

On Doing Without Ontology: Feature-Placing on a Global Scale

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Ontological Nihilism. It's an extreme view — to extreme to be defended by most, even though variants and close cousins have their champions. Once upon a time, I argued against it by way of a dilemma. Some have resisted one horn of the dilemma. I haven't been convinced by that resistance, but over time I've gotten less confident about the other horn. Here I'll look at a version of Nihilism that might be able to get around it.

1 ONTOLOGICAL NIHILISM

The Ontological Nihilist is someone who insists that there is nothing at all. But he does not deny that it *seems* that there are things. Like Parmenides, he thinks that the world is not as it seems. We are presented with a world structured by objects bearing relations to each other. The Ontological Nihilist thinks that these appearances are misleading at best. The world is structured, yes, but not by objects and relations.

The Nihilist's basic move is not novel. Many metaphysicians will happily tell you that there is less in the world than there seems to be. It seems, after all, that there are tables and tachyons; cats and corporations; hats and hairstyles. Few metaphysicians think there really are *all* of these, though. Perhaps there are really only atoms in the void, or regions of spacetime, or points in a higher-dimensional 'configuration space'. There really are no tables, corporations, hairstyles, or the like; but we can account for the appearance of such by talking about what the Democritan atoms, or the regions of spacetime, or the points in the configuration space are doing.

The Ontological Nihilist carries on in the spirit of these other, less ambitious 'nihilists'. He, however, thinks they do not go far enough. They account for the misleading appearance of some things by appeal to some other things. The Nihilist wants to account for all the appearances by appeal to nothing at all.

"Don't misunderstand," the Nihilist tells us. "When I say that I want to appeal to nothing at all, I don't mean to deny myself all descriptive resources. The world is structured, and I want to describe it. I just don't think this structure will involve any *things* — any *ontology*. I let myself have a theory, of course, and that theory will be couched in language. The language won't have any quantifiers, so it won't have any way of talking about things. But will be able to underpin some structure in the world that can account for the *appearance* of things. It will explain why it

seems that there are tacyons and trees but not square circles or UFOs parked on the quad. And it does so without dragging in any ontological structure.”

Two things need to be cleared up. First, the Nihilist keeps talking about ‘the world’ being structured. Does this mean that he is committed to at least *one* thing, ‘the world’? “No,” he says. “My talk about ‘the world’ is just shorthand. I’m trying to get you into the swing of my way of thinking, and I have to cheat a little to do that. I believe in precisely what is quantified over in the theory I endorse. And that theory doesn’t quantify. It certainly doesn’t quantify over ‘the world’, whatever that might be.

“But my theory does assert, and I believe what it asserts. Some of what can be said in my theory’s language is right, and some is wrong. That’s all I mean when I say ‘the world is structured’. Distinctions can be made; my theory makes them all the time. This doesn’t mean there has to be some entity, some ‘world’, that these distinctions are about.”

I hope that clears up what the Nihilist means by saying ‘the world is structured,’ because it’s all you’re going to get. But the Nihilist also talks about ‘ontological structure,’ because he wants to deny that there is any. What, precisely, is ‘ontological’ structure? What makes some structure *ontological*?

Ontological structure is the structure of quantification. It’s what we ascribe to the world by quantifying. That isn’t a definition, and I doubt any definition in more basic terms could be given. An image might help, though. When we quantify we treat the world like a pegboard. The pegs are the ‘things’, the ‘entities’. We seldom quantify barely; usually, we quantify to apply predicates to things. This is like stretching rubber bands between pegs. We may say ‘Something is red’, or in symbols, ‘ $\exists xRx$ ’. When we do this, we take the ‘red’ rubber band and hang it on one of the pegs. We may also say ‘Something loves everything’, or ‘ $\exists x\forall yLxy$ ’. When we do this, we pick one peg and stretch a ‘loving’ rubber band between it and each other peg on the board.

This, in rough form, is what ‘ontological structure’ amounts to: it is structure with basically this shape. The image isn’t perfect, though most of the problems come from the rubber bands, not the pegs. Properties and relations might have a fixed adicity, but rubber bands can be stretched between any number of pegs. Relations may be asymmetric, but if we stretch the ‘loves’ rubber band between two pegs, there’s no saying which peg is the lover and which the beloved. And so on.

Most of these defects can be fixed with a mild tweak. Rather than rubber bands, imagine extensible, flexible rods with a fixed number of holes in them. Perhaps *loving* is a rod with both a square hole and a round hole in it. If we stretch a rod, putting the square hole on one peg and the round hole on another, the peg in the square hole is the lover, and the one in the round hole is the beloved. Since they are flexible, the rods can bend around any other pegs that might get in their way.

They can also bend in a circle, so that a *loves* rod can have both holes on the same peg. This way, a peg can love itself.

This, then, is the image of ontological structure. It is the kind of structure the Nihilist rejects.

2 WHY BE A NIHILIST?

One might endorse Nihilism for any number of reasons: boredom, philosophical contrariness, a desire to be written up in the *New York Times Review of Books*, and so on. But the best reasons seem to be broadly scientific ones about the role that individuals play — or, better, fail to play — in our best scientific theories. Strands of these thoughts can be found in the work of the Ontic Structural Realists (e.g. Ladyman and Ross 2007: 145–155), but one of the clearest articulations of the idea is in Shamik Dasgupta’s ‘idlers’ argument (2009, 2017). Dasgupta argues that individuals are ‘explanatory idlers’: they do no theoretical work. Science never cares about the individuals themselves, but only about the framework of properties and relations that hangs on them. Individuals do no explanatory work. So, just as we have gotten rid of other purported features of our theories that do no explanatory work (like absolute velocities), we ought to get rid of individuals.¹

Let’s not worry about the argument’s subtle details but think of it instead in terms of our pegboard image. Suppose we have a world: a collection of pegs with an edifice of extensible rods hanging on them. We could pick that edifice up and rotate it, or shift it sideways, or do any number of similar things with it before dropping the whole shebang on some new pegs. The re-dropped rods, being on different pegs, seem to represent a *different* way for the world to be. But the differences, well, they don’t make a difference. All that really seems to matter is the patterns of rods between the pegs. Neither we nor science ever access the pegs directly; we always do it via the properties and relations.²

If that’s right, why bother with the pegs at all? Why not just glue some rods

¹Dasgupta doesn’t run this argument in support of Nihilism per se, but rather for a view that he calls *generalism*. Generalism allows that there can be ‘qualitative’ entities that aren’t individuals, such as properties and relations, and that there can also be individuals so long as they are grounded (in the sense of Schaffer 2009 or Rosen 2010) in these qualitative things. Against the second claim, Jeff Russell (2017) has argued that this leads to intolerable indeterminacy about individuals. If so, then if we are to be generalists, we should reject individuals entirely. Against the first claim, Dasgupta’s generalism (purged from individuals) stands to Nihilism as platonism about properties and relations stands to nominalism. I’ve argued elsewhere (2017) that the nominalistic version of generalism is preferable; if that is right, the idler argument best supports Nihilism. If either of those arguments are wrong, though, the version of Nihilism discussed below could be easily adapted into a new generalist theory instead.

²Cf. Langton 1998 and Lewis 2009.

together in the right shape? We don't have to 'hang' the rods on any pegs; we can just throw the whole system of rods down on the table and say, 'There! *That's* how the world is!'

