NOTHINGNESS FOR COMPOSITIONALISTS

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Abstract. *Given that worlds are defined compositionally as maximally spatiotemporally interrelated sums of possible objects, or as recombinations of actual states of affairs: what of empty worlds? It seems that such theories cannot admit such worlds, for nothing cannot come from the fusion or recombination of something. This is generally supposed to rule out metaphysical nihilism, the claim that there might have been nothing. In this brief note, I argue that the two positions can be made compatible by modifying the relationship between possibilities and possible worlds.*

Keywords: nothingness, compositionality, subtraction argument

1. Nothingness and Compositionality

Metaphysical nihilism [MN] is the view that there could have been nothing. One usually understands this possibility via an *empty* possible world; that is, one containing no objects or states of affairs whatsoever. We might wish to have such a world at our disposal to act as a truthmaker for the seemingly reasonable claim that our world, and indeed any world, might never have existed, that there might have been nothing. If we don't have such a possible world at our disposal, then the existence of *something* is rendered a necessary truth.[1]

According to the compositional account of worlds [C], worlds are `composed' out of some basic set of things: objects, states of affairs, etc. David Lewis [5], for example, defines a possible world as the biggest mereological sum of objects that are spatiotemporally related. David Armstrong [1] views possible worlds as recombinations of actual states of affairs. The received view seems to be that MN is incompatible with C. Armstrong is quite explicit about this, writing that the combinatorial approach ``cannot countenance the empty world'' since ``the empty world is not a construction from our given elements'' ([1], p. 63). I have no desire to defend C[2], nor MN for that matter. In this brief note I simply wish to demonstrate that MN and C can be rendered compatible. The trick is to let go of the idea that possibilities must be given by single possible worlds, and to allow a family of worlds to function in this role too.

2. The Subtraction Argument

[1]One might attempt to use the difficulties in making sense of the possibility of nothingness to answer the question of why there is something rather than nothing. Indeed, Armstrong defends just such a position, writing that it isn't ``logically possible for there to be nothing at all'' ([1], p. 24); as does Lewis ([5], p. 73).

[2]In fact, on Lewis' account, I think it is far too weak since it presupposes that the spacetime relation is fundamental. However, recent developments in physics appear to be converging on the view that this is not the case, and that spacetime is something that emerges at certain energy/length scales. However, one can also suppose that Lewis' position could be generalised to take account of whatever is the more fundamental relation---one suitable possibility is that spacetime is replaced by a `causal set' (see [4]).

MN is argued for on the basis of the `subtraction argument' [S] due to Tom Baldwin. S is, therefore, thought to pose problems for C. MN is derived as follows (here condensing the original presentation in [3], p. 232):

1.There is a world with a *finite* number n of *concrete* objects (accessible from our own). Call this world w_n.

2.The existence of any object o in w_n is *contingent*.

3.The non-existence of o does not imply the existence of another object o'.

4.There is a world, w_{n-1}, accessible from w_n containing exactly one less object than w_n. There is a world accessible from w_{n-1}, $w_{(n-1)-1}$, containing exactly one less object than w_{n-1}.

5.By iterating the preceding procedure (i.e. by repeated `subtraction') we arrive at a world $w_{n-m} = w_{min}$, accessible from w_n, that contains exactly one object.

6.Therefore, by steps 2, 3, 4, from w_{min} there is an accessible world, $w_{nil} = w_{n-m-1}$, containing no objects at all. W

This lands us with the following dilemma: if MN is true (as S seems to demonstrate), and if Armstrong and Lewis are right that C is inconsistent with MN, then either C must be false, or S is unsound. I argue that S in incoherent as it stands, but that MN is an option for C-theorists.

Baldwin's restriction to concrete objects, so as to rule out spacetime points for example, is problematic.[3] MN is an attractive view only if it refers to genuine nothingness, including the non-existence of spacetime points or regions (or the more fundamental structure underlying it). Indeed, it makes sense to include these less concrete objects in the subtraction argument too, for it is possible to have universes of different sizes and, therefore, containing different numbers of points or regions.[4] If we are to believe the standard model of cosmology, then our own universe has a radius that is dynamical. If the universe began at a single point (the initial singularity) and expanded (adding more spacetime) then we can envisage a physically realistic application of the subtraction argument by extrapolating backwards. The iteration (for each time step in some foliation of spacetime) will eventually bring us to a w_{min} stage. The C-problematic w_{nil} still remains, however: if we can step back to a single point, then why not take one more step?

