

Skepticism and Structuralism

Structuralism with respect to space and/or spatial relations is of considerable interest. Consider what I will call the *distance relation*: x and y stand in this relation just in case x and y lie at some distance or other from one another.¹ On a certain sort of structuralist account, (i) there is a causal role characteristic of the distance relation, and (ii) any relation which realizes the distance-role is distance. David Chalmers adopts a position of this sort. He accepts “a broadly functionalist view on which spatiotemporal concepts are concepts of those properties that play a certain functional role (either a phenomenal role, a nonphenomenal role, or a mix of the two....)”. As he also says: “Ordinary spatiotemporal notions function to pick out whatever properties and relations play a certain role within physics and with respect to our spatiotemporal experience” (p. 437).²

One way to sharpen the issues here is to consider the kind of possibilities that are used to motivate skepticism about the external world. Chalmers writes:

In the Matrix scenario...there is a computer running a complete simulation of the of the physical universe. The computer will have a causal complexity of the same order as the universe it simulates, with concretely implemented data structures for each fundamental particle, and computational properties of these structures for each fundamental property. When we take it that one particle affects another in our world, the data structure corresponding to the first particle really does affect the data structure corresponding to the second...All in all: the computer instantiates all of the nomic and causal structure of the universe it is simulating. (Chalmers, p. 433).

Say, for example, that you are in your house. There is a deer a hundred feet away in the direction you happen to be looking, but you don't see it because your vision is blocked by a wall. The spatial relations among you, the deer and the wall are responsible (in part) for your having an experience as of a wall rather than an experience as of an deer. With respect to the Matrix, there is some corresponding feature of the computer which, among other things, regulates your sensory inputs so that you have wall-experience rather than deer-experience. To simplify, let's suppose that your standing in relation R to the deer is your being a hundred feet from it. You stand in R* just in case the computer gives rise to the same sorts of effects on you and other items that R does. By hypothesis, R* has the same causal profile that we take R to have.³ But given structuralism about distance, any relation which behaves the way distance does *is* distance. So, if you are in the Matrix, there is an deer that really is a hundred feet away from you. That can be the case even if the computer itself is no more than a yard square.⁴

(1) Modality and Fundamentality

David Lewis's modal realism is one of the most influential and powerful accounts of the metaphysics of modality we have. According to Lewis, distance has a special metaphysical

status. The actual world consists of many individuals, the *i*'s, which are all parts of one possible world, @. In Lewis's terminology, the *i*'s are *worldmates*. Lewis's proposal is that "things are worldmates iff they are spatiotemporally related. A world is unified, then, by the spatiotemporal interrelation of its parts." (Lewis, p. 71). In particular, one way for a pair of *i*'s to be worldmates is to stand in the relation *x-is-some-distance-or-other-from-y*. Another way is to stand in the relation *x-is-some-temporal-interval-or-other-from-y*. As I will put it, distance is one of two worldmate relations which unify the actual world.⁵

One objection to structuralism about distance is that it conflicts with the Lewisian thesis that distance is a worldmate relation. The structuralist holds that distance is a role property that is realized by more fundamental properties and relations. In general, if A-properties realize B-properties, B-properties are less fundamental than A-properties. It follows that B-properties aren't absolutely fundamental. Various notions of fundamentality might apply here. Along one dimension, A is more fundamental than B if the instantiation of B supervenes on the instantiation of A (and other properties). If structuralism is correct, the instantiation of distance relations does supervene on the instantiation of other properties and relations. Worldmate relations, by contrast, aren't supervenient. They are an aspect of the ultimate base of reality upon which all else supervenes.⁶

Another way A-properties can be more fundamental than B-properties is for A-properties to be more natural than B-properties. That will be so if B-properties are more disjunctive than A-properties.⁷ Very plausibly, role-properties are more disjunctive than the properties which realize them. So, role-properties aren't perfectly natural, and therefore not absolutely fundamental. As a worldmate relation, distance is perfectly natural, and in that respect it is absolutely fundamental.

These observations underwrite an argument against the structuralist account of distance:

1. Distance is a worldmate relation.
2. As such, distance is absolutely fundamental.⁸
3. If distance is absolutely fundamental, then it isn't a role-property.
4. Hence, distance isn't a role-property.