If we do that, then it is the rods themselves, and not anything about the pegs, that make up a world. Pushing the rods around on the table, or spinning the whole thing, doesn't represent a new way for the world to be. The table isn't part of how the world is; it's just a place to drop our representation. The rods — the relations — all glued together make up the world. The pegs are out of the picture. It's all relation, no relata.

3 FROM IMAGE TO THEORY

That's the idea, anyway. Can we turn it into a *theory*? Picture thinking can help, but it needs a theory to back it up. Otherwise it's just a picture.

To turn the picture into a theory, we need to make good on two of its images. First, we need to understand how to glue rods together. Second, we need to understand how to throw them down on the table.

3.1 *Gluing Relations Together*

We 'glue relations together' with operations on relations. We're familiar with the thought that any two properties p and q have a conjunction, p -and- q , and that any property p has a negation not- p . These are two types of 'gluing together' that we can use.

To say it that way reifies the properties. Nihilists do not believe in properties, and so can't think of relational glue that way. But they can semantically descend. We don't talk about properties and relations, but the predicates that would express them if there were any. We don't talk about operations on properties or relations, but instead about *predicate functors* that combine with predicates to make new ones. For instance, along with predicates ' P ' and ' Q ', we have the *conjunction* functor, ' \wedge ', which allows us to form the complex predicate ' $P\wedge Q$,' the conjunction of ' P ' and ' Q .'

Second, we are going to have to extend these functors to deal with predicates of different adicities. Suppose, for instance, we have a predicate ' R ' that means 'is red' and a predicate ' L ' that means 'loves'. The former is monadic; the latter, dyadic. So what is the adicity of ' $R\wedge L$ '?

One useful interpretation has it that ' $R\wedge L$ ' is a two-placed predicate where, intuitively speaking, it is satisfied by x and y when x is a red thing and x loves y . More generally, we can understand how \wedge works with the principle

Conjunction: If Π is an n -adic predicate, Θ an m -adic predicate, and i the larger of m and n , then $\Pi \wedge \Theta$ is an i -adic predicate where

$$x_1, \dots, x_i \text{ satisfy } \Pi \wedge \Theta \text{ iff } x_1, \dots, x_n \text{ satisfy } \Pi \text{ and } x_1, \dots, x_m \text{ satisfy } \Theta.^3$$

Of course, this isn't something a *Nihilist* can say. But that's okay. We aren't Nihilists. We believe in objects, and we are trying to understand for ourselves how these predicate functors are supposed to work. The Nihilist won't accept these as anything like definitions; he'll take his understanding of ' \wedge ' and other predicate functors as basic. But he might think that principles like this are nonetheless helpful crutches for philistines like us trying to learn his language.

Conjunction on its own won't be enough. We'll need some other functors to be getting on with. We've already mentioned negation; we'll have that, too. We'll also have three more functors.

Two are *inversion* functors. These swap argument places. For the first, suppose that we have a triadic predicate ' P ' that means 'pointed out': ' $Pxyz$ ' means that x pointed out y to z . We can use this to construct a predicate that means that x was pointed out by y to z . This is the *minor inversion* of ' P '. We can also use ' P ' to construct a predicate that means that, to x , y pointed out z . This is the *major inversion* of y .

Finally, there is the 'padding' of P : the result of adding an extra argument place that does nothing. The 'pad' of ' P ' is a predicate that w, x, y , and z satisfy exactly when x points out y to z . The added place for w is a 'dummy' place; it does no actual work.

We can specify these functors more precisely as follows. Where Π is any n -placed predicate,

Negation: x_1, \dots, x_n satisfy $\sim\Pi$ iff x_1, \dots, x_n do not satisfy Π .

Minor Inversion: x_1, \dots, x_n satisfy $\imath\Pi$ iff $x_2, x_1, x_3, \dots, x_n$ satisfy Π .

Major Inversion: x_1, \dots, x_n satisfy $\mathbb{I}\Pi$ iff $x_2, x_3, \dots, x_n, x_1$ satisfy Π .

Padding: y, x_1, \dots, x_n satisfy $\mathbb{P}\Pi$ iff x_1, \dots, x_n satisfy Π .⁴

³My notation is Quinean (Quine 1940): greek characters Π and Θ are metasyntactic variables ranging over predicates, and ϕ and ψ range over formulas. I will suppress corner quotes, though. ' $\Pi \wedge \Theta$ ' is shorthand for ' $\ulcorner \Pi \wedge \Theta \urcorner$ ', which is itself shorthand for 'the result of writing down " Π " and then writing down ' \wedge ' and then writing down Θ '.

⁴Assuming there is an identity predicate to work with (as I am), this is the predicate functor language of Kuhn 1983 and differs from that of Bacon 1985 only in trading a conditional operator for a conjunction. It differs in several small ways from the system of Quine 1960. Note that if the presence of an identity predicate is thought objectionable for the Nihilist, he could replace it with Quine's reflection operator, where the reflection of an n -placed predicate Π is an $n - 1$ -placed predicate that x_1, \dots, x_{n-1} satisfy iff $x_1, \dots, x_{n-1}, x_{n-1}$ satisfy Π .

Here's a happy result. If ϕ is any (finite) quantifier-free open sentence we can construct out of truth-functional connectives and basic predicates, we can also construct an equivalent predicate Π out of these functors and the same basic predicates. (See Kuhn 1983; the predicate is equivalent in the sense that $\phi(x_1, \dots, x_n)$ will be true relative to a variable assignment precisely when $\Pi(x_1, \dots, x_n)$ is true relative to the same assignment.) This, then, is how the Nihilist will glue relations together.

3.2 *Placing Features*

We can use predicate functors to link the rods of relation to each other without ever hanging them on pegs. But we need more than complex predicates. We need to *do* something with them.

Those of us who believe in things use predicates by combining them with quantifiers and variables. We might take a complex predicate, such as 'Unicorn \wedge Red', and say nothing satisfies it with

$$(1) \sim \exists x(\text{Unicorn} \wedge \text{Red}(x)).$$

We might instead say that something satisfies it with

$$(2) \exists x(\text{Unicorn} \wedge \text{Red}(x)).$$

If we're feeling really wild, we might even say everything satisfies it, which is done with

$$(3) \forall x(\text{Unicorn} \wedge \text{Red}(x)).$$

But whatever we do, we do it with quantifiers.⁵

The Nihilist doesn't have these options. Quantifiers quantify over things, and the Nihilist doesn't think there is anything to quantify over. If the Nihilist is going to use these complex predicates in any interesting way, he is going to have to do something different with them.

The basic idea comes from P. F. Strawson (1954, 1963) in the form of *feature-placing languages*.⁶ Consider first weather reports. When I say 'it is raining' or 'it is hot,' there is no particular *thing* of which I predicate rain or heat. The 'it' is pleonastic; it doesn't pick out anything doing the raining or being the heat. I'm just saying that rain or heat is going on.

⁵Well, not *whatever*. We might instead use a name, saying for instance 'Unicorn \wedge Red(tony)'. I take it for granted that this will entail (2), and so even if we don't *use* a quantifier, we still implicate one.

⁶See also Hawthorne and Cortens 1995, Schaffer 2009: 368-390, and Chalmers 2009: 118.

Strawson noted that we didn't, in principle, have to limit this sort of talk to the weather. Rather than saying 'there is a red unicorn,' we might simply say 'it is unicorning redly'. This places a certain feature — redly unicorning — in the environment without saying that any particular *thing* is the red unicorn, in the same way that 'it is cold' places a certain feature — coldness — in the environment without saying that any particular thing is the cold. It is an *ontologically innocent* way of using predicates.

