No Lacuna and No Vicious Regress: A Reply to Le Poidevin[1]

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Abstract: In his "Space, supervenience and substantivalism" Le Poidevin proposes a substantivalism in which space is discrete, implying that there are unmediated spatial relations between neighboring primitive points. This proposition is motivated by his concern that relationism suffers from an explanatory lacuna and that substantivalism gives rise to a vicious regress. Le Poidevin implicitly requires that the relationist be committed to the "only *x* and *y*" principle regarding spatial relations. It is not obvious that the relationist is committed to this principle in such a context. An additional motivation for Le Poidevin's argument, that space should be considered to be discrete, is that he believes that substantivalists are committed to a vicious regress. I show that the regress is in fact not of the vicious variety. These two main arguments show that Le Poidevin's suggestion that we drop the density postulate for space is unnecessary.

Key Words: relationism, substantivalism, only x and y principle, Le Poidevin, regress

I

In his "Space, supervenience and substantivalism" Le Poidevin proposes a substantivalism in which space is discrete, implying that there are unmediated spatial relations between neighboring primitive points. This proposition is motivated by his concern that relationism suffers from an explanatory lacuna and that substantivalism gives rise to a vicious regress. However pleased the relationist is with Le Poidevin's move to discrete space (since it weakens his argument against relationism), the move is unnecessary since it will be shown first that the relationist is not committed to the principle Le Poidevin assumes, and second that the subvenience regress is not vicious.

Rejecting the density postulate (that "for any two spatial points, however close together, a straight line running from one to the other will always pass through a third point" (Le Poidevin 2004, 195)) not only radically weakens the argument against

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relationism (Le Poidevin 2004, 198)[2] but also has far-reaching physical ramifications. I claim this is not a move Le Poidevin is required to make. Given that his ultimate conception of atomistic space does nothing to suggest an adoption of metric conventionalism over objective metric,[3] does nothing to close the explanatory gap of relationism and introduces a controversial conception of the nature of space, one must question the benefit of such a solution. Certainly it solves the regress problem for substantivalism, but if the regress can be shown to be of the non-vicious species, or if it can be avoided all together, then substantivalism and the density postulate can peacefully coexist.

II

Le Poidevin's first motivation for rejecting the density postulate is his belief that relationism has a gaping explanatory lacuna.[4] Consider two objects, A and C, which are ten inches from one another without any intervening object. There is then this true proposition:

(1) A is ten inches from C

Given the truth-maker principle—the principle that every true proposition has something in virtue of which it is made true[5]—(1) is made true by the relation R_1. Given the

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[2] One could even argue that the move to atomistic space obviates the argument against relationism.
[3] This is another concern that Le Poidevin raises. From p195-96: We can adopt a conventionalism with regards to measurement and deny that there is any fact of the matter as to whether two distances are equivalent independent of our measurement of them. This would save the relationist from the argument in fn 3. Since the conventionalist takes equivalences to depend upon the measuring system chosen, the inference that the relationist makes about the distance between A and C based on the distances between A and B and B and C is entirely a feature of the measuring system that we have chosen, not a fact about relations in the world.

[4] What follows come from pages 193-4.
[5] Though this principle requires adherence to a type of a correspondence theory of truth the debate about whether it's acceptable is beside the point being made here.

assumption of relationism, R_1 is unmediated and independent of anything other than the distance between A and C.

Next a third object, B, is placed on a line two fifths of the way between A and C. There are now two new true propositions:

(2) A is four inches from B

(3) B is six inches from C

There are also two new distance relations that are the truth makers of these propositions, R_2 and R_3 holding between A and B and between B and C respectively. These relations are also unmediated—R_2 depends on nothing other than the distance between A and B and R_3 depends on nothing other than the distance between B and C.

Since R_1 does not supervene on anything other than the distance between A and C, R_2 and R_3 cannot be considered to be the truth makers of R_1. But given that (2) and (3) together entail a third proposition:

(1) A is ten inches from C

and given the explanatory principle—"Where *p* entails *q*, there is a corresponding connection between the truth-makers of *p* and *q* that explains the entailment" (Le Poidevin 2004, 191)—there must be *some* connection between the truth makers of the entailing propositions and the truth makers of the entailed proposition. So there must be some relation between R_2, R_3 and the truth maker of (1). However, by assumption R_1 depends on nothing save the distance between A and C. Therefore it cannot have the kind of connection with R_2 and R_3 that the explanatory principle implies. Therefore, Le Poidevin believes that there is a fourth relation, R_4 that is an additional truth maker of (1) and that supervenes on R_2 and R_3.

