences must, therefore, be ramsified before the account of this section can be applied. ‘Ted is a philosopher’ must be replaced with a ramsey sentence of the following form: “some object, t , plays such and such a role vis a vis everything else, and some property, p , plays such and such a role vis a vis everything else, and t has p .”²⁵ Only such a replacement sentence is capable of being microfessionally true.

The account I have suggested, on behalf of monism, has been schematic in several ways. As we saw last section, actual monists know few details about M ’s structure. They would need to know more before providing a precise

²⁴Relatedly, the monist ought to allow the possibility that no microfeature fiction is perfectly apt, and introduce a notion of “near-microfessional truth” corresponding to nearly-apt microfeature fictions.

²⁵It might also be useful to include information about the structures of sets of properties; see note 21.

characterization of what it would take for a microstatespace fiction M_F to “accurately describe” M ’s “real structure”. They would also need to fill in details about how to generate M_F from the micropluriverse fiction PW_F . And, finally, they would need to know how to “ramsify” ordinary sentences. Thus, in order to implement my strategy and actually *give* a fully precise definition of microfictional truth for ordinary sentences, monists would need to possess more information than they in fact have. Still, the account is useful to them. They can look forward to a day when implementation would be feasible. And, perhaps more importantly, they can regard the in-principle availability of an implementation as underwriting their use, here and now, of ordinary talk about subworld objects and natural subworld features. The account demonstrates that, within a monistic world, there exist facts that can ground its being as if such talk is true. Pluralists feel free to speak of tables and chairs without knowing, exactly, how facts about them are grounded in what’s fundamental; monists can feel free to do the same.

5 Existence and priority monism revisited

The fictionalism of section 4 applies only at the sentence level, not at the level of the predicate. That is, it defines the expression ‘ ψ is microfictionally true’; it does not define the expression ‘object o microfictionally satisfies open sentence $\psi(x)$ ’.

Existence monists would clearly have no use for a notion of microfictional satisfaction, since they do not believe in the existence of subworld objects. But what about priority monists, who do believe in subworld objects? Could they use section 4’s methods to develop an account of microfictional satisfaction?

In fact the answer is *no*, at least given the formulation of priority monism I have been working with. That formulation, recall, is: *no natural features are had by any object other than the world-object*. It follows from this that every two subworld objects are “fundamentally alike”, in that, roughly, they have the same natural features, both intrinsic and relational. But fundamentally alike things must share *all* features, since every feature of a thing is determined by its natural features, both intrinsic and relational. Thus, any putative relation of microphysical satisfaction would be vacuous: every two subworld entities would microfictionally satisfy exactly the same open sentences.

Let me lay out this argument more carefully. For definiteness’ sake, take all “features” to be quantities, and take an n -place quantity, q , to be an n -place

function from objects to members of some value-range VR_q .²⁶ (We lose no generality in so doing, since properties can be construed as one-place relations, and n -place relations construed as n -place quantities with value-range $\{0,1\}$.) I'll need the following definitions:²⁷

Preservation function f *preserves* n -place feature $q =_{df}$ for every $x_1 \dots x_n$ in f 's range, $q(x_1 \dots x_n) = q(f(x_1) \dots f(x_n))$

(Global) supervenience Feature q *supervenies* on set of features $B =_{df}$ for any possible worlds w and w' , and every function f that maps the objects of w one-to-one onto the objects in w' , if f preserves all the features in B then f preserves q

Now for the argument. I assume the truth of the following:²⁸

Supervenience on the natural Every feature supervenes globally on the set of natural features

Consider any possible world, w , and any two subworld entities at w , o_1 and o_2 . Let f be a function that maps o_1 to o_2 and o_2 to o_1 , but which otherwise maps each object (including the world-object) at w to itself. Given priority monism, f preserves all natural features: the only natural features are those of the world-object, and f maps it to itself. So, given global supervenience, f must preserve *all* features. Thus, if there were a putative feature of *fictionally satisfying* 'x is a donkey', then if o_1 had it, o_2 would have it as well. Conclusion: any putative feature of fictionally satisfying a given open sentence would be vacuous; for each open sentence, either every object would fictionally satisfy it or every object would fail to fictionally satisfy it.

The vacuity of any notion of fictional satisfaction may seem incompatible with the fact that fictional truth is *not* vacuous. Even though one cannot define

²⁶The nature of the value-range would depend on the quantity in question; it could be a subset of the real numbers, a subset of the complex numbers, or even a set with less structure, such as $\{0,1\}$.

²⁷Slight rewording required if objects are transworld rather than worldbound. Note: in this section I am discussing what's *really* true according to priority monism, not what's fictionally true; so the possible worlds, features, and objects I am discussing are "real" possible worlds (however one thinks about such things), real features, and real objects, not the fictional worlds, features, and objects of section 4.

²⁸By 'features' I have in mind here *qualitative* features; predicates that can be defined only by naming particular objects do not count as features on this usage.

a notion of fictional satisfaction such that some objects would satisfy ‘ x is a donkey’ and others would not, (a suitable ramsification of) the following is nevertheless microfictionally true: ‘There exist an x and a y such that x is a donkey and y is not a donkey’.²⁹ But in fact, there is no tension here. *In the fiction*, it’s not true that all objects are alike; nevertheless, all objects really are alike (assuming priority monism).

