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The regress argument against realism about structure

Javier Cumpa

Department of Logic and Theoretical Philosophy, Complutense University of Madrid, Madrid, Spain

ABSTRACT
Is structure a fundamental and indispensable part of the world? Is the question of ontology a question about structure? Structure is a central notion in contemporary metaphysics [Sider 2011. Writing the Book of the World. Oxford: Clarendon Press]. Realism about structure claims that the question of ontology is about the fundamental and indispensable structure of the world. In this paper, I present a criticism of the metaphysics of realism about structure based on a version of Russell’s famous regress argument against nominalism [Russell 1911. “On the Relation of Universals and Particular.” In Logic & Knowledge. Reprint, London: George Allen & Unwin]. First, I argue that the three general tests for the fundamentality of structure proposed by realism about structure rely on a particular empirical test for structure, namely, the so-called ‘similarity test for structure.’ Second, I argue that the similarity test is not well-founded because it leads to a vicious regress. Third, I argue that the regress affects the whole metaphysics of realism about structure, and that no structural notion can be said to be fundamental in connection with any of the other tests. Lastly, I argue that the question of ontology as a question about structure is not substantive.

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1. The metaphysics of realism about structure

According to Sider, ‘metaphysics, at bottom, is about the fundamental structure of reality’ (Sider 2011, 1). This means, on his view, ‘figuring out the right categories for describing the world’ (Sider 2011, 1). But what is the significance of searching for the fundamental and indispensable structure of the world? Fundamental and indispensable structure help us improve ‘our understanding of the world’ (Sider 2011, 10). For example, structure helps us understand relevant issues, such as objective similarity, intrinsic properties, laws of nature, reference, induction and confirmation.
as well as disputes concerning time, modality, ontology, and logic, among others (Sider 2011, 10).

On Sider’s view, there are three general tests (criteria) which assign to structure certain fundamental theoretical roles:

(1) Empirical tests for structure: $x$ is structure if $x$ meets empirical criteria. For example, similarity, confirmation, laws of nature, explanation, induction, reference, and physical geometry. (Sider 2011, Chapter 3).

(2) Fundamentality tests for structure: $x$ is structure if $x$ meets criteria of metaphysical fundamentality. For instance, purity, completeness, sub-propositionality, absoluteness, determinateness, and fundamentality. (Sider 2011, 115–137).

(3) The indispensability test for structure: $x$ is structure if $x$ meets an indispensability criterion. Namely, to be an indispensable belief in our best theories of the world. (Sider 2011, 14).

What is going to be our line of argument in order to show that structure is neither fundamental nor indispensable and, therefore, that the question about structure is not a substantive question of ontology? In this paper, I present a criticism of Sider’s metaphysics of realism about structure based on a version of Russell’s famous regress argument against nominalism (Russell 1911). First, I shall argue that Sider’s three general tests for the fundamentality of structure rely on a particular empirical test for structure, namely, the so-called ‘similarity test for structure.’ Second, I will argue that Sider’s similarity test is not well-founded because it leads to a vicious regress. Third, I shall argue that the regress affects the whole metaphysics of realism about structure, and that no structural notion can be said to be fundamental in connection with any of the other tests. Lastly, I will argue that the question of ontology as a question about structure is not substantive.

2. The similarity test (and other empirical tests)

Structural categories are categories which are fundamental. These are the ‘genuine’ categories, namely, those that carve nature at the joints. But what is it for something to ‘carve at the joints’ and be ‘fundamental’? A first answer, according to Sider, can be found by appealing to similarity. As Sider notes:

Consider three objects: two electrons in identical intrinsic states, and a cow. It is the most natural thing in the world to say that the electrons are perfectly similar to each other, and that neither is perfectly similar to the cow. The three objects
should be divided into two groups, one containing the electrons, the other containing the cow. The electrons go together, and neither goes with the cow. (Sider 2011, 1).