This line of thought might raise various qualms. It is controversial whether there is an absolutely fundamental level of reality. In addition, someone might wonder whether there are perfectly natural properties. The argument against structuralism can be recast in order to side-step such concerns:

1. Worldmate relations are more fundamental than role-properties.
2. Distance is a worldmate relation.
3. If distance were a role-property, it would be less fundamental than itself, which is impossible.
4. Therefore, distance isn't a role-property.

In intuitive terms, material objects aren't worldmates because they participate in specific causal relations. Rather, material objects can and do participate in specific causal relations because they are worldmates. The structuralist gets things the wrong way around.⁹

Chalmers himself has some reservations about the compatibility of structuralism with facts about what is fundamental:

It is arguable that Matrix and non-Matrix scenarios differ in matters of fundamentality: the Matrix scenario may have a further level of more fundamental truths realizing the computation, and perhaps about the world outside the computation (p. 436).

However, according to Chalmers, the discrepancy doesn't really amount to very much:

It could turn out that [our world] has additional nomic structure beyond the sort of structure we think it has. If these non-Matrix scenarios turned out to be actual, most ordinary beliefs would not be undermined...The extended scenario will have a more fundamental layer underlying truths that were fundamental in the original non-Matrix scenario, and will extend much further than the original scenario. Despite these changes, most of our ordinary beliefs will be true in this non-Matrix scenario. Further the nomic and fundamentality truths that hold in this scenario will also hold in the Matrix scenario. (p. XXX).

Here is the idea by way of an example. Let's say that, as you believe, the ultimate components of the world are atoms that are governed laws N. The atoms have no finer structure. What if it had turned out instead that atoms aren't fundamental, but are composed of smaller particles governed by more basic laws N+? Your original picture would be incorrect in some respects, since what you took to be fundamental wouldn't be so. But, otherwise, what you believe about the world would still be true. Now compare a world in which atoms have no more basic constituents with a corresponding Matrix world. The Matrix world has at least one more basic level than the non-Matrix world does (i. e., the level of the computer hosting the Matrix). The denizens of the Matrix believe, as you do, that what they take to be atoms are fundamental, and they are wrong about that. However, they are right about more or less everything else, including distance facts—just as you would be if it emerged that are subatomic particles, contrary to what you had believed.

Chalmers underestimates the difficulties facing the structuralist account. Maybe adding a lower level of nomic and mereological structure to a world leaves nearly all truths about higher levels undisturbed. But that is irrelevant in the present case. Our question is whether the relation between items in the Matrix is really distance. Arguments (1) - (5) and (6) - (9) remain sound no matter how many levels of nomic and mereological structure there might turn out to be. The conclusion stands that distance-in-the-Matrix isn't distance, which is contrary to the structuralism Chalmers espouses.

One possible reply is that there are two varieties of distance, primary distance which is fundamental and secondary distance which isn't fundamental. Bearing the primary distance relation to each other makes *x* and *y* worldmates. Say that the Matrix computer simulates an elm tree, and that the computer itself has an on-off switch on the side of its cabinet. The elm and the switch are parts of the same possible world, although by hypothesis they aren't primary-spatially related. If, however, being primary-spatially related is a necessary (and sufficient) condition for two material objects to be worldmates, then this suggestion must be rejected.¹⁰

The structuralist might press on, calling for a more relaxed account of the worldmate relation. On this revision, if the existence of *y* is grounded by the existence of *x*, then *x* and *y* are worldmates. Thus, a particular file on the computer's hard drive, *F*, is a worldmate of the elm tree, because the existence of *F* grounds the existence of the elm tree. *F* is also a worldmate of the switch insofar as they are distant from another. By transitivity of the worldmate relation, the switch is then a worldmate of the elm tree. However, suppose at the outset that *F* exists and the elm tree exists, each in some possible world or other? To say that the file's existence grounds the elm tree's existence is, at least, to assert the truth of the counterfactual *If the file hadn't existed, the elm tree would not have existed*. The truth of counterfactuals rests, in part, on independent facts of the matter as to which entities are in which possible worlds, i.e. facts about worldmate relations. Worldmate facts aren't grounded in grounding facts. Or, to be a bit more explicit, suppose α and β belong to different possible worlds. In that case, α doesn't (can't) ground the existence of β ; α doesn't (can't) ground β *because* α and β belong to different possible worlds. The availability of such an explanation indicates that worldmate relations are prior grounding relations, contrary to the structuralist's proposal that worldmate relations can derive from grounding relations.