Formally, the Nihilist can make use of this by extending his language with one more predicate functor, ' Δ '. The idea is that ' $\Delta(\text{Unicorn} \wedge \text{Red})$ ' says that it is redly unicorning, giving the Nihilist a thing-free way of using the 'red unicorn' predicate. This is meant to be the Nihilist's official way of throwing the red-unicorn rod on the table.

4 THE DILEMMA

The theory isn't yet complete. It isn't complete for a simple reason: We haven't yet said how Δ works when applied to relational predicates. ' $\Delta(\text{Cat})$ ' may be the Nihilist's way of saying that it is catting, and thereby accounting for the appearance that there are cats. But what does ' $\Delta(\text{Orbits})$ ' mean? 'Orbits' is a two-place predicate. Does ' $\Delta(\text{Orbits})$ ' make a sentence, saying that orbiting is going on and thus accounting for the appearance that one thing orbits another? Or does it instead make a monadic predicate, a sort of Nihilistic correlate to our predicate 'orbits something'?

I argued in my (2011) that problems loom either way. If we take the first option, we can find a Nihilistic-friendly way to translate any sentence of the form

$$\exists x_1 \dots \exists x_n \phi,$$

where ϕ is quantifier-free. (This is because ϕ will be equivalent to a complex predicate, as noted in section 6.1, and on this option ' Δ ', simulates a block of however many existential quantifiers are needed to make ϕ into a sentence.) We can thus account for any appearances of that sort. And the Nihilist can then claim to have vindicated the world of appearances with his ultimate reality.

But not every appearance is of that form. It appears that some mouse ate all the cheese; it appears that every cat chased some mouse that ate all the cheese; it appears that some dog in the neighborhood growled at every cat which chased some mouse that ate all of the cheese; and so on. We can find appearances of unbounded quantificational complexity. The Nihilist can't vindicate these appearances simply by throwing ' Δ ' in front of a complex, quantifier-free predicate. To vindicate them he needs a bunch of new sentence-forming devices. Since there's no upper bound on how complex our blocks of quantifiers can be, there's no upper

bound on how many new sentence-forming devices he needs. This sort of Nihilism is overly complicated, and so should be given up.

What of the other horn? Here the problem can be put in either of two ways. Picture thinking first. On this option, when we put a ' Δ ' in front of 'orbits' we get a complex predicate, the Nihilist's supposedly ontology-free version of 'orbits something'. But we don't really know how to make sense of this in terms of peg-free structure. Consider

(4) $\Delta(\text{Orbitz})$.

It throws one half of the *orbits* rod on the table, keeping the other up for later use. But to what kind of use can this other half be put? Suppose we go on to assert

(5) $\sim\Delta\sim\Delta(\text{Orbits})$.

What does (5) do with the bit of the rod (4) kept up? (5) says, in effect, "Okay, for every *other* place that a hole on a rod might land, we will put the other end of *orbits* down there, too." But this only makes sense if there are some pre-determined possible landing places for rods. There has to be a fact about where those rod-ends need to be thrown. And that's all but reintroducing pegs. After all, if we have pre-fab 'landing places' for our large rod structure, we can pick the whole thing up, move it so its holes line up with *different* landing places, and drop it down again. This was supposed to be the sort of transformation that the Nihilist wanted to avoid. But if we don't reintroduce the possibility of such a transformation with (5), it's hard to see what we *are* doing.

That's the picture thinking. It can be backed up with a more careful argument. I won't present the details here (they can be found in Turner 2011: 43–45), but here's a sketch. Consider a language that uses the functors of section 6.1 rather than variables to combine predicates into complex formulas, but uses an existential quantifier ' \exists ' to form sentences. A speaker of this language means 'there is' by ' \exists ', but will use it in precisely the same circumstances that the Nihilist will use ' Δ '. Given a plausible principle of interpretation, then, ' Δ ' and ' \exists ' mean the same thing. So ' Δ ' really is a quantifier in disguise; we have inadvertently reintroduced pegs. On this horn we don't really have a *Nihlist* theory after all, but our old-fashioned object-using theory in novel garb.

5 GRASPING THE FIRST HORN

There's been some pushback against my alleged dilemma, mostly against the second horn (e.g., Donaldson 2015: 1062–1063, Azzouni 2017: 184–186). I haven't been fully convinced by any of that pushback yet. But that's neither here nor there, because I now think the argument goes too fast on the first horn. I want to look at a possible response, and the sort of Nihilist theory that falls out of it.

Let me rewrite the argument on the first horn a little more carefully to help things along. It runs:

- (i) If ‘ Δ ’ works as suggested, Nihilism can form feature-placing sentences corresponding to ‘ $\exists x_1 \dots \exists x_n \phi$ ’, but not to other sentences with a richer quantificational structure, unless Nihilism has a big mess of feature-placing primitives.
- (ii) If Nihilism cannot form feature-placing sentences corresponding to quantificational sentences with a richer quantificational structure, then it cannot account for appearances with a richer quantificational structure.
- (iii) If Nihilism cannot account for appearances with a richer quantificational structure, it’s no good.
- (iv) If Nihilism has a big mess of feature-placing primitives, it is no good.
- (v) So, if ‘ Δ ’ works as suggested, Nihilism is no good.

Now, I think premises (i), (iii), and (iv) are on the money. Nihilism needs to account for *all* the appearances, not just the ones that are easily specifiable. And if it does so with a big mess of feature-placing primitives, one for every degree of quantificational complexity, then it’s a big messy ungainly theory we ought to reject.

I’m less confident about premise (ii). Sure, the Nihilist needs to account for the appearances. After all, it *seems* as though there are lots of things, and those seemings aren’t delusions. If the Nihilist can’t say something about why these seemings are getting at *something* right, his theory can’t fit the data.

But (ii) insists that the Nihilist fit the data in a certain *way*. It insists that the fit must go by *pairing*, matching each claim about the appearances with some sober metaphysical truth that underwrites it. The pairing goes piecemeal, each claim about the appearances being translated into a sober counterpart.

The Nihilist might instead account for the appearances more holistically. He may be able to say when a claim ϕ accurately describes the appearances without picking out some single sober counterpart that perfectly matches it. If so, then premise (ii) is false; the Nihilist can account for appearances with a richer quantificational structure in some indirect way.

Let’s go back to our picture. The Nihilist wants to connect some rods into a complex structure, throw those connected rods down, and say, “*That* is the world.” His is a *global* undertaking: he’s describing the entire world all at once. If we demand that he tell us what rod-like structure accounts for the appearance that some mouse ate all the cheese, we are asking him to tell us a story that *just* involves

the mice and cheese rods. But he wasn't interested in that project to begin with. He may well say, "Look, I've told you what the whole world is like. That by itself settles all issues about mice and cheese. I don't see why I have to engage in a mini-project of translating your mouse-and-cheese claim into something about a corresponding rod configuration. Why should I? I've given you the whole world! Why must I break it into parts for you as well?"

Of course, his complaint is only legit if the information we want about part of the world really is embedded in the whole. Perhaps we were secretly worried that, in describing the whole world, he inadvertently left the bit about the mouse and cheese out. If he *could* translate the mice-and-cheese claim, that would convince us that he hadn't left it out after all. If he is going to refuse to translate it, we might fairly ask him how he's so sure that the information really is there.

