# Worlds Enough for Junk

David Sanson

**Abstract:** A *cap* is something that is not a proper part. A *junky thing* is something that is not part of any cap. Can there be junky things? The view that possible worlds are concrete cosmoi suggests not: every possibility involves the existence of a cosmos, and that cosmos is a cap. But this can be overcome by allowing that some parts of a cosmos may collectively represent a complete possibility. The resulting view helps cast light on some important features of the Modal Realist's attitude toward modality.

> *But what has any of this to do with any controversy in metaphysics? If ignoring is our game, we can ignore what we will and attend to what we will.*
>
> David Lewis (1986, 226)

## 1 Junk

Some familiar big picture questions about mereology concern the least parts: Are there any? If so, how many, and what are they like? Here it is helpful to frame our questions in terms of two concepts: the concept of a simple, and the concept of a gunky thing. A *simple* is a least part, that is, something that has no proper parts: a Democritean atom, say, or a point-sized particle. A *gunky* thing is a thing that has no least parts, that is, has no simples as parts (Lewis 1991, 20).

We can ask parallel big picture questions about the greatest wholes: Are there any? If so, how many, and what are they like? We can frame our questions using parallel concepts. Just as we call a least part a simple, we can call a greatest whole, that is, something that is not a proper part of anything, a *cap*. And just as we call a thing that has no least parts gunky, we can call a thing that is not subsumed by a greatest whole—that is, a thing that is not part of any cap—*junky*.[1]

[1] I borrow the term 'junky' from Bohn (2009b), who borrows the term from Schaffer (2010, 64).

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The existence of a single gunky thing, *g*, entails the existence of an infinite downward hierarchy of gunky things as its parts. Since *g* is gunky, it has no simples as parts. Since everything is a part of itself, it follows that *g* is not simple, and so has proper parts. And since *g* has no simples as parts, it follows that these proper parts have proper parts. Finally, since proper parthood is transitive and asymmetric, it follows that the proper parts of those proper parts have proper parts, and so on, ad infinitum.

By parallel reasoning, the existence of a single junky thing, *j*, entails the existence of an infinite upward hierarchy of junky things: since *j* is not a part of any cap, *j* is not itself a cap, so is a proper part of something else, which in turn is not a cap, and so is a proper part of something else, and so on, ad infinitum.

The question addressed by this paper is the question of the possibility of junk. That is, could there be junky things? Is the proposition,

> **Junk**: There exists a junky thing,

possibly true?

But this paper is both narrower and broader in focus than this question might suggest. First, it is narrower because I will be interested only in resisting one sort of argument that has been made against the possibility of junk. That argument hinges upon certain Lewisian views about the nature of possible worlds, and the relationship between possible worlds and possibility. Second, it is broader because the strategy I propose for resisting that argument has broader ramifications for how we think about the relationship between possible worlds and possibility, suggesting a way of understanding the Lewisian framework for understanding modality that imposes far fewer restrictions on what is and isn't possible than others have supposed.

### 1.1 Junk and Unrestricted Composition

Assuming absolute generality for plural quantifiers, *Junk* contradicts

> **Unrestricted Composition** (**UC**): For any $xx$'s, there is a sum of those $xx$'s.[2]

By *UC*, there is a sum of all things, and everything is a part of it. That sum is a cap: it is a part of itself, but not a proper part of anything. So, by *UC*, everything is a part of a cap. So if *UC* is true, *Junk* is false, and if *Junk* is true, *UC* is false.[3]

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[2] As I am using the word 'sum,' $y$ is a sum of the $xx$'s just in case $y$ has each of the $xx$'s as parts, and $y$ has no part that is disjoint from each of the $xx$'s.

[3] If we also assume,

> **Uniqueness of Composition**: For any $xx$'s, if $y$ is the sum of the $xx$'s, and $z$ is the sum of the $xx$'s, then $y = z$,

then we can infer that there is a *unique* sum of all things, and everything is part of *it*.

This means that, if *Junk* is possible, then *UC* is, at best, contingent. Most of the extant literature on junk is focused on how best to resolve this conflict. Bohn (2009a) argues that *Junk* is possible, and so concludes that *UC* is, at best, contingent. Schaffer (2010, 64) and Watson (2010) both argue that *UC* is necessary, and so conclude that *Junk* is impossible. Contessa (2012) suggests a conciliatory strategy, arguing that *Junk* is consistent with a weakened version of *UC*.

I don't know how to resolve this issue, and I will not attempt to do so here. Instead, I want to consider an argument against the possibility of junk that is, I think, more dubious: an argument that somehow the putative possibility can be ruled out from on high, by general considerations about the nature of possible worlds and possibility.