That proposal faces an additional difficulty. There are various more or less plausible candidates for grounding relations: causation, composition, even emanation of the soul from the body. However, the grounding relation the structuralist wants to invoke—the emergence of a spatial world from a complex of electronic circuits—seems *sui generis*, mysterious, and unprincipled. In that light, the structuralist's claim that the switch and the elm tree are worldmates via the grounding relation is hard to distinguish from simply thumping the table and insisting that the two are worldmates even though they aren't distant.¹¹

(2) The Unity of Space

As we have seen, structuralism about distance clashes with the Lewisian account of modality. Lewis's approach is powerful and attractive, so having to reject it carries a significant cost. What's more, the objection can be re-framed in terms of modal characteristics of space, independently of Lewis's views about the worldmate relation. Let's allow *arguendo* that the denizens of the Matrix inhabit a genuine space. This space would be disconnected from the space in which the computer is situated. There is no continuous path from the location of a physical object within the Matrix to the location of an ordinary physical object.¹² But two spatial

regions that are (always) disconnected aren't in the same possible world. Hence, no possible world is such that the Matrix is hosted by an ordinary material object in one space, while items in the Matrix exist in their own right in some other, entirely disconnected space.

The point can be sharpened if we make an additional assumption. Say that the Matrix computer simulates an elm tree. The further assumption is that Matrix objects, like the elm tree, are identical to some feature or other of the computer. (For example, the tree might be a file stored at a particular location on a hard drive). Imagine again that the computer has a switch which is located one foot away from the elm tree file; the switch and the tree/file are distant. At the same time, no path from the elm tree would take a denizen of the Matrix to the switch. Hence, it seems, there is no relation of distance between the elm tree and the switch. Putting the two thoughts together, the switch and the elm tree/file both are and aren't some distance from one another. That can't be.

The response at this point might be to insist that the space containing the computer and the space of the Matrix can belong to one and the same possible world, even though they are disconnected. But this defense of structuralism can't be sustained, even if we allow in principle that disconnected spaces can belong to a single possible world. The trouble is that the file exists in the space inhabited by the computer, while it also exists as an elm tree in another space, namely the space of the Matrix. One and the same object can't exist in two disconnected spaces. If it did, the spaces would have a part in common, namely the region occupied by the object. In that case, the spaces wouldn't be disconnected after all.¹³

Chalmers might resist this objection as follows. In an earlier paper, which he continues to endorse, he wrote:

Just which pattern of bits is a given virtual object? Surely it will be impossible to pick out a precise set. Response: This question is like asking: just which part of the quantum wavefunction is this chair, or is the University of Arizona? These objects are all ultimately constituted by an underlying quantum wavefunction, but there may be no precise part of the micro-level wavefunction that we can say "is" the chair or the university. The chair and the university exist at a higher level. Likewise, if we are envatted, there may be no precise set of bits in the micro-level computational process that is the chair or the university. These exist at higher level." (p. XXX).

This passage suggests that objects in the Matrix have no location in the space of the host computer.¹⁴ If that claim holds, then it may seem that Chalmers can skirt at least the sharper version of the objection just brought up. The elm tree in the Matrix won't be distant from the switch in the everyday space we inhabit, because the elm tree has no location at all in our space. Hence, the contradiction that the elm tree both is and isn't distant from the switch doesn't arise.