But he has an answer. "I threw my edifice of rods on the table by constructing a complex predicate Π ," he says. "I did that by asserting $\Delta\Pi$. And you have a decent translation of *that* sentence. It's

$$(6) \exists x_1 \dots \exists x_n \phi(x_1, \dots, x_n),$$

where ϕ has no quantifiers in it. Your translation has the same information about rods as my $\Delta\Pi$ does. So if you can derive your mouse-and-cheese sentence from (6), you'll know that I implicitly said enough to fix the mouse-and-cheese appearances."

This is a good answer. It needs a small tweak, though. If $\Delta\Pi$ really corresponds just to (6), it won't entail enough, because it won't entail any interesting universal claims. A sentence of (6)'s form tells us how x_1 through x_n are, but it doesn't say that these are all the things. As a result, for any non-trivial universal claim we might care about, (6) will always be compatible with its falsehood, because it will always be compatible with us adding one more thing, not among x_1, \dots, x_n , that stands as a counterexample to it.

Presumably, though, when the Nihilist throws his connected rods on the table, he intends to describe the *whole* of reality. So really he shouldn't take $\Delta\Pi$ as merely corresponding to the open-ended open-ended (6), but instead the beefed-up version that adds a 'that's-all' clause:

$$(7) \exists x_1 \dots \exists x_n \phi(x_1, \dots, x_n \wedge \forall y (y = x_1 \vee \dots \vee y = x_n)).$$

He can then say that ψ accurately describes the appearances exactly when (7) entails it, where the ϕ in (7) is the formula that corresponds to his complex predicate Π .

Can the Nihilist capture *all* the appearances this way? There are good reasons to think so, especially if the appearances are as of only finitely many things. (We'll consider the infinite case in a moment.) This is because we can basically reverse-engineer a complex predicate for the Nihilist to put behind a Δ that will do the

trick. We first construct a Ramsey sentence of (7)'s form from the appearances, and we then trade the quantifier-free formula ϕ we made in it with its corresponding complex predicate Π .

Here's how to make our Ramsey sentence. First assign one variable to each thing in the appearances. Then run through each predicate Θ and combination of variables x_{i_1}, \dots, x_{i_n} . If the things assigned to those variables satisfy Θ (in that order), write down $\Theta x_{i_1} \dots x_{i_n}$. If they don't, write down $\sim \Theta x_{i_1} \dots x_{i_n}$. When that's finished, conjoin all these formulas. This is our ϕ ; when we use existential quantifiers to bind all of these variables and add a 'that's-all' clause, we have our Ramsey sentence, and everything true in the appearances will follow from it.

Once we've made our ϕ , since it is quantifier-free, the Nihilist can easily turn it into a complex predicate Π_ϕ . He then asserts $\Delta \Pi_\phi$. Since we've already agreed that the Ramsey sentence this corresponds to entails all the appearances, we know that the Nihilist hasn't inadvertently left any information out.

So it seems that the Nihilist can offer us a simple theory, one that only needs section 6.1's predicate functors plus the sentence-forming ' Δ '. The theory mirrors his motivations for it: the functors lets him glue together his various rods, and ' Δ ' lets him throw down a rod structure to represent the world. It avoids any worries about ' Δ ' being a covert existential quantifier without inviting ideological bloat. And it seems that it can account for all the appearances through the entailment strategy: ψ correctly describes the appearances if and only if it's entailed by the Ramsey sentence corresponding to $\Delta \Pi$. Call this theory *Global Nihilism*

6 TO INFINITY AND BEYOND

6.1 The Problem

Global Nihilism is a nice theory. Unfortunately, as it stands, it might not be adequate. The problem has nothing to do with the Nihilism; ' Δ ' is just fine. The problem is with the predicate functors from section 6.1. They don't handle infinity very well. The appearances may be of infinitely many things. If there are, our Ramsey sentence will need a quantifier-free part ϕ with infinitely many variables. The Nihilist would need a corresponding predicate with infinitely many places. But the Nihilist may have no predicate large enough to correspond to ϕ .

If there are only countably infinitely many things in the appearances, we are still okay. We only need to mirror our construction of the Ramsey sentence in our predicate-functor language. If there are countably many things, then each thing can be assigned a natural number, which corresponds to the index i of the variable x_i that we assign to it. Our strategy will be to construct a complex predicate corresponding to each atomic formula of the Ramsey-sentence's language where

we trade indices on variables for ‘places’ in predicates. For instance, the formula ‘ Rx_1x_2 ’ will correspond just to ‘ R ’, but the formula ‘ Rx_2x_1 ’ will correspond to ‘ iR ’, and the formula ‘ Rx_2x_3 ’ will correspond to ‘ $\mathbb{P}R$ ’. Let’s call each such predicate the *conversion* of our atomic formulas. We can make them using just the original predicate, ‘ \mathbb{P} ’, ‘ i ’, and ‘ \mathbb{I} ’. Note that a conversion of an atomic formula has as many argument places as the highest index in the formula. Since every atomic formula has variables with only finite indices, each of these conversions has only finitely many places.

Next we form a set of predicates. Whenever we have a sentence $\Theta x_{i_1} \dots x_{i_n}$ in our Ramsey sentence, we throw its conversion in the set; whenever we have its negation in our Ramsey sentence, we throw the negation of its conversion in the set. Finally, we extend \wedge so that it can operate on a set of predicates to create a new predicate. The idea (as we ontologically-minded people would have it) is that the infinite sequence x_1, x_2, \dots satisfies $\wedge S$ if and only if, for every predicate Π in S , x_1, x_2, \dots satisfies Π .⁷ Since for every n , there is an n -placed predicate in the set we constructed, if we take the infinite conjunction of the whole set, we get an infinite-placed predicate, and one equivalent to the infinite formula we wanted to represent.

This strategy breaks down if there are more than countably many things in the appearances, though. There are a handful of reasons, but one of the most pressing is simply that major inversion makes no sense when applied to certain predicates. Consider the Ramsey predicate we just made. It has no ‘last’ argument place. The job of \mathbb{I} is to bump the last argument place down to the first; if we apply ‘ \mathbb{I} ’ to that, what happens? Nothing, apparently. And if nothing happens, how can we ever switch other argument places around to glue together infinite predicates? Padding and minor inversion can’t on their own switch the 27th and 93rd argument places of an infinite-placed predicate.

This isn’t a minor problem. The appearances include not just the medium-sized dry goods of daily experience, but the deliverances of our best science, too. Our best science talks about continuously many things all the time. A more promising Nihilism is going to need to replace the functors of with something that better handles higher infinities.

6.2 *Transposition Functors*

Let’s consider an alternative set of predicate functors borrowed from algebraic logic. We start by distinguishing a predicate’s *argument places* from what is called its *support*. Consider a predicate that’s had the padding functor applied to it. If ‘ R ’

⁷If Π is an n -placed predicate, then an infinite sequence satisfies Π if and only if its initial segment of length n satisfies Π .

is a two-placed predicate, ‘ $\mathbb{P}R$ ’ is a three-placed predicate, but in a very real sense it only cares about the last two of its argument places. It ignores what’s in the first place while deciding whether to be satisfied or not. The argument places it cares about are its *support*.