### 1.2 The Impossibility of Junk

Schaffer presents a version of this argument:

> [T]he impossibility of junk also follows from the platitude that a possible object must exist at a possible world. No world—provided that worlds are understood as possible concrete cosmoi—could contain worldless junk because a world that contained junk would be an entity not a proper part of another entity at that world. A world would top-off the junk. (2010, 65)

Schaffer presents this as the last of three arguments for the impossibility of junk (the first argument is the argument from *UC*), and in support of what he calls the "asymmetry of existence," that is, the claim that "there must be an ultimate whole, but there need not be ultimate parts." This, in turn, is meant to support his *Priority Monism*—the view that the whole is prior to its proper parts.

Here is a reconstruction of the argument:

(1) It is possible that a junky thing exists just in case *at some possible world*, a junky thing exists.
(2) At every possible world, everything is part of that world and so nothing is junky.
(3) Therefore, it is not possible that a junky thing exists.

(1) is the "platitude" mentioned in the first sentence of the quote (later we will see that it is not a platitude, and can be rejected). (2) is the claim, found in the second sentence, that no world could contain worldless junk.

As Schaffer admits in the quoted passage, (2) is only plausible if we assume, rather controversially, that possible worlds are concrete cosmoi. Since Schaffer flags this assumption but does not defend it, and since he offers this as just one of three arguments against the possibility of junk, it is not clear that he means to endorse the assumption. Perhaps he simply offers this argument for the consideration of those who would. In any case, many

philosophers would reject this assumption, holding instead that possible worlds are propositions (Prior 1977), sets of propositions (Adams 1974), states of affairs (Plantinga 1974), properties (Stalnaker 1976; Kripke 1980), or facts (Armtrong 1989; Fine 2003). On such views, possible worlds are not material objects, and the things that exist at a given possible world need not be parts of that world, so premise (2) can be rejected.[4]

Still, many philosophers, even if they don't identify possible worlds with concrete cosmoi, might accept something that is close enough to (2), namely,

(2′) At every possible world, there is a cosmos, everything is a part of that cosmos, and so nothing is junky.

For example, King (2007), following Stalnaker (1976), holds that a possible world is a property that a concrete cosmos could have. From this it follows that every possibility involves both a property—the possible world—and a cosmos that instantiates that property.

But note that the view that possible worlds are properties does not by itself force anything like (2′) upon us. To be sure, *if* we assume the necessary truth of *Unrestricted Composition*, then, for every way things could be, there is a corresponding way that the sum of those things could be. So then it is harmless, and perhaps convenient, to identify each possible world with a way some sum of all things could be—that is, as a property a concrete cosmos could have. But we already know that the possibility of junk conflicts with the necessity of *UC*. So if you are attracted to the view that a possible world is a property things could have had, and you think junk is possible, then you should insist that a possible world is a collective property a plurality of things could have had, and that there need not always be a corresponding sum of those things.

So there is nothing fundamental to a modal framework that identifies worlds with properties that forces us to endorse something like (2′). (2′) is an optional extra assumption we might make *if* we are attracted to the necessity of *UC*, and so already inclined to reject to the possibility of junk.

Matters are different, however, when we return to the view that possible worlds are concrete cosmoi. If that is our modal framework, then (2′) does not seem like an optional extra assumption: it seems instead fundamental to our understanding of what it is to be a possible world.

Nevertheless, I want to argue that there there remains a way out, even for those who think possible worlds are concrete cosmoi. It involves the rejection of premise (1) rather than premise (2), and it requires the rejection of some common assumptions about the relationship between possibility and possible worlds. But I think the assumptions we need to reject are assumptions modal realists should reject, and are of a kind with assumptions many modal realists already do reject.

[4] Bohn (2009b, 200) has some other suggestions that are narrowly tailored to the accommodation of junk, though it is not clear to me that narrow tailoring is called for here.

## 2 Junk and Modal Realism

### 2.1 Junk, Nihilism, and Island Universes

If you think that possible worlds are cosmoi, and think that *Junk* is possible, you have a problem. But this is not your only problem. As Lewis (1986, 71–74) admits, his view also renders impossible, for exactly parallel reasons, *Ontological Nihilism* and *Island Universes*:

> **Ontological Nihilism (ON)**: Nothing exists.
>
> **Island Universes (IU)**: Some things are spatiotemporally isolated from each other.

Here is the argument against *ON*:

(1) It is possible that nothing exists just in case at some possible world, nothing exists.
(2) At every possible world, a world exists and so something exists.
(3) Therefore, it is not possible that nothing exists.