This reply is unsatisfactory for two reasons. First, why should we agree that Matrix

objects can't be identified with particulars located in everyday space? It seems that they very well might, in certain circumstances. In that event, Chalmers's response would cut no ice, leaving his view in a precarious condition.¹⁵ What's more, the challenge to the structuralist position can be adjusted to take into account the suggestion that Matrix objects have no place in ordinary space. Presumably, the brain victimized by the computer that hosts the Matrix is in ordinary space. That brain is also affected by the elm tree, which by hypothesis is outside ordinary space. (For concreteness imagine that, inside the Matrix, you see the elm tree, so your brain registers effects of the tree). The unacceptable result would be that the victimized brain exists in two disconnected spaces—ordinary space and the space of the Matrix.¹⁶

I should note that Chalmers makes some other remarks that are hard to reconcile with the structuralist position I have been considering:

Rather, I should infer that the physical world is constituted by computations beneath the microphysical level. There are still tables, chairs, and bodies: these are made up fundamentally of bits, and of whatever constitutes these bits.”
(p.XXXX). **Check this.**

To the extent that bits are information, and information is distinguished from the physical item which carries it (the whole computer if need be), information is some kind of abstract object. If Matrix items are constituted by bits, then Matrix items will be abstracta. However, abstract objects as such don't operate as causes or effects. Objects in our world (e.g. radios) do have causal powers, so if objects in the Matrix are just like objects in our world, objects in the Matrix must have causal powers too. Then, it seems, radios in the Matrix couldn't be abstracta, any more than radios outside the Matrix are. Radios can't be “composed of bits”.

In the same paper, Chalmers appears to concede that Matrix objects and objects outside the Matrix are radically different in kind:

These are all entities constituted by computational processes. If I am envatted, then the objects that I refer to (hair, Tucson, and so on) are all made of bits. And if another being is envatted, the objects that it refers to (hair*, Tucson*, and so on) are likewise made of bits. If the envatted being is hooked up to a simulation in my computer, then the objects it refers to are constituted by patterns of bits inside my computer. We might call these things virtual objects. Virtual hands are not hands (assuming I am not envatted), but they exist inside the computer all the same.
[XXXX]

I would think that if a thoroughgoing structuralism is correct, items that have all the structural properties that hands do are hands, not something else (“virtual hands”).¹⁷

That said, the passage just quoted may be taken as pointing towards an alternative, non-structuralist reply to skepticism. This view allows that hands outside the Matrix aren't “made of

bits”, although virtual hands inside the Matrix are “made of bits”. Virtual hands aren’t hands. But, the idea goes, denizens of the Matrix will have true thoughts about virtual objects rather than false thoughts about ordinary objects. (Compare: Denizens of Twin Earth have true thoughts about XYZ rather than false thoughts about H₂O). Hence, the possibility of living in the Matrix isn’t a possibility in which all our thoughts would be false. And, to that extent, the possibility of living in the Matrix raises no skeptical worries (or so the thought goes). This position differs from the one I have been discussing: Matrix items have structural properties, in virtue of which they instantiate ordinary properties like distance—*genuine* distance, if you like. From this standpoint, inhabitants of the Matrix are supposed to have true thoughts about ordinary objects (or at least about ordinary distance) rather than true thoughts about virtual objects (and “virtual distance”). That position is untenable, as I have tried to show.

(3) A General Objection

There is a broader lesson to be learned. A structuralist about property F may have difficulty accommodating various necessary truths involving F. Let F be standing in the distance relation. A necessary truth about distance is that if x and y are distant and y and z are distant, then x and z are distant. The structuralist treatment of distance is unable to preserve this fact. A more general argument against this view can be given. It is a necessary truth that material objects participate in distance relations. Let ‘x is D’ stand for ‘x stands in distance relations’. Thus:

1. $\Box [(x) (x \text{ is a material object} \supset x \text{ is D})]$.

On a structuralist account of distance, to stand in distance relations is to participate in certain causal relations, C. That is, the property D is the role-property C:

2. $D = C$.

Identity claims, if true, are necessarily true, and permit substitution in modal contexts.¹⁸ Hence:

3. $\Box [(x) (x \text{ is a material object} \supset x \text{ is C})]$. [From 1, 2].

But causal relations are contingent. Material objects don’t stand in specific causal relations as matter of necessity. Therefore:

4. $\Diamond [(\exists x) (x \text{ is a material object} \ \& \ x \text{ isn't C})]$.

(4) contradicts (3). So, by reductio:

5. $D \neq C$.

(5) is the denial of the identity claim which captures structuralism about distance. And, clearly,

what holds with respect to distance holds for any other property F for which it is necessarily true that material objects are F. (Substitute 'F' for 'D' in the argument above). Structuralism about any such property is false.