In algebraic logic we treat each predicate as having infinitely many argument places, indexed by some ordinal.⁸ What we would usually think of as a simple dyadic predicate — the two-placed R , for instance — is now thought of as an infinite-placed predicate that depends only on the first two of its places. It’s like an ordinary dyadic predicate where infinitely many ‘dummy’ places — the sort of places ‘ \mathbb{P} ’ creates — are added on to the end. ‘ R ’ has infinitely many places, but only cares about the first two. More generally, anything we used to think of as an n -adic basic predicate is now a predicate that has an infinite number of argument places but only depends on the first n .

Next we introduce some *transposition functors* ‘ \mathbb{T}_{ij} ’. They switch which argument places a predicate cares about. If ‘ R ’ only cares about its first two places, ‘ $\mathbb{T}_{1,17}\mathbb{T}_{2,55}R$ ’ only cares about its 17th and 55th places. (It cares about its 17th in the same way that ‘ R ’ cares about its first, and it cares about its 55th in the same way ‘ R ’ cares about its second.)

More precisely, a *transposition language* is a language with some basic predicates, predicate-forming conjunction and negation functors, and transposition functors.⁹ Each transposition language is associated with a cardinal telling us how many argument places its predicates have. We write the language \mathcal{T}_α , where α is the cardinality of the predicates’ places. In the language \mathcal{T}_ω , for instance, each predicate has countably many argument places.

If we want an official characterization of our transposition functors’ behavior, this will do:

Transposition: (i) If $i < j$, then

$x_1, \dots, x_{i-1}, x_i, x_{i+1}, \dots, x_{j-1}, x_j, x_{j+1}, \dots$ satisfy $\mathbb{T}_{ij}\Pi$ iff

$x_1, \dots, x_{i-1}, x_j, x_{i+1}, \dots, x_{j-1}, x_i, x_{j+1}, \dots$ satisfy $\mathbb{T}_{ij}\Pi$; and

(ii) If $j \leq i$, then

$x_1, \dots, x_{j-1}, x_j, x_{j+1}, \dots, x_{i-1}, x_i, x_{i+1}, \dots$ satisfy $\mathbb{T}_{ij}\Pi$ iff

$x_1, \dots, x_{j-1}, x_i, x_{j+1}, \dots, x_{i-1}, x_j, x_{i+1}, \dots$ satisfy $\mathbb{T}_{ij}\Pi$.

It isn’t particularly easy to read, though. We can streamline it with a bit of notation.

⁸We’re also implicitly assuming the Axiom of Choice, which entails that every set can be indexed by some ordinal. We will eventually worry about whether this is a problem.

⁹A transposition language is essentially a partial polyadic algebra logic. Cf. Halmos 1962: 170–172. Such logics generally allow a much larger range of transformations, but in the presence of an identity predicate and atomic predicates of only finite support, the transpositions suffice to produce the rest, so we need only add them here.

If we have a sequence $x_1, x_2, x_3 \dots$, we define a function d_{ij} by:

$$\begin{aligned} d_{ij}(x_i) &= x_j; \\ d_{ij}(x_j) &= x_i; \text{ and} \\ d_{ij}(x_k) &= x_k \text{ for all other } k. \end{aligned}$$

Then we can rewrite the rule for ‘ \mathbb{T} ’ as

Transposition: x_1, \dots, x_n, \dots satisfies $\mathbb{T}_{ij}\Pi$ iff $d_{ij}(x_1), \dots, d_{ij}(x_n), \dots$ satisfies Π .

If our transposition language has only finite conjunction, it’s equivalent to our (finite) language of section 6.1, and if both languages are supplemented with an existential quantifier, they are both equivalent to a first-order language. The transposition language does a much better job of handling higher orders of infinity, though. The functors of section 6.1 tried to bump argument places off the back and move them to the front in order to swap them around. When there is no back, those functors falter. But the transposition functors don’t need there to be a back; they can reach directly into the i th place and move it to where it’s wanted.

Infinite first-order languages are generally equipped with two cardinal numbers, γ and δ , where γ puts an upper bound on how many formulas can be conjoined or disjoined and δ constrains how many variables can be bound in one go. We call the language $\mathcal{L}_{\gamma\delta}$ to keep track of these cardinals. Since we want to make quantifier-free predicates, we don’t need to worry about the second cardinal, but we should pay attention to the first one. When we have infinite conjunction, it corresponds to the γ in \mathcal{T}_γ , and constraints how many argument places we can swap around. It also places an upper bound on how many predicates we can conjoin all at once.

6.3 *Infinitary Flexible Rod Structures*

Our transposition language handles infinite predicates better than our original set of functors. But is it expressive enough? For our purposes, yes. The Global Nihilist doesn’t need to translate every infinite sentence, but only the quantifier-free portion of the Ramsey sentence he wants to simulate. He’s only interested in complex predicates that express the complex rod structure he’s glued together — predicates Π corresponding to the ‘inside’, quantifier-free bit of a Ramsey sentence.

A finite Ramsey sentence, recall, is of the form

$$(7) \exists x_1 \dots \exists x_n (\phi(x_1, \dots, x_n) \wedge \forall y (y = x_1 \vee \dots \vee y = x_n)),$$

where the ϕ can be constructed only using conjunction and negation.

The same is true in the infinite case. If the appearances are as of κ many things, they will be described by a Ramsey sentence

$$(8) \exists x(x \wedge \bigwedge_{y \in x} S \wedge \sim \exists y \bigwedge (y \neq x)),$$

where the formulas in S are the atomic formulas or negations of atomic formulas that tell us what each sequence of things does or does not satisfy.

For the Global Nihilist's strategy to work, it's enough to verify that, for every formula ϕ of a language $\mathcal{L}_{\gamma\delta}$ that can be constructed using just primitive predicates, negation, and conjunction, there is an equivalent predicate Π of \mathcal{T}_γ . And this is in fact easy to show.¹⁰

Of course, we introduced \mathcal{T}_γ by appeal to objects satisfying predicates, and the Nihilist doesn't believe in such things. By the same token, we show that each of our relevant ϕ 's in $\mathcal{L}_{\gamma\delta}$ has an equivalent predicate in \mathcal{T}_γ by appeal to objects satisfying predicates. But that's okay — we are proving the equivalence for our benefit, not the Nihilist's. The Nihilist will take the predicates of \mathcal{T}_γ and simply *announce* that each one corresponds to some conjunction-and-negation formula ϕ of $\mathcal{L}_{\gamma\delta}$. If we doubt him, we might look for a with a model where some things satisfied ϕ but not the corresponding predicate. If we did that, we would refute the Nihilist's claim by appeal to objects. By appealing to objects to show that this can't happen, we simply foreclose our main way of doubting the Nihilist's claim.

7 NOT SIMPLE ENOUGH?

Global Nihilism escapes the first horn of my dilemma while remaining faithful to Nihilism's initial motivations. I recommend it to aspiring Nihilists. But we might wonder: *how* good is it? Might it still have some drawbacks making it better just to believe in things?

We might have either of two concerns. The first is a worry about simplicity, stemming from somewhat technical concerns about the language \mathcal{T}_γ . The second worry is much more philosophical, focusing on the theory's implicit holism. I'll discuss the first worry in this section, and the second worry in the next.

To understand the first worry, start by noting that \mathcal{T}_γ 's grammar is ambiguous. Does it have just one functor $\mathbb{T}_{_ _}$, with two slots for ordinals and one slot for a predicate? Or does it have many functors with just one slot each, for predicates, and these are simply each written with three symbols?