Here is what’s going on, at an intuitive level. The idea behind introducing a notion of fictional satisfaction, as opposed to a notion of fictional truth, would be to enable saying, of a *particular* subworld object o , that it’s as if *it* is a donkey (say). Given supervenience on the natural, something at the fundamental level must attach this as-if description to o . But since all subworld objects are, fundamentally speaking, exactly alike, anything that would attach this as-if description to o would also attach it to every other subworld entity.

I stated priority monism in a particularly strong way, as ruling out *all* subworld natural features. This could be weakened in various ways. One could allow, for example, natural relations of identity and parthood, which would relate subworld entities as well as the world-object.³⁰ But even this would not allow for an interesting notion of fictional satisfaction. Though it would no longer be true that every two subworld things are exactly alike, it would still be true that any two “mereologically similar” things would be exactly alike; and this would preclude any interesting notion of fictional satisfaction. Let f be any one-one function from world w ’s objects onto themselves, such that $f(x)$ is part of $f(y)$ iff x is part of y . f will preserve all fundamental features, given the new version of priority monism, and so, given global supervenience, must preserve all features. So, for any putative notion of fictional satisfaction, if I have the feature of fictionally satisfying ‘ x is a person’, so must $f(\text{me})$. But $f(\text{me})$ could be any mereologically isomorphic object—a mereologically isomorphic asteroid on the other side of the universe, say.³¹

Even priority monists, then, will define only fictional truth, not fictional

²⁹For that matter, a suitable ramsification of the following would also be fictionally true: ‘There exist an x and a y such that x satisfies ‘ z is a donkey’ and y does not satisfy ‘ z is a donkey’.

³⁰Under the original formulation, there would be no “positive” facts at all involving the subworld entities: speaking at the fundamental level, all one could say of a subworld thing o is that “ o is not F ” for various natural world-object features F .

³¹If atomism is true (i.e., no “gunk”) then any two objects o_1 and o_2 containing the same number of atoms can be paired by such a function f . Construct f by first letting it map each atom of o_1 to a unique atom of o_2 ; then let it map every other atom to itself; and finally, map every nonatomic b to the fusion of $\{f(x) : x \text{ is an atom that is part of } b\}$.

satisfaction. This means that the priority monist’s subworld objects are, in a strong sense, superfluous: they play no role in the monist’s reconstruction of ordinary and scientific talk about the world. This is unsurprising, since they have no fundamental features. But then: why believe in them? They seem to be playing no theoretical role.³²

6 The objection from intrinsic properties

This fictionalism allows the monist to answer an objection that I put forward previously (Sider, 2007a): that the monist has no way to account for the *ordinary correctness* of judgments of intrinsicity for microproperties. The reply goes as follows. When some micropluriverse fiction PW_F says that two fictional possible objects (perhaps from distinct fictional possible worlds) have the same fictional natural properties and whose fictional parts³³ stand in the same fictional natural relations³⁴, let PW_F also say that those objects are “fictional duplicates”; and let PW_F then say that any fictional property, whether natural or no (that is, whether one of $f_1 \dots$ or no) is intrinsic iff it never differs between fictional duplicates according to PW_F . Thus updated, the monist’s micropluriverse fictions speak of intrinsicity. As a result, the microworld fictions will speak of intrinsicity as well, and so the fictionalist may speak of it being *as if* there is a distinction between intrinsic and extrinsic subworld properties.

7 Challenges for monism

Monism can be made materially adequate; monists can say that the world is *as if* common sense and science were true. Nevertheless, my suggested strategy for securing material adequacy—heavy reliance on the structure of statespace—has some worrisome aspects.

First, it requires a deep commitment to uninstantiated natural features, and a structure over these features. (If the monist rejects uninstantiated features, then all the monist has at the fundamental level is a single world-feature! How

³²Let me reiterate that my conclusions are based on my formulation of priority monism in naturalness-theoretic terms, and may not hold under alternate formulations, for example Schaffer’s formulation.

³³The monist should probably hard-wire a predicate ‘part of’ and constraints on its instantiation into the definition of a micropluriverse fiction.

³⁴Here I follow Lewis’s (1986, pp. 61-62).

could one recover the structure of statespace out of that?) Only one³⁵ member of the monist's statespace M is instantiated. And one cannot regard facts about the nature of the uninstantiated members of M as being somehow derivative from facts about instantiated features, since the members of M are supposed to be *fundamental*. This commitment is deeply nonactualistic. For the pluralist, by contrast, the rejection of fundamental uninstantiated features is a viable option.³⁶

Second, the structure of the monist's statespace cries out for an explanation that the monist cannot give (this was the main argument of Sider (2007a)). The monist's statespace must have an immense, complicated structure, enough to select a single apt microfeature fiction (or a small enough class of them). Now, this structure is *as if* it were generated, by combinatorial means, from natural subworld features. (Otherwise the strategy for securing material adequacy would not work.) But it raises an awkward question: *why* is the statespace so structured? Is it just an accident that this structure is as if it were generated from a much simpler basis, i.e., by combinatorial means from subworld natural features (and a relatively small number of them, if current science is on the right track)? We are generally suspicious of such coincidences. Rather than believing merely in sensory impressions organized *as if* they were caused by objects that continue to exist when we are not looking, we deem it reasonable to believe a simpler hypothesis: that this organization is no accident, that it is due to the existence of real physical objects.³⁷

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³⁵Or a small number; see note 18.

³⁶Some argue that uninstantiated features ought to be postulated in some cases. We might want to "round out" our laws of nature by including a law concerning very high-energy states that physics predicts, but which have never and will never be realized (Tooley, 1987). But this commitment to the nonactual is nothing like what the monist requires.

³⁷Compare Russell (1912, chapter 2).

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