Here is the argument against *IU*:

(1) It is possible that some things are spatiotemporally isolated from each other just in case at some possible world, some things are spatiotemporally isolated from each other.
(2) At every possible world, everything is spatiotemporally connected and so nothing is spatiotemporally isolated.
(3) Therefore, it is not possible that some things are spatiotemporally isolated from each other.

As you can see, this arguments exactly parallel Schaffer's argument.

Lewis accepts the conclusions of these arguments, but he sees this as a cost: all else equal, one's modal analysis should not arbitrarily rule impossible things like *IU* and *ON* that seem possible. But he bites the bullet, and claims that the other benefits of modal realism outweigh these costs (1986, 71).

In what follows, I will argue that this a bullet Lewis does not need to bite. I begin by describing Bricker's (2001) strategy for accommodating the possibility of *IU*. I then show how we can extend that strategy to accommodate the possibility of junk, and how the resulting view can be simplified if we follow the lead of Yagisawa (1992). Finally, I consider some objections to the resulting view, and what the view reveals about the modal realist analysis of possibility. In a brief addendum, I describe how the view could be extended further to accommodate the possibility of *ON*.

## 2.2 Cosmoi, Possibilities, and the Possible Worlds Analysis

Our goal is to extend the modal realist analysis in a way that allows for the possibility of island universes and the possibility of junk. But first, we need a clear statement of the basic view that is to be extended.

The fundamental claim that concerns us is the claim that possible worlds are cosmoi (PWC). Let's unpack that claim.

A *cosmos* is a mereological sum of its world-mates. For Lewis, two things are *world-mates* just in case they are spatiotemporally connected (1986, 69). So a cosmos is a thing that comprises everything spatiotemporally connected to it. (Lewis [1986, 75] and Bricker [1996] propose other world-mate relations, but those details need not concern us here.)

There are two ways of thinking about what it is to be a *possible world*. First, a possible world is something that shows up in the *Possible Worlds Analysis* of possibility (and necessity),

> **The Possible World Analysis (PWA):** *Possibly* $p$ is true iff $p$ is true at some possible world.

Second, a possible world is a *complete* or *maximal* possibility: a possibility such that, if were to obtain, this would settle all contingent matters of fact. So, for example, the possibility *that pigs fly* is not a possible world (though it may be part of a possible world), because it is not complete. For suppose it were to obtain: that would not settle all contingent matters of fact, because it would not settle, for example, whether or not there are purple cows.

These two ways of thinking about possible worlds are not unconnected: part of the point of *PWA* is that it invites us see that everything possible is possible as part of some complete possibility.

So the claim that possible worlds are cosmoi is the claim that the things that play this role in *PWA*, and the things that are complete possibilities, are cosmoi.

Given *PWC* (and given modal realism), we can understand the role possible worlds play in *PWA* in mereological terms. The right-hand side of *PWA* involves truth at a world. If worlds are cosmoi, then truth at a world is truth at a cosmos. So here is a definition of *Truth at a Cosmos*:

> **Truth at a Cosmos (TC):** $p$ is true at $c$ iff $p$ is true on an interpretation that restricts the domain of the quantifiers and the extensions of the predicates to the parts of $c$.

For example, consider the sentence 'Some pigs have wings.' For the Modal Realist, 'Some pigs have wings' is true absolutely, because the absolute domain—the domain of all things in all worlds—includes some things that are both pigs and have wings. But it's not true *at our cosmos*—that is, when we restrict our attention to the things that are spatiotemporally connected to us, and so parts of our cosmos.

Or consider the sentence, 'Exactly one cosmos exists.' For the modal realist, this sentence is false absolutely: many cosmoi exist, all equally real. But it is true *at every cosmos*, and so necessarily true. Or, again, 'Every cosmos is a cap,' is false absolutely (by *UC*, each cosmos is a proper part of the sum of all cosmoi), but it is true *at every cosmos*, and so necessarily true.

### 2.3 Island Universes

Bricker (2001) accepts *PWC* and shares Lewis's commitment to modal realism. But he saves the possibility of *Island Universes* by allowing one or more cosmoi *together* to *collectively* represent a single possibility. To this end, he replaces *PWA*, with,

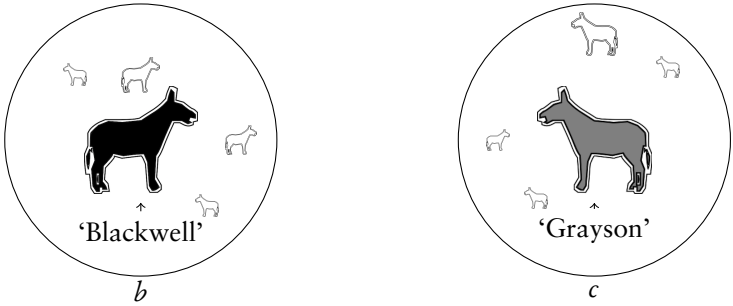
> **The Possible Worlds Analysis (PWsA):** *Possibly* $p$ is true iff $p$ is true at some possible world *or worlds*.[5]