The first option doesn't seem available to the Nihilist. If the \mathbb{T} functors have slots for ordinals, there had best be some ordinals to fill them. But if there are ordinals, Nihilism is false. The Nihilist says there is nothing at all, and *a fortiori*, no ordinals. Better, then, for the Nihilist to take the second option.

¹⁰Assuming the Axiom of Choice. See appendix.

The second option, though, leads to the objection: “You have all these many, many \mathbb{T} functors. But that bloats your theory, giving it γ -many undefined expressions. That’s bad; we’re supposed to prefer simple, more elegant theories over more complex and baroque ones. So we should reject Global Nihilism.”

Is she right? That depends. First, the objector’s speech might be getting at any of several complaints, and we ought to distinguish them. Second, we should remember that arguments like this are essentially *comparative*. There’s no platonic ‘simplicity’ bar that ever viable theory must meet. We instead compare theories to each other, and favor the more theoretically virtuous ones. So we can’t take this complexity complaint in isolation. We have to compare Global Nihilism to a rival theory.

The rival theory will be some form of non-Nihilism. To keep things simple, we assume the non-Nihilist agrees with the Nihilist about what the appearances are like. If the non-Nihilist thinks that it appears that is a mouse that ate all the cheese, the Nihilist agrees that appears so. But the non-Nihilist thinks this is so thanks to how some particular things — mice and cheese — are, and the Nihilist thinks it is so instead thanks only to the way some features are placed in this thing-free world.

As a result, both parties will accept the same Ramsey sentence. They will just disagree about how to generate it. The Nihilist thinks it is generated (in the appearances) by placing Δ in front of the appropriate complex predicate. What does the non-Nihilist say?

There are two options here. The *Ramseyan* simply takes the Ramsey sentence itself to express his basic theory. As a result, his metaphysically serious language must be $\mathcal{L}_{\gamma\gamma}$ (where he thinks there are no more than γ -many things). As noted, the Ramseyan makes his sentence by assigning each variable to something and then forming atomic formulas and negations of atomic formulas that reflect how those so-assigned somethings are. These formulas are then conjoined and turned into a Ramsey sentence.

The other option is taken by the *Tractarian*. Whereas the Ramseyan assigns each thing to a variable, the Tractarian assigns each thing to a *name*. Once the names are assigned, the Tractarian follows the Ramseyan strategy, forming atomic sentences telling us how all the named things are and negations of atomic sentences telling us how all the named things aren’t. This collection of sentences won’t be enough on its own to settle how the world is, because all of those atomic sentences would still have been true even if there had been more things. So the Tractarian will also need a that’s-all clause. Let T be the set of all the Tractarian’s names; since (we are supposing) there are γ -many things, T has cardinality γ . The Tractarian’s that’s-all clause can be given by a final sentence

$$(9) \quad \forall x \sim (\bigwedge_{c \in T} (x \neq c)).$$

Having introduced the competition, let's return to the contest. The Global Nihilist's language \mathcal{T}_γ is supposed to be objectionably complex. How so? We have several possibilities.

7.1 Simple Counting

Here's one thought. \mathcal{T}_γ suffers by having γ -many primitive (that is, undefined) terms.

How could this tell in favor of either the Ramseyan or the Tractarian theory, though? Both of them have infinitely many undefined primitive terms: the variables, for the Ramseyan, and the names, for the Tractarian.

Perhaps the thought is that, even though all the theories have infinitely many expressions, the \mathbb{T} functors are somehow *worse*. Why would they be? Well, I sometimes hear that, unlike other expressions, expressions that go in name position (variables and names) are ideological free lunches. If so, we could see why infinitely many of them would be kosher while infinitely many functors wouldn't be.

But treating name-like expressions differently leads to some weird conclusions. Consider, for instance, the *Quinetarian*, who starts out like the Tractarian but then endorses Quine's elimination of names in favor of predicates. The Quinetarian trades each of the Tractarian's names c for a new predicate, C . The Quinetarian adds to his theory axioms of the form

$$(10) \exists x(Cx \wedge \forall y(Cy \rightarrow x = y))$$

for each of these new names, and whenever the Tractarian endorses the atomic $\Pi c_1 \dots c_n$, the Quinetarian replaces it with

$$(11) \exists x_1 \dots \exists x_n(C_1 x_1 \wedge \dots \wedge C_n x_n \wedge \Pi x_1 \dots x_n).$$

Where the Tractarian had infinitely many names, the Quinetarian has infinitely many predicates. If names were ideological free lunches but predicates were not, the Quinetarian's theory should be a non-starter. But it's not. It's a bit more clunky than the Tractarian's, sure, but that has more to do with the extra (10)-axioms than the number of expressions involved.

Could other considerations give the non-Nihilists an extra boost? Let's let them take turns. The Ramseyan goes first: "Variables are a free lunch because they don't really *mean* anything. They are just a calculational device for gluing predicates together. But using a variable isn't saying more about *how the world is*, so they don't bloat my theory."

She may be right, but if she is, the Global Nihilist can make the same appeal. "My \mathbb{T} functors are just calculational devices for gluing together predicates as

well,” he says. “When I use them, I’m not saying anything about how the world is, but just getting predicate places moved around so I can stitch them together. So if your variables are a free lunch, my functors are as well.”

What about the Tractarian? She can’t plausibly say that his names are mere calculational devices, but she has another move. “Names don’t add to the ideological complexity of my theory because they *already* add to its *ontological* complexity. They are simply tags for things. When judging my theory, we account for that by adding the tagged things to my ontology. To *also* say my ideology is more complex thanks to these names would be double-counting!”

She may be right, but if she is, the Global Nihilist can pit his ideology against her ontology. “Ontological and ideological parsimony are both virtues,” he says. “You complain about my ideological bloat in terms of the \mathbb{T} functors, but never compared that to your ontological bloat with your γ -many things. You say you have a slim ideology. Fine; but you have a massive ontology to trade for it. I may have a massive ideology, but I have a maximally thin ontology to balance against it. As far as I can tell, we’re simply tied.”

Note, in passing, that the exchange between the Tractarian and the Global Nihilist suggests that parsimony considerations won’t be useful in an argument for Nihilism. If the Nihilist must buy his low ontology in the coin of high ideology, he can’t very well boast of huge savings. But that’s okay. Our Nihilist wasn’t driven to Nihilism by parsimony considerations anyway. He was worried about objects being theoretically idle; he wasn’t worried about having *too many* of them.

7.2 *Tu Quoque?*

Before coming to Global Nihilism we rejected another theory for being too complex. Let’s call this theory *Rejected Nihilism*. According to it, every possible block of quantifiers gets its own corresponding sentence-forming operator. I rejected this on parsimony grounds, claiming that the theory was bloated and ungainly. But given what I’ve just said about the ‘ \mathbb{T} ’-functors, was that too quick? Might Rejected Nihilism be better than I had originally supposed?

I don’t think so. Our previous discussion taught us that we can’t just count up undefined expressions when judging a theory. It’s *complexity* that counts, not size.

And Rejected Nihilism really is complex. To see this, notice we’ll need entailment relations between sentences formed with different feature-placing operators. And we have no systematic way to understand these entailments. Consider, for instance, the sentences

$$(12) \quad \begin{array}{l} \forall x \exists y \forall z (Qxyz) \\ \exists x \exists y \forall z (Qxyz) \quad \forall x \exists y \exists z (Qxyz) \\ \exists x \exists y \exists z (Qxyz) \end{array}$$

The sentence on the top line entails each of the sentences on the second line, which each entail the one on the bottom line. But the bottom sentence doesn't entail any of the others, and each sentence on the second line entails only the one above it.