If we classified the electron and the cow of the example together, then we would be ‘carving the world up incorrectly’ (Sider 2011, 2), as we would not be taking into account the relevant objective similarities among the objects. Sider calls ‘object-similarity’ the genuine similarity related to properties of (and) relations among objects. Returning to Sider’s example, there is a fundamental category of property structure, because there are certain properties of objects, such as being an electron, ‘whose sharing make for similarity’ (Sider 2011, 3). By contrast, ‘non-genuine properties’ (as Sider calls them), such as being either a cow or an electron, do not carve at the joints, because the sharing of these properties cannot make for similarity (Sider 2011, 3).

Now, according to Sider, we can discover a whole new realm of fundamental categories of structure if we consider, not similarities among objects, but rather similarities among facts:

Next we must change our focus, from object-similarity to fact-similarity. The connection between similarity and structure, in the case of the existential quantifier, should be understood thus: if existential quantification carves at the joints, then whenever two facts are existential facts, that is a genuine similarity between them. The fact that there is a donkey and the fact that there is an electron are genuinely similar in that each is an existential fact. Similarly, to evaluate whether ‘or’ ensures similarity we must ask whether any two disjunctive facts are ipso facto similar; to evaluate whether modal operators ensure similarity, we must ask whether all facts of the form possibly, $P$ are ipso facto similar; and so on. (Sider 88–89)

Just as in the case of property structure, also existential quantification and disjunction make for similarity. Indeed, if we want to classify existential or disjunctive facts, we must classify these facts in virtue of genuine features of facts, namely, those of being existential and being disjunctive. (Sider 2011, 89). There are, then, two fundamental categories of existential quantification and disjunction, because there are two genuine features of facts, which are ‘similarity-makers.’ (It should be noted that for Sider (2011, 89) similarity judgements about factual structure do not require us to reify facts.)

So far, genuine properties and features are makers of similarities, and it is in virtue of these genuine properties and features that objects and facts are of such-and-such fundamental category of structure. But similarity is not, Sider insists, the whole story about the fundamental nature of structural categories:
The connection to similarity is just one of a network of theoretical connections that give the notion its life. These are the connections we have been exploring, the connections to laws, explanation, metasemantics, epistemology, physical geometry, substantivity, objectivity, and epistemic value. (Sider 2011, 88).

On Sider’s view, structure can carve at the joints or be fundamental, not only by making for similarity, but also by playing other empirical roles in connection to laws of nature, reference, confirmation, and physical geometry, among others. (Sider 2011, Chapter 3). For instance, in the following passage Sider tries to show that certain relations carve at the joints in connection to physical geometry because they help us understand the intrinsic structure of space:

A realist about structure has a clear path to this realism about physical geometry. Metaphysically, the distinction enjoyed by the genuine betweenness and congruence relations is that they are part of reality’s distinguished structure: they carve perfectly at the joints, unlike any relations of Euclidean-betweenness and Euclidean-congruence. (Sider 2011, 42).

Lastly, Sider claims that structure’s tests (1), (2) and (3) are ‘intertwined’ (Sider 2011, 14), so the empirical connections are related to the tests of fundamentality and indispensability as we shall see next.

3. The fundamentality tests

Sider claims that there are six tests of metaphysical fundamentality for structure: completeness, purity, subpropositionality, absoluteness, determinateness, and fundamentality (Sider 2011, Chapter 7). These tests have to do now, not with empirical, but rather with metaphysical fundamental roles that structure plays:

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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<tr>
<td>Purity</td>
<td>Fundamental truths involve only fundamental notions (Sider 2011, 115).</td>
</tr>
<tr>
<td>Completeness</td>
<td>Every nonfundamental truth holds in virtue of some fundamental truth (Sider 2011, 115; and 115–116).</td>
</tr>
<tr>
<td>Subpropositionality</td>
<td>Structure is subpropositional: the relevant notions apply to constituents of propositions rather than to entire propositions (Sider 2011, 128).</td>
</tr>
<tr>
<td>Absoluteness</td>
<td>Structure is absolute (rather than comparative): claims about structure cannot be further explained (Sider 2011, 128–129).</td>
</tr>
<tr>
<td>Determinateness</td>
<td>The fundamental is determinate: it is neither vague nor indeterminate (Sider 2011, 137).</td>
</tr>
<tr>
<td>Fundamentality</td>
<td>Structure is fundamental: carving at the joints does carve at the joints (Sider 2011, 137).</td>
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Sider characterizes these criteria of metaphysical fundamentality for structure by way of two sorts of considerations (Sider 2011, 105). On the one hand, the theory of structure that meets these criteria has more explanatory power than those that do not meet the criteria. On the other hand,
the theory of structure that emerges from meeting these criteria provides a more intuitive picture of the nature of reality. In Sider’s own words:

There are both systematic and intuitive reasons for taking structure to be subpropositional. The systematic reasons will emerge in section 8.3: a subpropositional notion is explanatorily more powerful. The intuitive reason is that subpropositionality is tied to the following attractive picture: there are some fundamental ‘building blocks’—the ‘ultimate constituents of reality’—and the nature of reality is given by the arrangement of these building blocks (Sider 2011, 128).

4. The indispensability test

Now I will explore the relationship established by Sider between structure and indispensability. Why should we consider the categories of structure fundamental ideology of the best theory of the world? The answer to this question depends ultimately on an indispensability argument: structural notions are indispensable beliefs in our best theories of the world. As Sider puts it:

The Quinean thought about ontology is sometimes put in terms of indispensability: believe in the entities that are indispensable in your best theory. The analogous thought about ideology may be similarly put: regard as joint-carving the ideology that is indispensable in your best theory. This is fine provided ‘indispensable’ is properly understood, as meaning: ‘cannot be jettisoned without sacrificing theoretical virtue.’ (Sider 2011, 14)

5. The intertwined character of structure’s roles

As we have seen, according to Sider, fundamental categories of structure (such as, property, relation, and existential quantification) carve at the joints. This is so, on Sider’s view, because the sharing of these genuine properties and features make for similarity. Now, Sider has stated that similarity is just one of the many theoretical roles of structure. Sider has stressed that no theoretical role of structure (say, laws, explanation, and the other roles related to fundamentality and indispensability) rely in fact on the similarity test for structure. As Sider puts it:

None of these further aspects of structure’s theoretical role relies on similarity. So even if we set aside similarity, structure has a rich enough remaining theoretical role to be intelligibly applied beyond the predicate. (Sider 2011, 88).

The question that naturally arises is whether it is actually the case that none of the other structure’s tests depend upon the similarity test, given
the fact that Sider have claimed that they are all intertwined. In this section, I will critically examine the nature of the relationship between structure’s tests (1), (2), and (3). In particular, I shall argue that the three general tests of structure are not merely intertwined, but they are much more strongly connected. I will argue that (1), (2), and (3) depend ultimately upon the theoretical test of similarity for structure. As we shall see, for property structure (say, the property of Sider’s two electrons) to carve at the joints in connection to laws, it should first carve at the joints in connection to similarity, and the same seems to hold, I submit, for the case of the rest of tests (1), (2), and (3).

So, it seems that similarity is not just one test among other tests for structure, but the most fundamental test, one which is prior for structure to carve at the joints in the other tests (1), (2), and (3). What I mean is this: if a property (or a relation) does not carve nature at the joints in connection to similarity, then that property (or relation) will not be capable of carving at the joints in connection to laws of nature or physical geometry. Also, it seems that the property of Sider’s two electrons cannot become an indispensable belief in the best theory of the world if it does not carve at the joints first in connection to empirical tests (1), and second in connection to fundamentality tests (2). As I shall attempt to show, there is no exception to this rule.