As before, worlds are cosmoi, truth relative to cosmoi is truth relative to a restricted domain, and the restriction is understood in terms of a part-whole relation. But this time, the restriction is not to the parts of a single cosmos, but to the parts of any number of cosmoi, taken collectively:

> **Truth at Some Cosmoi (TCs):** $p$ is true at $cc$ iff $p$ is true on an interpretation that restricts the domain of the quantifiers and the extensions of the predicates to the parts of the $cc$'s.

Consider, for example, the claim

q. There are two spatiotemporally isolated donkeys.




For the modal realist, $q$ is true absolutely. Let $b$ and $c$ be two distinct cosmoi that each contain some donkeys, among other things. Call one of the donkeys in cosmos $b$, 'Blackwell.' Call one of the donkeys in cosmos $c$, 'Grayson.' Since Blackwell and Grayson are in distinct cosmoi, they are spatiotemporally isolated from each other. So, absolutely speaking, it is true that there are two spatiotemporally isolated donkeys.

[5] The lowercase 's' in the label is a pneumonic intended to indicate the plural nature of the analysis: it is the "Possible Worlds Analysis, while *PWA* is the "Possible World Analysis."

Given *PWA*, *q* is not possibly true: when we restrict the domain to the parts of a single cosmos, say, *b*, we find that all the donkeys in that domain are spatiotemporally connected to each other.

But given *PWsA*, *q* is possibly true, because it is true *at b and c* taken together. To see that *q* is true at *b* and *c* taken together, interpret *q* relative to a domain that includes all the parts of both cosmoi:

- Domain: {Blackwell, Grayson, *b*, *c*, . . . }
- Extension of 'donkey': {Blackwell, Grayson}
- Extension of 'spatiotemporally isolated': {<Blackwell, Grayson>, <*b*,*c*>, <Blackwell, *c*>, <Grayson, *b*> . . . }[6]

So, relative to this restriction, the sentence *q*, 'there are two spatiotemporally isolated donkeys' comes out true. So, given *PWsA*, *q* is possibly true.

The shift from *PWA* to *PWsA* does not require any change in the underlying metaphysics: we continue to operate with a plurality of existing cosmoi and their parts, and the absolute truths about those cosmoi and their parts remain the same. Nor does *PWsA* require a fundamentally different approach to the analysis of possibility: we continue to analyze possible truth as truth relative to an appropriately restricted domain.

But the shift does require us to be a bit more careful when we claim that possible worlds are cosmoi. Given *PWsA*, cosmoi are possible worlds in one sense: they are things that truth is relative to on the right-hand side of our analysis of possibility. But they are no longer possible worlds in the other sense: there are complete possibilities that include some things that are spatiotemporally isolated from each other, and these complete possibilities cannot be identified with any one cosmos.

## 2.4 Junk Again

*Junk* is not true at any cosmos, because the cosmos itself "tops-off the junk." Nor is it true at two or more cosmoi taken together: such possibilities multiply cosmoi, and so multiply caps. Relative to a plurality of cosmoi, each one of the cosmoi is cap: there is nothing of which it is a proper part. A junky thing requires the elimination, not multiplication, of caps. But we can invert Bricker's strategy: instead of looking for possibilities that stretch beyond the boundary of a given cosmos, we can looking for possibilities that lie within the boundaries of that cosmos.

There are cosmoi at which *Junk* is all but true. Consider a cosmos whose every proper part is also a proper part of some proper part of the cosmos. That might be hard to consider. Imagine the center of an onion, surrounded by a layer. Imagine that that layer is in turn surrounded by another layer, which is in turn surrounded by another layer, ad infinitum, until your onion

[6] Restricting extensions of predicates is more tricky than these simple examples suggest. For further discussion, see section 3.2 below.

expands to fill an infinite space. There is no one layer that contains the whole onion. Still, there is the whole onion, and it contains all the layers. So every layer of the onion is contained within some layer of the onion. A cosmos whose every proper part is also a proper part of some proper part of the cosmos has a mereological structure that mirrors the structure of this onion.

Here is something we might say about our imaginary onion: but for the whole onion itself, everything would be a layer contained within a layer. Here is something we can say about a cosmos whose every proper part is a proper part of some proper part of that cosmos: but for the cosmos itself, everything in that cosmos would be junky. Call such a cosmos a *capped junk cosmos*.