Rejected Nihilism captures these using four primitive sentence-forming operators: Δ , Δ^* , Δ' , and Δ^\dagger . With these, the sentences in (12) become:

$$(13) \quad \begin{array}{c} \Delta^\dagger Q \\ \Delta^* Q \quad \Delta' Q \\ \Delta Q \end{array}$$

The entailments in (12) should carry over to their counterparts in (13).¹¹ But the different Δ functors are just semantic black boxes. We have no real idea about what they mean that would let us understand why, for instance, $\Delta^\dagger R$ entails $\Delta^* R$ but $\Delta' R$ doesn't. So these have to be brute, inexplicable entailments.

Or so say I. There are a number of moves that the Rejected Nihilist could make in his defense, each of which mirror some moves argued against in my Turner 2011 (§4.3.4.) I'm not going to recreate that discussion here. Note instead that even if I'm wrong about all of that, Rejected Nihilism is still in trouble. Now that Global Nihilism is in the running, we can compare the two, and here it really does seem that Rejected Nihilism is worse off. Rejected Nihilism needs all the apparatus of Global Nihilism plus more. It still needs to create a Nihilistic counterpart to a Ramsey sentence, so it still needs all the ' \mathbb{T} '-functors. It is still holistic, because its Nihilistic Ramsey counterpart won't be settled by the 'smaller' sentences it entails. But on top of all that, it still needs the extra $\Delta^?$ -operators that Global Nihilism does without.

This parsimony really is an advantage. Each $\Delta^?$ -operator represents, picturesquely, a different way of inserting a complex rod structure into the world. For the most part, we don't really understand what these many ways are. But each comprises a unique, *sui generis* extra bit of metaphysical structure. These $\Delta^?$ -operators aren't mere calculational devices, and they're not trading off with some equivalent bit of structure in the Global Nihilist's theory. They really are extra, and can be done away with. So let's do away with them.

7.3 Ordinal Structure

Instead of complaining about the *number* of \mathbb{T} functors, we might complain about their *structure*. \mathcal{T}_γ treats argument places not just as infinite, but as *ordered*, having a structure isomorphic to some ordinal. This is extra structure not needed by the Ramseyan or the Tractarian; they may have formulas with infinitely many variables,

¹¹See Turner 2011: §4.3.4 for an argument why.

but they don't need to think those variables have some ordered structure. Since extra structure leads to extra complexity, this is a problem for Global Nihilism.

Here's one way to see the issue. We said in section 6.2 that the language \mathcal{T}_γ treats each predicate as having infinitely many places (even if it only cares about some of them). Those places are also *ordered* — it makes sense to ask which is the first, which is the eighth, which is the ω -th, which is the $\omega + 317$ -th, and so on. But the infinite first-order language $\mathcal{L}_{\gamma\gamma}$ has no such commitments. It may have a formula that depends on infinitely many variables, but it doesn't have to say that any one of those variables counts as the 'first' or the ' $\omega + 317$ -th'.

So \mathcal{T}_γ really does have extra structure, and in two ways. First, the Axiom of Choice is equivalent to the claim that every set can be indexed by some ordinal. If the Axiom of Choice is true, then the variables in any formula of $\mathcal{L}_{\gamma\gamma}$ can be indexed by some ordinal, and we can impose an ordering on any formula of $\mathcal{L}_{\gamma\gamma}$. But if the Axiom of Choice is false, then some sets can't be indexed by any ordinal. Some of these will be sets of variables. If $\mathcal{L}_{\gamma\gamma}$ constructs a formula that depends on a set of variables that can't be indexed by an ordinal, there may not be any predicate of \mathcal{T}_γ that corresponds to it. So \mathcal{T}_γ implicitly assumes the Axiom of Choice. That is, it implicitly assumes something about the *structure* of infinite argument places. As $\mathcal{L}_{\gamma\gamma}$ makes no such assumptions, it presupposes less structure.

Let's be clear. I'm not calling the Axiom of Choice bad mojo and \mathcal{T}_γ tarnished by the association. I'm no Choice-hater. I like Choice, and prefer to theorize with it. But $\mathcal{L}_{\gamma\gamma}$ is neutral about it in a way that \mathcal{T}_γ is not. I may share \mathcal{T}_γ 's prejudices, but I have to admit that it is more complex for having them. It is ideologically less simple, and that is a mark against it.

Even setting aside worries about the Axiom of Choice, \mathcal{T}_γ may still impose more structure. If Choice is right, then the variables of any formula ϕ of $\mathcal{L}_{\gamma\gamma}$ can be ordered. But the ordering isn't unique; they can be ordered in ever so many ways. In \mathcal{T}_γ , by contrast, the ordering *is* unique. There's a fact about which argument place in a given predicate is first, which is second, which is ω -th, which is the α -th, and so on. There has to be, or else $\mathbb{T}_{\alpha\beta}$ wouldn't know how to do its job.

This structure really does look *excess*. Suppose we have a complex predicate Π . We can imagine another predicate Π' where the argument places are simply permuted. The predicate is distinct, and is in a sense inequivalent to Π' , since $\Delta(\Pi \wedge \Pi')$ may be false even when $\Delta\Pi$ is true. (If they were strictly equivalent, $\Pi \wedge \Pi'$ should be equivalent to $\Pi \wedge \Pi$ which is equivalent to Π .) But there doesn't seem to be any real difference between $\Delta\Pi$ and $\Delta\Pi'$ — permuting argument places in a feature before placing it is a lot like simply turning a complex rod structure sideways before dropping it on the table. As this was *precisely* the kind of thing the Global Nihilist wanted to avoid, he seems to be in trouble.

I can think of two ways he might try to get out of the trouble. The first starts by observing that variables seem to create the same sort of effects, but that nobody

thinks variable-using languages impart too much structure. For instance, suppose we have formulas ϕ and ϕ' of $\mathcal{L}_{\gamma\gamma}$ which share x as their variables and where ϕ' differs from ϕ only by a systematic re-shuffling of these variables. Then $\exists x(\phi \wedge \phi')$ may well be false even though $\exists x\phi$ and $\exists x\phi'$ are both true. The general explanation for that appeals to the idea that variables are somehow semantically empty — they don't mean anything on their own, but simply serve to link argument places in different predicates together. The differences in ϕ and ϕ' don't have to do with how they relate to the world, but with how they relate to other formulas. They don't represent different complex rod structures, but the same complex rod structure in different ways, and the weirdness that comes from conjoining them has to do not with how they each relate to the world but with how they relate to each other.

The Global Nihilist might try to make a case that his 'T'-functors are perfectly analogous. "It's true that my language represents complex rod structures by appeal to an ordering," he says, "but that ordering is itself merely a notational device. If Π and Π' differ from each other merely by a re-ordering of argument places, this isn't because they represent different complex rod structures, but instead because they represent the same ones in a different way. There may be a fact about which argument place in a *predicate* is first, but that is a fact about how that predicate represents, not about what is being represented. As a result, $\Delta\Pi$ and $\Delta\Pi'$ are completely equivalent; they don't represent different ways of throwing a rod structure on the table, but instead are different representations of the same rod-throwing act. My ordered predicates are no worse than your unordered variables, at least when it comes to imposing excess structure."