This over-determination of truth does not concern Le Poidevin but he does find it a bit odd that there are two relations existing independent of one another and yet are the truth makers for the same proposition. He argues that we cannot assume that one exists and not the other, for eliminating the non-supervenient R_1 undermines the basic assumption of relationism—that R_1 depends for its existence on nothing but the distance between A and C; if R_1 suddenly ceased to exist because of the introduction of a new body, then R_1 is not dependent on only the distance between A and C, but also on the non-existence of anything else between A and C. If we eliminate the supervenient R_4, then we violate the explanatory principle.

The trouble arises when we consider what happens when we move either A or C. Suppose that A and C are each moved one inch farther from the other and B remains stationary. Now we have the following propositions:

(4) A is twelve inches from C

(5) A is five inches from B

(6) B is seven inches from C

Each of these propositions has at least one truth maker namely R_5, R_6 and R_7 respectively. The question is: Why, if they are completely independent of one another, do R_1 and R_4 undergo exactly the same transformations?[6] Le Poidevin believes that the relationist has no answer to this.

On the contrary, I believe that the relationist *can* answer Le Poidevin's challenge by pointing out his implicit dependence on the "only *x* and *y*" principle regarding spatial

[6] I am following Le Poidevin's suggestion that R_1 and R_4 have been replaced by R_5 and what we can call R_8,the relation that supervenes on R_6 and R_7 and is a second truth maker for (4).

relations. It is not obvious that the relationist is committed to this principle in such a context. In fact, an argument can be made that the relationist is not so committed.

The "only *x* and *y*" principle states roughly that whether two objects are numerically identical depends only upon facts about those two objects, and on nothing else. Le Poidevin insists that R_1 before the introduction of B is identical to R_1 after the introduction of B (2004, 193).[7] However, if we give up the "only *x* and *y*" principle regarding spatial relations, then the numerical identity of R_1 and R_1' is no longer obvious. If R_1 is different from R_1' then one can argue that R_1 no longer exists after the introduction of B and likewise no longer exists when A and C are moved farther from one another. Thus it is no longer the case that "the fate of R_1… depend[s] on the existence or non-existence of R_4" (2004, 194) and no more explanatory lacuna.

That the "only *x* and *y*" principle can be eschewed in the context of spatial relations is suggested by Alan C. Kingsley's (2004). Kingsley draws on Peter Geach's definition of Cambridge change[8] to argue that a modified "only *x* and *y*" principle can be applied to objects that really exist, but not to objects that exist in a mere-Cambridge way.[9] If relations are objects that exist in a mere-Cambridge way, then it is open to argument that the "only *x* and *y*" principle can be dropped in the context of spatial relations.

Kingsley defines objects that exist in a mere-Cambridge way as objects that cease to exist as a result of mere-Cambridge change (2004, 346). Consider a relation like

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[7] From here on out I will call "R_1 *before* the introduction of B" simply R_1 and "R_1 *after* the introduction of B" R_1'.

[8] An object undergoes a "Cambridge change" just in case the truth value of a proposition about that object changes. An object undergoes a "mere-Cambridge change" just in case it undergoes a Cambridge change but no properties inherent in the object change.

[9] The principle is modified such that it is can better withstand arguments brought against it. The modifications make it more clear that the principle is not applicable to entities that exist in a mere-Cambridge way, but the details of the modifications are not essential to the point made in the present paper.

"childless couple".[10] Before acquiring a child Sue and Charles stand in this relation to one another. After acquiring a child one would not say that Sue and Charles stand both in the "childless couple" relation and in the "couple with child" relation; rather, one would say that the "childless couple" relation has ceased to hold between Sue and Charles. A particular instance of the relation "childless couple", the one that held between Sue and Charles, has ceased to exist.[11] This is not because some property inherent to the relation has changed. So we can say that on account of the fact that the relation ceased to exist as a result of a mere-Cambridge change,[12] it exists in a mere-Cambridge way.

Le Poidevin seems to accept that spatial relations also exist in a mere-Cambridge way. He claims that when A and C are moved apart, R_1 and R_4 are "replaced by two new relations" (2004, 194) implying that (those instances of) R_1 and R_4 no longer exist. The change that led to their demise was a mere-Cambridge change[13] thus R_1 and R_4 exist in a mere-Cambridge way. Given this and Kingsley's argument in (2004), the "only *x* and *y*" principle does not hold in the context of spatial relations, and so the relationist is not beholden to explain how a non-supervenient relation can be intimately tied to a supervenient relation. R_1 and R_1' are not necessarily identical and R_1' is not necessarily non-supervenient. Thus the explanation owed is how R_1' and R_4 are tied to one another. This is not difficult since both R_1' and R_4 are dependent on the same objects, A, B and C.