A capped junk cosmos has among its parts all the mereological structure needed to represent the possibility of junk. If only we could restrict the domain to the proper parts of the cosmos, but leave the cosmos out! Then we'd have a domain relative to which *Junk* would be true. If only we could convince ourselves that such a domain restriction should count as representing a complete possibility, even though the objects in the domain don't form a mereological or spatiotemporally complete cosmos! Then we could claim that *Junk* is possible. Let's see what happens if we try.

Replace *PWA* and *PWsA* with an analysis in terms of what is true at some parts of some possible worlds:

> **Parts of Possible Worlds Analysis (PsPWsA):** *Possibly p* is true if and only if *p* is true at some world, or some worlds, or some part or parts of some worlds.

As before, worlds are cosmoi, truth relative to some parts of some cosmoi is truth relative to a restricted domain, and the restriction is mereological. But this time, the restriction is not to the parts of one or more cosmoi, but to the parts of one or more *parts* of one or more cosmoi:

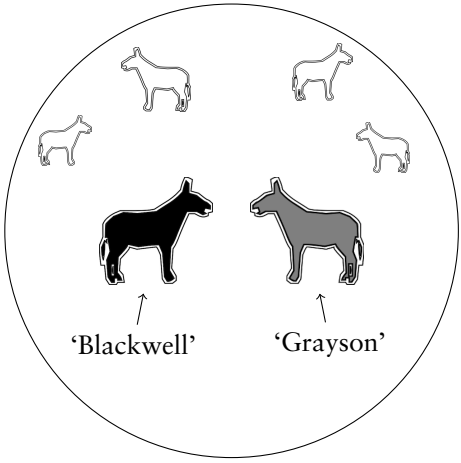
> **Truth at Some Parts of Some Cosmoi (TPsCs):** *p* is true at some parts *pp* of some cosmoi *cc* iff *p* is true on an interpretation that restricts the domain of the quantifiers and the extensions of the predicates to the parts of the *pp*'s.

This analysis allows us to represent familiar possibilities in new ways. Consider, for example, the possibility that

*r*. There is exactly one donkey.

For Lewis, this is possible because there is at least one cosmos that has, among its parts, exactly one donkey. For Bricker, it is possible for the same reason, but also because there are several cosmoi that collectively have, among their parts, exactly one donkey. Given our new analysis, it is possible for both those reasons, but also because there is a part of a cosmos that has, among its parts, exactly one donkey.

For example, consider a cosmos that has many parts that are donkeys. Let Grayson be one of those parts. Grayson himself is a part of a cosmos, and Grayson has exactly one part that is a donkey—namely himself. So $p$ is true at Grayson, and so is true at some part of a cosmos, and so, by our analysis, is possibly true.




*d*

So much for finding new ways to represent old possibilities. If that was all that we could do, our analysis would have little value. Indeed, this proliferation of ways of representing the same possibility might be seen as an objection to the analysis.

But the power of the analysis lies in its ability to represent new possibilities that the other analyses could not. Consider a simple violation of Unrestricted Composition:

> $s$. There are two donkeys but nothing that has at least two parts that are donkeys.

There is no cosmos at which $q$ is true: if there are two donkeys at a cosmos, that cosmos has those two donkeys as parts. So $q$ is not possible, given *PWA*.

*PWsA* does allow for the possible truth of $s$, so long as the donkeys are spatiotemporally disconnected: consider two cosmoi, each containing exactly one donkey. When we restrict the domain to the parts of those cosmoi, the domain contains two donkeys, but it does not contain any sum of those two donkeys, for no such sum is among the parts of either cosmos.

Our new analysis allows us to represent this same possibility, but without invoking two separate cosmoi. Suppose Blackwell and Grayson are two donkeys that are both parts of the same cosmos, $d$. A domain that includes all and only the parts of Blackwell and Grayson will include both Blackwell and Grayson, and so include two donkeys, but it will not include the sum

of Blackwell and Grayson, or anything else that has both Blackwell and Grayson as parts. So, relative to this domain, *s* is true.

Once we have the power to represent possible violations of *UC*, the possibility of junk is not far away. Consider again,

> **Junk**: There exists a junky thing.

Let *j* be a capped junk cosmos. Consider the domain that consists of all and only the proper parts of *j*. Since *j* is a capped junk cosmos, every proper part of *j* is also a proper part of some proper part of *j*: *j* has no "penultimate" proper parts, that would rise up to become caps, should *j* go missing. So, relative to this domain, everything is junky. So *Junk* is true at some parts of a cosmos, and so is possibly true, by our analysis.