1. **ISH.**

2. Chalmers's [XXXX] treatment of skepticism is part of an intricate, comprehensive account of a wide range of topics in epistemology and the philosophy of mind. What I say here doesn't address much of what Chalmers says to motivate and defend his position. But the structuralist approach he adopts can be made relatively independent of the rest of his system, and my attention will be directed toward a free-floating variant of that sort (see Chalmers, p. XXX).

3. Really?

4. Chalmers writes: "(1) The content of ordinary beliefs is structural. (2) The structural content of most ordinary beliefs is true if this scenario [the computer simulation] is actual. [Therefore:] (3) Most of my ordinary beliefs are true if this scenario is actual" (p. 434). That goes for beliefs about spatiotemporal relations like distance, in particular. Chalmers anticipates that spatiotemporal truths may pose a special problem for his view, but he discounts such concerns (p. 437).

5. This terminology is convenient but somewhat distorted. Strictly speaking, for Lewis there is just one worldmate relation as such. Items can be worldmates in virtue of participating in different fundamental relations, i.e., spatial distance, temporal distance, and perhaps "analogously spatiotemporal relations".

6. As a Humean, Lewis maintains that causal relations have to supervene on non-causal properties and relations. **Cf. Chalmers XXX.**

7. **Similarity.**

8. Lewis holds that distance is absolutely fundamental, at least in the actual world, regardless of its status as a worldmate relation. The most fundamental constituents of our world, the elements of the "Humean mosaic", are structured by the spatial (and temporal) relations they bear to one another.

9. To borrow a Lewisian example, you can't hear a donkey talk because there are no talking donkeys in the actual world. It would be a mistake to say that talking donkeys aren't actual because you can't hear them.

10. Lewis maintains that worldmate relations have to be *pervasive*: "mostly, or perhaps without exception, when there is a chain of relations in the system running from one thing to another, then also there is a direct relation." (Lewis, p. 76). The suggestion that primary-spatial relatedness is a worldmate relation, but not pervasive, is under strain for that very reason.

11. Lewis contemplates a possible world in which only spirits exist, suggesting that they would be worldmates in virtue of bearing temporal relations to one another (Lewis, p. 73). Could the material objects in the Matrix be worldmates of ordinary material objects by existing in the

same time? This suggestion seems, again, like special pleading. We could follow Chalmers and allow that some, but not all, material objects are worldmates insofar as they are spatially related, or see no compelling reason for making that exception, and deny that Matrix objects are genuine material objects in the first place. See Note XX; §2 immediately below also bears on this point.

12. Some philosophers have urged that a possible world can contain isolated space times, so-called “island universes.” If so, it could be that α and β are both actual, while there is no continuous path from the location of one to the location of the other. The point is contentious, however (see Divers XXXX); cf. Bricker (XXXX), Pargetter et al (XXXX), and allowing the existence of island universes wouldn’t be enough to save the structuralist position, in any event. See below.

13. Mc Daniel (XXXX) argues that an object can exist in two spacetime regions that are completely disconnected and are parts of different possible worlds. This proposal is even more radical than the position that an object can be bi-located within a single space. I won’t pursue the point, except to say that if structuralism leads to a view like Mc Daniel’s, then defending structuralism becomes even more difficult than one might have thought.

14. The analogy between items in the Matrix and ordinary objects within a wavefunction ontology is less helpful than Chalmers intends. See Ney XXXX.

15. Chalmers himself....

16. **Cite Chalmers.**

17. Chalmers distinguishes between “Edenic” spatial concepts that figure in the content of experience and their structuralist successors which figure in scientific and (perhaps) ordinary thinking. So, he might allow that the “Edenic” concept of distance includes its being fundamental and transitively closed, yet deny that material objects in the actual world are distant in that sense. Our naive picture of the world is false to that extent. One might think that this result is, in and of itself, a victory for skepticism, regardless of the structuralist salvage-enterprise Chalmers then undertakes. Chalmers himself wouldn’t agree, of course. For a valuable perspective on these issues see Wilson (1984).

18. **Lewisian scruples.**