[10] To be more perspicuous one may want to express the relation as "childlessly coupled with" but "childless couple" works just as well. I thank Sven Bernecker for this example.
[11] This of course implies a strong version of realism about relations but realism about relations is assumed from the beginning. (Le Poidevin, 192).
[12] We can say that the proposition that changed in truth value is the proposition: "The relation 'childless couple' holds between Sue and Charles".
[13] To argue that it was not a Cambridge change but rather a real change (the alternative) would require showing that there are some properties inherent to the relations.

III

Another motivation for Le Poidevin's move to discrete space is that substantivalism seems to give rise to a vicious regress. Substantivalists believe that relations between objects supervene on intervening spatial points. Suppose that an object A is ten inches from an object B.[14] The relation between A and B, call it R_1, supervenes on the spatial relations among the points that lie between A and B. In particular R_1 will supervene on both the relation between A and C, where C is a point half way between A and B, and on the relation between B and C. Likewise, the relation between A and C, call it R_2, supervenes on both the relation between A and D, where D is a point half way between A and C, and on the relation between C and D. This process of analyzing spatial relations between points in terms of subvenient relations will continue without end. Thus Le Poidevin concludes that there is no subvenient basis for a relation if the substantivalist takes space to be infinitely divisible. He takes this regress to be vicious and fatal to the substantivalist's claim that space is infinitely divisible and that spatial relations supervene on the relations between the points that intervene.

Le Poidevin draws a parallel between the regresses of subvenience and the regresses that arise from a realistic conception of universals as discussed in Loux's (2002). Loux rehearses the Platonic concern that there is a regress when the realist about universals attempts to give a complete explanation of attribute agreement. If we claim that *a* and *b* are both *F* and if universals are real, then *a* will stand in the relation *R* to *F* and *b* will stand in the relation *S* to *F*. Since *R* and *S* are the same relation—here, exemplification—then there is some attribute agreement among *R* and *S*. Thus there must

[14] Though it is more precise to talk about the center of the mass of objects I will forego the cumbersome terminology.

be some universal, *E*, to which both *R* and *S* stand in some relation; *R* stands in the relation *r* to *E* and *S* stands in the relation *s* to *E*. Further, if there is attribute agreement among *r* and *s*, then they must be the same relation; there *is* some attribute agreement among *r* and *s* and thus there is some universal *D* to which both *r* and *s* stand in some relation. The attempt to ground the original exemplification of *F* by *a* and *b* with an appeal to other universals fails (Loux 2002, 36-7; Le Poidevin 2004, 195).

Le Poidevin argues that the case is the same for substantivalists when they attempt to determine the subvenient basis of spatial relations. Fortunately the substantivalist has it open to him to show that the regress is not of the vicious variety and so maintain the density postulate and the physics and geometry that come with it.

The way in which the substantivalist can show that the regress is not vicious is parallel to the way in which the Platonist avoids the regress of universals. Le Poidevin relies on Loux's discussion of the third-man argument against realism about universals, but neglects to apply to the case against the substantivalist Loux's proposal for why the regress in the universal's case is not vicious. Loux proposes that the regress is not vicious since the Platonist only purports to be able to explain a *single* case of attribute agreement and her account does just that; it explains how both *a* and *b* are *F* – they both exemplify *F-ness*. That *fully* explains why both *a* and *b* are *F*. Now of course there is another case of attribute agreement, namely that between *R* and *S*. The Platonist is free to again *fully* explain this case of attribute agreement by saying that *R* and *S* both stand in some relation to *E*. Nothing about the explanation of how both *a* and *b* are *F* hinges on the explanation of how both *R* and *S* are *E* (Loux 2002, p38). Thus, the regress is non-vicious since it is not a regress of meaning, but rather a regress of implication (Russell 1996, §99).

Since Le Poidevin assumes at the outset that the reality of relations is assumed by the substantivalist (Le Poidevin 2004, 192), there is a parallel between Loux's argument and the substantivalist's situation. The substantivalist can *fully* explain the relation R_1 between A and B by its supervenience on the relations R_2 and R_3, where R_2 is the relation between A and some point C between A and B, and R_3 is the relation between B and C (we are guaranteed the existence of C from the density postulate). Granted this explanation gives rise to the need to explain the relation between A and C and the relation between B and C in terms of the relations that they supervene upon, but these two facts can be explained in the same way as the first. There is nothing about the explanation of R_1's supervenience on R_2 and R_3 that hinges on how R_2 or R_3 supervene on yet different relations.[15] Again there is no regress of meaning here, merely of implication; therefore the regress is not vicious. In light of this the substantivalist need not give up the density postulate and its attendant explanatory benefits.

[15] There is a similar argument put forth by Peter Klein in his (2003) in the context of infinitism in epistemology that seeks to dull the accusation of "vicious regress" as made by Carl Gillett (2003). I want to thank Sven Bernecker for calling my attention to this article.

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