I think that there is a problem on how tests for structure, which seem to play independent roles, are in fact intertwined in a way that it seems that certain tests, say fundamentality tests (2) for structure can fail if other tests, namely, the empirical tests (1) fail. Let’s take a closer look at Sider’s example in which relation structure is required to account for the intrinsic structure of space (Sider 2011, 38 ff). The category of relation, relation structure, is invoked to play a theoretical role in physical geometry. Now, could the betweenness and congruence relations at stake in Sider’s example carve at the joints in connection to physical geometry without carving at the joints first in connection to similarity? My fundamental thought here is that, analogously to bizarre, complex properties like being either an electron or a cow, relations which do not carve at the joints in connection to similarity will be bizarre, nongenuine relations. The pressing question, naturally, is then: can properties, relations, existential quantification, conjunction, and disjunction carve at the joints in connection to laws, explanation, meta-semantics, epistemology, or physical geometry, etc., even if these do not carve at the joints in connection to similarity? That Sider’s non-similarity tests for structure rely on the similarity test for structure is clear from the fact that Sider insists several
times that tests for structure such as laws, explanation, and induction, and purity, among others, do not work with properties other than genuine properties, i.e. properties whose sharing make for genuine similarity. (Sider 2011, 23, 35, and 36).

I think that this shows that all non-similarity tests for structure rely on the similarity test, and, therefore, this provides a case against Sider’s thesis that no other theoretical test relies on similarity.

6. The similarity regress

Let us take stock. We have seen that structure’s theoretical roles (1), (2), and (3) rely in fact on the theoretical role of similarity. Now I will examine the nature of the relationship between similarity and structure. As we will see, Sider’s categories of structure will not be capable to carve at the joints in connection to any test, because his similarity test for structure is not well-founded. For it turns out that when we ask whether similarity carves nature at the joints we find out that it does not carve nature at the joints, because there exists a tension between Sider’s similarity test and his nominalistic (or particularistic) characterization of structure.

Sider favors a nominalist conception of similarity. He writes:

For Armstrong, a predicate is sparse when there exists a corresponding universal; for Lewis, a predicate is sparse when there exists a corresponding natural property or relation. Each assumes the existence of abstracta. But the idea that the world has a distinguished structure—that electrons go together and not together with cows, that it is better to think in terms of electrons than in terms of electron-or-cows, and so on—does not require this assumption. (Nominalists could surely embrace the idea.) The notion of structure is to be free of commitment to abstract entities. (Sider 2011, 85).

Let’s consider the genuine similarities among Sider’s two electrons. The following criticism of Sider’s similarity test for structure is designed to hold for Sider’s object- and fact-similarity, and is independent upon conceptions of similarity as being ontic or merely ideological. For the target of the criticism is precisely to show that the similarity test for structure fails to make the properties of Sider’s electrons to carve at the joints, because the test is not-well founded. It is not well-founded, since Sider’s nominalistic interpretation of structure leads to an endless regress. My criticism is reminiscent of Russell’s argument against Nominalism (Russell 1911).