### 2.5 Simplification

*PsPWsA* is a natural extension of *PWA* and *PWsA*. It provides an alternative analysis of possibility against the backdrop of the same absolute ontology proffered by Lewis and Bricker, an analysis according to which junk is possible. But it is also a mouthful. At the cost of allowing one additional sort of possibility, we can greatly simplify the analysis, by defining possibility in terms of truth at some things, without worrying about whether or not those things are parts of cosmoi.

Consider,

> **Some Things Analysis (STsA)**: *Possibly p* is true iff *p* is true at some things.

This works as a simplification of *PsPWsA* because *almost* every thing is a part of some cosmos. So truth at some parts of some cosmoi, as *PsPWsA* requires, is *almost* the same as truth at some things, as *STsA* requires.

The new possibilities allowed by the simplified analysis involve intercosmic sums—like the sum of two spatiotemporally isolated donkeys. Such a sum is not a part of any cosmos. Is there some reason to suppose that it is possible that there be two isolated donkeys, but deny that it is possible that there be a sum of two such donkeys? If not, *STsA* is to be preferred to *PsPWsA*.

*STsA* itself can be seen as a natural extension of an analysis separately proposed by Yagisawa (1992) and Yablo (1999):

> **Some Thing Analysis (STA)**: *Possibly p* is true iff *p* is true at some thing.

As Yagisawa emphasizes, there is something odd about Lewis's insistence that cosmoi play a privileged role when it comes to representing possibilities. It seems inegalitarian: why treat cosmoi as special, rather than as some things among many? Once you've accepted that what is possible is a matter of how you can restrict domains, why only allow restrictions to cosmic domains?

If you find Yagisawa's charge persuasive, note that there is something equally odd about insisting that each domain restriction be pegged to a single object: why not also, as Bricker suggests, allow restrictions pegged to several objects taken together?

*STA*, like Bricker's *PWsA*, allows for possibilities that *PWA* does not. In particular, assuming the absolute existence of super-cosmic sums, *STA* allows for the possibility of island universes. But because the analysis is singular, it does not allow for possibilities that violate *UC*, like *Junk*. So, just as we can see *PsPWsA* as a natural extension of *PWsA*, which is a natural extension of *PWA*, we can also see *STsA* as a natural extension of *STA*, which is a natural extension of *PWA*.

## 3 Objections

It is time to consider some objections.

### 3.1 Nearby Nonexistent Donkeys

Bricker objects to *STA*, arguing that if we allow a part of a possible world to represent a complete possibility, then "'something exists that is spatiotemporally related to something that doesn't exist' will be possibly true" (2001, 44–45). This objection, if correct, would apply to *STsA* too.

But it is a bad objection, for it assumes a bad analysis of truth at a part or some parts: there is no thing or things at which 'something exists that is spatiotemporally related to something that doesn't exist' comes out true. Consider our two donkeys, Blackwell and Grayson, who are both proper parts of the same cosmos. Is the sentence 'something exists that is spatiotemporally related to something that doesn't exist' true *at Blackwell*?

Grayson does not exist *at Blackwell*, and, speaking absolutely, Blackwell is spatiotemporally related to Grayson. So it is tempting to infer that, *at Blackwell*, something—namely Blackwell—is spatiotemporally related to something else—namely Grayson—that doesn't exist. But Blackwell is not spatiotemporally related to Grayson *at Blackwell*. When we restrict our attention to what is true *at Blackwell*, we must both restrict the domain and restrict the extensions of our predicates. The extension of a relational predicate, like 'is spatiotemporally related to,' should be restricted to pairs of relata each of which exist in the restricted domain. Given that restriction, it is not true *at Blackwell* that Blackwell is spatiotemporally related to Grayson, and so our analysis does not imply that it is possible that something exists that is spatiotemporally related to something that doesn't exist.[7]

[7] Note that the decision to restrict the extensions of our relational predicates in this way is not forced upon us. Bricker's objection depends on the assumption that spatiotemporal relatedness entails the existence of both relata. Perhaps that is true, but not true of all relations, or perhaps it is true of spatial but not temporal relatedness. In any case, it is a virtue of our

### 3.2 Unmarried Donkey Husbands

Parsons (2007, 174) also objects to *STA*, in the form defended by Yablo (1999), arguing that if we allow a thing to represent a complete possibility, then 'There is an ummarried husband' will be possibly true. His objection, if correct, would apply to *STsA*.

Suppose Blackwell and Grayson are married. Then it is not true *at Blackwell* that Blackwell is married to Grayson, since Grayson does not exist *at Blackwell*, and, as we've just seen, we need to restrict the extension of a relational predicate, like 'is married to,' to pairs of related things each of which exist in our restricted domain.