However, if we include spacetime points (or the deeper `pregeometry') in S, then w_{nil} does appear incoherent, no matter what view one espouses. What object could possibly stand for or represent nothingness in this radical sense? Certainly no world, for how could one characterise it? But MN nonetheless seems attractive. This puts C (and genuine modal

[3]Baldwin argues that concreteness is to be determined by the principle of the identity of indiscernibles: only concrete objects satisfy the principle. Unfortunately, this rules out the entire (particle) ontology of our own world, replete as it is with bosons and fermions, both of which fail to satisfy the principle---bosons violate a very strong form of the principle where even relational properties are included (see [7]; but see [6] for an argument that rescues PII from fermions).

[4]One might object that this will involve infinitely many objects and threaten the argument. However, there is a real possibility of discrete, quantized geometry at scales of the order 10^{-34} cm (i.e. the Planck length). This would imply that a physical space with a finite radius is built up from a finite number of elementary volumes (see [2]).

realism) in trouble, for whatever is possible is actual in some world, and nothingness seems possible.

3Putting Composition to Work

One can discern the elements of an answer to this problem in Armstrong's own discussion. For example, he writes that ``The first premise is that the world is exclusively a world of contingent beings. But any contingent being might not have existed'' ([1], p. 24). The step of metaphysical nihilists is of course to infer that *all* contingent beings might not have existed from the fact that any one of the beings might not have existed. Armstrong views this as a non sequiter and rejects MN. However, this is a problem since good models of our own universe suggest the creation *ex nihilo* of not only matter but spacetime (qua gravitational field structure) too. I argue below that this is not forced upon the compositional theorist: one can take the conjunction of individual satisfactions of contingent existence to provide a totality that makes sense of nothingness in the compositional account.

According to genuine modal realism, possibilities are reduced to possible worlds: if something is possible then there is a possible world in which it is the case. More precisely, `possibly p ' is true in a world w just in case p is true in some world w' accessible from w. The most natural way to represent MN on this way of understanding the relation between possibilities and possible worlds is:

$$\mathrm{MN} \equiv \Diamond\forall x \neg E!x \qquad (1)$$

Or, in notation in which we explicitly quantify over worlds:

$$\mathrm{MN} \equiv \exists w \forall x \neg E!xw \qquad (2)$$

C faces a problem with MN so defined because there can be no such w. However, so long as we respect the basic intuition in (1), then MN can be incorporated. To this end, we extend the definition given in (2) so that instead of quantifying over a single world w we quantify over families of worlds W, then the espouser of C can accept MN.

In more detail, suppose we have a world w_{total} (accessible from the actual world, by subtraction say) that contains three objects, x, y and z. We assume that each object has a contingent existence. Then accessible from w_{total} are the following three worlds:

1. $w_{total-x}$ containing y and z, but not x
2. $w_{total-y}$ containing x and z, but not y
3. $w_{total-z}$ containing y and x, but not z

We can, therefore, write:

$$\Diamond\neg E!x \wedge \Diamond\neg E!y \wedge \Diamond\neg E!z \qquad (3)$$

Now let W consist of the worlds $w_{total-x}$, $w_{total-y}$, and $w_{total-z}$. We can write a revised version of MN, that still respects the central idea that there might have been nothing, as follows:

$$\mathrm{MN}_2 \equiv \exists W \exists w \in W \ \ \forall x \neg E!xw \qquad (4)$$

Now, because the C-theorist can construct W, since they can construct the individual elements, they are able to espouse MN_2, and so allow for the possibility that there might have been nothing. The problem previously faced was in supposing that the possibility operator in (3) was (left) distributive, so that:

$$\Diamond\neg E!x \wedge \Diamond\neg E!y \wedge \Diamond\neg E!z \equiv \Diamond[\neg E!x \wedge \neg E!y \wedge \neg E!z] \quad (5)$$

Leading us to interpret the statement as:

$$\exists w \neg E!x \wedge \neg E!y \wedge \neg E!z \qquad (6)$$

However, there is no reason to suppose that this is so, and there is no reason to suppose that is required in order to supply meaning to the statement that there might have been nothing as I have shown above.

References

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