Let’s assume that there are four electrons, $a$, $b$, $c$, and $d$ and that they have, following Sider’s nominalistic characterization of property and
relation structure, their relevant particular properties, \( F_1, F_2, F_3, \) and \( F_4. \) Let’s assume for the sake of Sider’s characterization that properties \( F_1 \) and \( F_2 \) stand in a similarity relation, \( R_1; \) that properties \( F_3 \) and \( F_4 \) stand also in a similarity relation, \( R_2; \) that properties \( F_1 \) and \( F_3 \) stand in a similarity relation, \( R_3; \) and that properties \( F_2 \) and \( F_4 \) stand in a similarity relation, \( R_4. \) Well, as Sider has shown, properties \( F_1, F_2, F_3, \) and \( F_4 \) carve nature at the joints because they are ‘similarity-makers’, i.e. they make for objective similarity relations, namely, \( R_1, R_2, R_3 \) and \( R_4. \) Now I will try to show how properties \( F_1, F_2, F_3, \) and \( F_4 \) cannot really carve at the joints. The question is: Do these similarity relations carve at the joints? In more plain words, do the similarity relations \( R_1 \) and \( R_2 \) stand in the same similarity relation to each other as do \( R_3 \) and \( R_4? \) According to Sider’s nominalistic characterization of structure, such similarity relations are to be understood as being four different, particular similarity relations. So, properties \( F_1, F_2, F_3, \) and \( F_4 \) carve at the joints just at the price of introducing a further similarity relation which holds between those similarity relations. The endless process to introduce such higher-order relations among relations is thus a vicious regress. But the introduction of higher-order relations between relations does not fix the problem of how \( F_1, F_2, F_3, \) and \( F_4 \) can be particular instances of the same property. Sider might admit the existence of a universal relation of similarity holding among all similarities. But in this case, particular similarity relations would become superfluous.

The vicious regress shows that the similarity test for structure is not well-founded. It is not well-founded due to the characterization of structure. Sider’s nominalistic characterization of structure makes the properties of the electrons fail as similarity makers. And if the similarity test for structure fails, then the properties of Sider’s electrons, relations, existential quantification, conjunction, and disjunction cannot carve at the joints in any of the other tests either. I find this regress to be an argument to reject Sider’s similarity test for structure. Naturally, the regress is a problem for Nominalism, and Sider could avoid it just by dropping Nominalism. Now, I am not sure that dropping Nominalism would be that simple, because he characterizes structure in opposition to Armstrong’s universals for the following reason. Namely, Sider’s realism about structure is pursuing the project of going beyond predicate structure and including in his metaphysics also logical structure such as conjunction, disjunction and existential quantification (Sider 2011, 86). So, if Sider rejected Nominalism, then he would avoid the similarity regress, but he would have to abandon the project of going beyond predicate structure.
Sider might try to block the similarity regress by adopting a form of Resemblance Nominalism (Rodriguez-Pereyra 2002, 63) and conceiving of similarity as being a primitive resemblance relation. Resemblance is primitive because it cannot be reduced to the sharing of properties. Now, Sider’s realism about structure does not seem to be compatible with Resemblance Nominalism. For as Sider notes, similarity is reducible to the sharing of fundamental properties:

The idea of a genuine similarity is that of a real commonality. Here we have a negatively charged thing; there we have another negatively charged thing; has something in nature recurred? Is there a real commonality between the negatively charged things? We think so. The recurrence was within objects in this case, but that is inessential to the legitimacy of the question. There exists a donkey; there exists an electron—has anything recurred? Is there something in common between there existing a donkey and there existing an electron? If I am right that quantification carves at the joints, then the answer is yes; these facts share a real commonality (Sider 2011, 89).

Now, it is not only that Sider cannot adopt Resemblance Nominalism in order to block the regress because his Nominalism and Resemblance Nominalism provide incompatible accounts of similarity. But, also, if Sider adopted Resemblance Nominalism, then his notion of structure would cease to be primitive (‘fundamental’ in his terminology). Properties, disjunction, and even worse, existential quantification would be derived from certain primitive similarities.

7. Realism about structure beyond the predicate?

According to Sider’s view, the similarity test for structure makes, not only similarities among objects such as electrons, but also similarities among facts. For instance, the fact that there is a donkey and the fact that there is an electron share a real commonality, namely, that both of them are existential facts:

There exists a donkey; there exists an electron—has anything recurred? Is there something in common between there existing a donkey and there existing an electron? If I am right that quantification carves at the joints, then the answer is yes; these facts share a real commonality. But if I am wrong (as defenders of ‘quantifier variance’ think—see chapter 9) then the answer is no; quantifical- tional facts do not particularly ‘go together’. (Sider 2011, 89).