But, for all we have said so far, it is true *at Blackwell* that Blackwell is a husband. After all, 'is a husband' is a monadic predicate, so its extension, when we restrict the domain to parts of Blackwell, should include all the parts of Blackwell that are husbands, and so should include Blackwell.

But putting these two points together, it follows that 'There is an unmarried husband' is true *at Blackwell*, and so, by both *STA* and *STsA*, it is possibly true.

We can avoid this consequence by introducing a further restriction on what sorts of instances are allowed relative to a restricted domain. The property *being a husband* is extrinsic—whether or not a thing has it depends on the relations it does or doesn't stand in to other things. In particular, whether or not Blackwell is a husband depends on whether or not he is married to anyone. So the extension of 'is a husband,' relative to a restricted domain, should exclude things that are in the domain, but are married to things outside the domain.

More generally, given an extrinsic monadic predicate, $P$, the extension of $P$ relative to a domain should be restricted to those things that are in the restricted domain, that have $P$, and that are such that their having $P$ does not depend on any relations they stand in to relata not in the domain.[8]

This restriction comes at a cost. Our account of domain restriction now depends on a prior distinction between extrinsic and intrinsic properties. So we cannot use our analysis of possibility to provide a non-circular analysis of that distinction.

This is serious a problem for Yablo, who hoped to use *STA* to provide just such an analysis. So Parsons' objection hits its intended target. But should it worry those of us who are just interested in providing an analysis of possibility, and are not also aiming for a reductive analysis of the intrinsic/extrinsic distinction?

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analytic framework that it has the flexibility to accommodate whatever views we wish to take on these matters.

[8] Again, it should be noted that such restrictions are not forced upon us by the framework, independent of our prior judgments about what is and isn't possible. Parsons assumes that, when an extrinsic property depends on a relation, it depends on the existence both relata. If you want to deny this—perhaps a widower is still a husband, even though his wife no longer exists—the framework can accommodate your position.

I used to think that it should—that this was, at a minimum, a cost of the analysis, and so a reason one might wish to abandon *Junk* and retreat to Lewis's original analysis. But upon further reflection I am not so sure. For suppose we introduce a monadic predicate, 'proppar,' that is satisfied by all and only those things that are proper parts of something else.

Now consider the sentence,

*t*. Something is a proppar, but it is not a proper part of anything.

If, as Lewisians, we restrict our domain to the parts of the actual world, then one of the things in that domain is the actual cosmos. Now, as a matter of absolute metaphysical fact, the actual cosmos is a proper part of innumerable extra-cosmic sums, so it is in the absolute extension of 'proppar.' But those sums are not in our restricted domain. So if we restrict our domain in the manner proposed earlier, without recourse to any distinction between intrinsic and extrinsic properties, *t* will come out true at our cosmos.

This is exactly the same problem as the problem of unmarried husbands, played out at the cosmic level. As we saw, we can avoid this consequence if we restrict the extensions of our monadic predicates by considering facts about extrinsic dependence. This suggests, then, that any broadly Lewisian analysis of possibility and necessity in terms of domain restriction is committed to some prior distinction between intrinsic and extrinsic properties. There is no special objection here to *STA* or *STsA* that does not apply equally to *PWA*.

### 3.3 Actuality

Lewis offers a speaker-relative analysis of actuality:

- *x is actual* is true relative to speaker *s* iff *x* and *s* are world-mates.

But this works only if each speaker is bound to exactly one complete possibility. So long as we identify complete possibilities with cosmoi, that condition is satisfied. But once we loosen that connection to accommodate *Island Universes* or *Junk*, we see that every speaker is part of many complete possibilities, and so, the identity of the speaker no longer determines a unique possibility.

Bricker (2006) addresses this problem by supposing that actuality is absolute rather than speaker-relative. Full assessment of this response goes beyond the scope of this paper. To take this route is to add an additional metaphysical commitment, and that will count, for many people, as a serious cost.

The simplest alternate analysis that adds no additional metaphysical commitments is this:

- *x is actual* is true relative to some things iff *x* is a part of those things.

The trouble here is that we have replaced speaker relativity with relativity to some things. It is easy enough, in a given conversation, to figure out who the speaker is. But how are we supposed to determine, in a given conversation, which things we are supposed to evaluate claims about actuality relative to?

Here I think Yagisawa (1992) gets it right. He suggests that, broadly speaking, to say that something is actual is to say that it is "around here in logical space," and we have to leave it up to other features of the context—speaker intentions together with shared background beliefs, perhaps—to determine, to whatever degree of precision communication requires, what counts as "around here." He adds that the only reason he can find to demand a sharp boundary between the actual and the possible, determined in some more robust metaphysical fashion, is the "myth that actuality is a metaphysical stonewall that separates what is actual or 'real' from what is 'merely possible' " (1992, 8).