Here Sider seems to think of the recurrence of the existential quantifier as being a feature shared by the two facts. If existential quantification recurs in more than one fact, does it mean that the existential quantifier is a
feature of those facts? To this question Sider gives an answer in the affirmative:

If all existential facts are indeed similar, this is because of something about quantification: being existential is a genuine, not merely nominal, feature of facts. (Sider 2011, 89).

Sider’s distinction between object- and fact-similarity is intriguing. Objects have properties, and (some of) these properties carve at the joints in virtue of being similar to each other or not. Facts have properties, so-called ‘features.’ Two facts can be existential, because both have this same feature. Now, is the existential quantifier (‘there is’) really a feature of facts? As I see it, if existential quantification, conjunction, and disjunction were features of facts, then these features should really belong to the category of property (predicate structure). Now, as we know, Sider’s realism about structure is pursuing the project of going beyond predicate structure and including in his metaphysics also logical structure such as conjunction, disjunction, and existential quantification. So, Sider’s understanding of logical categories of structure as features leaves his project of going beyond predicate structure under the threat of self-refutation.

8. Structure does not carve at the joints

Now I will examine the particular relationship between the similarity test and four of Sider’s metaphysical fundamental tests for structure (2), namely, purity, completeness, absoluteness, and fundamentality. In the first place, how are we supposed to understand Sider’s tests of purity and completeness, according to which fundamental truths involve only fundamental notions, and every nonfundamental truth holds in virtue of some fundamental truth? Let’s consider Sider’s example of existential quantification: there is a donkey. The quantifier, according to Sider, carves at the joints in virtue of the similarity test (Sider 2011, 89). Now, on Sider’s view, such truth is not fundamental, since ‘donkey’ is not a fundamental notion. Given the test of completeness, in the second place, this nonfundamental truth must hold in virtue of some fundamental truth (Sider 2011, 115–116). But if similarity does not carve nature at the joints, I do not see why I should think of the ‘existential quantifier’ as a fundamental notion, and of ‘donkey’, by contrast, as a nonfundamental notion. As a consequence, the issues of ‘what is more fundamental of what’ and ‘what is in virtue of what?’ become rather superfluous.
Now, and thirdly, Sider could argue, based on the test of *absoluteness*, that claims about the existential quantifier cannot be explained further (Sider 2011, 128). However, it would seem that an account of the existential quantifier that appeals to relations of (fact-)similarity cannot be absolute, and *might*, in principle, be explained further precisely in terms of the higher-order relations of fact-similarity of the regress. Lastly, Sider might argue, in accordance with the test of *fundamentality*, that the existential quantifier carves at the joints because fundamentality (or *being joint-carving*) in fact is fundamental (or *joint-carving*). (Sider 2011, 137). We are now in position to argue that ‘being joint-carving’ cannot be a joint-carving notion because the most fundamental tests for structure, namely, object- and fact-similarity do not carve nature at the joints.

I will explore also now briefly the relationship between similarity and Sider’s indispensability test for structure (3). We can make the relationship between the similarity test and indispensability explicit by asking: can structural categories such as the property of Sider’s electrons become an indispensable belief of our best theory of the word without carving at the joints first in connection to empirical tests such as similarity, and then fundamentality tests like (2)? The answer is ‘no’.

At this point of the investigation, we may ask: is Sider’s question of ontology understood as a question about the world’s structure a *substantive* one? According to Sider, the criterion of substantiveness for particular questions about structural categories is closely related to the fundamental tests (1), (2), and (3):

In my view, whether a question is substantive —in one important sense of ‘substantive’— depends largely on the extent to which its terms carve at the joints; to the extent, that is, that the question concerns the world’s fundamental structure. (Sider 2011, 6).

In this regard, if structure is not fundamental in (1), (2), and (3), then it seems that there is no reason in principle to think of the question about structure as a substantive and genuine question of ontology.

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ORCID

Javier Cumpa http://orcid.org/0000-0002-8848-2117

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