This might seem radical indeed. But Lewis himself seems inclined to allow flexibility of precisely this sort. Discussing the question of whether or not a set is actual if one of its members is in this world, but its other members are in other possible worlds, he says,

> There is no need to decide, once and for all and inflexibly, what is to be called actual. After all, that is not the grand question: what is there? It is only the question which of all the things there are stand in some special relation to us, but there are special relations and there are special relations. (Lewis 1986, 95)

It is not hard to get from this to Yagisawa's view: be liberal about what counts as a candidate "special relation"; allow the conversational context to settle which candidate is in play in a given conversation; don't sweat the precise boundaries.

Still, it cannot be denied that one cost of abandoning *PWA* in favor of this other more permissive analysis of possibility is that it complicates our corresponding analysis of actuality.

### 3.4 Ignoring Reality

I want to consider one final objection that is, I think, brought out by consideration of these various putative analyses of possibility in terms of various proposed domain restrictions.

You might say that all I have shown is that, if we *ignore* some part or parts of a cosmos, we can *pretend* that what is left is a self-standing complete possibility, and so pretend that *Junk* is possible, even though, as a matter of real absolute metaphysical fact, *Junk* is false. I am sympathetic to this charge. But the same charge applies with equal force to Lewis's own view. You might say that all that Lewis shows is that, if we *ignore* some

features of reality as a whole, we can *pretend* that what is left is a self-standing complete possibility, and so pretend that it is possible that there are no flying pigs, even though, as a matter of real absolute metaphysical fact, there are flying pigs.

This is an objection to any analysis of modality in terms of domain restriction. If you think truth relative to a domain restriction does not capture genuine possibility—that genuine possibilities must have instead some more robust basis in the absolute metaphysical facts—then you should not be a modal realist. For the modal realist, what it is to think about things in modal terms just is to pick out some one part of reality (or, perhaps, some parts), and willfully ignore the rest.

## 4 Addendum: Nothing at All

Briefly, what about the possibility of *Ontological Nihilism*?

**ON**: Nothing exists.

*STsA* fails to accommodate the possibility of *ON*. Efird and Stoneham (2005) suggest that, to accommodate this possibility, the modal realist should introduce a "null individual," modeled after the null set. Bricker (2001, 47) suggests that his analysis can be extended to cover this case by introducing a "null plurality," again modeled after the null set. Rodriguez-Pereyra (2004) argues against Bricker's proposal, on the grounds that plural quantification just doesn't work that way, and one cannot make good sense of attempts to extend plural quantification along these lines.

But is there a real problem here? I'm not sure there is. As we've seen, for the modal realist, possible truth is truth relative to a restricted domain. Is there some principled reason why we cannot simply include, among the candidate restrictions, a restriction to the empty domain?

One easy way to restrict a domain is to glom on to a given object or objects, and consider the set of all their parts. So far, all our proposed analyses have worked in this way. If we want to continue in this vein, we could expand our analysis to allow a restriction instead to the *proper parts* of a thing. Then, assuming that we have, in our absolute domain, at least one simple, *s*, we can say that *ON* is true at the proper parts of *s*—that is, relative to an empty domain.

But if our goal is to represent the possibility of nothing by ignoring everything, this seems like a roundabout strategy. Perhaps we should just include, as an additional disjunct in our analysis, the claim that whatever is true relative to the empty domain is possibly true. Is this ad hoc? I struggle to see how it is, really: it seems like a natural extension of any account that analyzes possibility in terms of truth relative to a restricted domain. But even if it is ad hoc, does that matter? After all, this is not, as Lewis might say, one of the grand questions. If we judge that *ON* is possible, why not tweak our analysis to fit that judgment?

## 5 Conclusion

To be clear, I have not argued that *Junk* is possible, nor have I defended the *STsA* analysis of modality as the correct analysis. I have instead argued that there is no good argument from broad platitudes about modality against the possibility of *Junk*, even for if we think of possible worlds as concrete cosmoi. More specifically, I have argued that there is a principled extension of *PWA* that allows us to say that *Junk* is possible, and that this extension requires no addition or alteration to fundamental Lewisian metaphysics. If there is a fact of matter, when it comes to choosing between *PWA*, *PWsA*, *PsPWsA*, *STA*, and *STsA*, or whatever other domain-restricting analysis of possibility a modal realist might proffer, it seems to me that that fact should be decided by considering first-order arguments about what is and isn't possible.

David Sanson
E-mail : desanso@ilstu.edu

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