I find this response hard to judge. I want to agree that the apparent excess structure in variables is no structure at all, but an artifact of the variable-binding apparatus. I find it difficult to take the same attitude towards the Global Nihilist's ordering of predicates. But I can't see any principled way to argue that the two are different, and worry that I am less charitable to \mathcal{T}_γ simply because it is unfamiliar. I would prefer to reject \mathcal{T}_γ based on principle, not xenophobia.

Even if it is rejected, the Global Nihilist has a fallback position. "Look, I care about making complex rod structures and 'placing' them without hanging them on pegs. I started out using predicate functors, because that is fashionable among Nihilists these days. When they failed me in the infinite case, I moved to the transposition functors instead. Now you are telling me I can't have those either. Fine. I'll have what you're having: variable binding. You like to bind your variables with quantifiers, which is your business, but I think is a bad idea because quantifiers commit you to objects. But I can bind variables *without* committing myself to objects. I will use an infinitary version of the predicate-forming operator ' λ '. Where you have any formula ϕ open in the variables x , I can form the predicate $\lambda x\phi$. That will represent a complex rod structure which I can then throw down by asserting $\Delta\lambda x\phi$. That's all I need for my purposes, so I am in the clear."

Is anything wrong with this response? I don't think so. Temptation to think otherwise comes from our bad habit of thinking that *variable binding* is ontologically committing. I blame Quine. His slogan, 'To be is to be the value of a bound variable,' makes it sound as though variables themselves are the ontologically guilty party. But they're not. I can bind variables all day without committing myself to anything. When I say 'It is possible that there be an x such that x is a red unicorn,' I don't commit myself to unicorns, red things, possible unicorns, or really, anything at all.¹² We commit ourselves to things when we say that there are things, and we do that with quantifiers, not variable-binders. But if variable-binding is an innocent way of gluing rods together, we can't stop the Nihilist from using it. And once he does, all residual worries about ideological complexity fall away. He gets all his new variable-binding apparatus from the believer in objects; she can't fairly object to that apparatus without thereby objecting to herself.

8 HOLISTS JUST WON'T LEARN

So I'm not sold on the simplicity objections. I do worry about a more philosophical objection to Global Nihilism stemming from its implicit holism.

General Nihilism doesn't describe the world a few rods at a time, but all in one go. And it *must* do that. We can't use ' Δ ' to lay down local states of the world that will then fix its global state. Since ' Δ ' forms (the Nihilist's equivalent of) a Ramsey sentence, it can only describe the world *in toto*. No fundamental description of the world contains any less information.

So what happens when we learn, say, that some mouse ate all the cheese? We didn't learn anything about the world that can be directly expressed in the Global Nihilist's feature-placing terms. We learned instead that the true, metaphysically perspicuous theory $\Delta\Pi$ corresponds to a Ramsey sentence ψ where ψ entails that some mouse ate all the cheese.

This is fine insofar as it goes. But we don't encounter the world all in one go. We come at it piece by piece, picking up different bits of information all the while. We then combine these bits of information to get some new information. We often do this by finding individuals in each piece of information that we can identify. When we realize that *this* F -thing that we met yesterday is the *same* as the G -thing we met today, we come to learn that there is an F -and- G thing. But it is very puzzling how we could do this if there are no things for us to identify across bits of information. If Global Nihilism is true, it makes this practice mysterious.

¹²Even those who, like Williamson (2013) think that if it is possible that there is an F , there is a possible F , think that this is a substantive thesis which doesn't follow trivially from the mere fact that a variable has been bound.

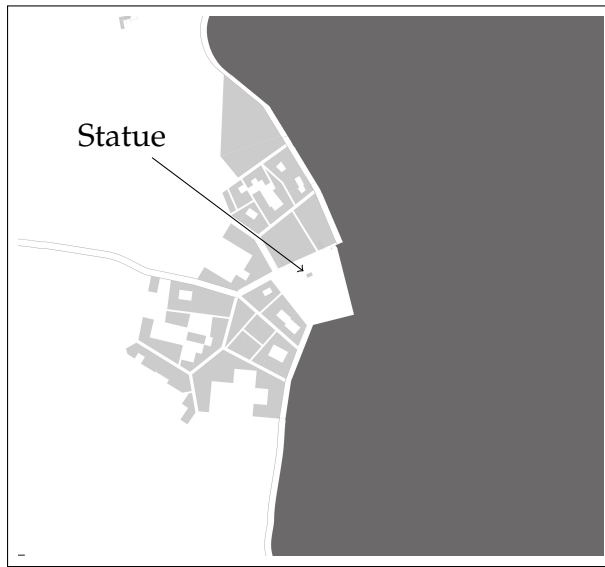


Figure 1: What you Learn on Tuesday

An example can help. Suppose you're visiting, for the first time, the medieval market town of Nihilmore. On Tuesday, you wander around the west of the village, enjoying the statue in the market square and the quaint narrow back alleys. You decide to make a map (figure 1).¹³ On Wednesday, you head around the east side of the city, appreciating the ruined castle above the river and the old manor houses on the hill, and make another map (figure 2). Now you wonder: Can you put your two maps together into a single, large one?

Yes, and there is a simple way. All you need to do is to find something that showed up on both your Tuesday map and your Wednesday map. You can then use that thing to staple the maps together. The statue will do; once you realize the statue you mapped on Tuesday is the *same* statue you mapped on Wednesday, you know how to align the maps and link them together, as in figure 3.

Question: Did we *have* to put the map together this way? Answer: Yes. We might be tempted to think otherwise. We might be tempted to think, for instance, that we could have lined the maps' borders up and snapped them together like a jigsaw-puzzle. But this is an illusion. First, how did we know to line them up rather than to keep them separate as in figure 4, with some no-man's land between the original map edges? Second, without knowing that the statues in each map are the same, the maps *don't* fit together — the sticky-out bit with the statue in each keeps the maps from fitting. You can only combine them in the right way if you know it's legit to make those two bits overlap, but you can only know that's legit if

¹³Maps generated at <https://watabou.itch.io/medieval-fantasy-city-generator>.

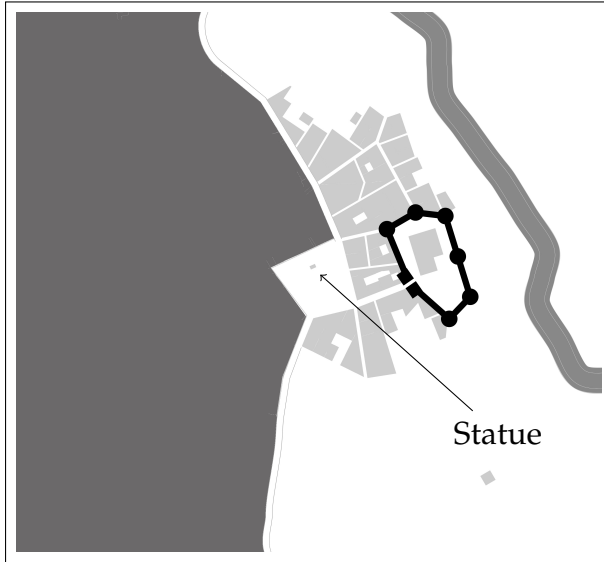


Figure 2: What you Learn on Wednesday

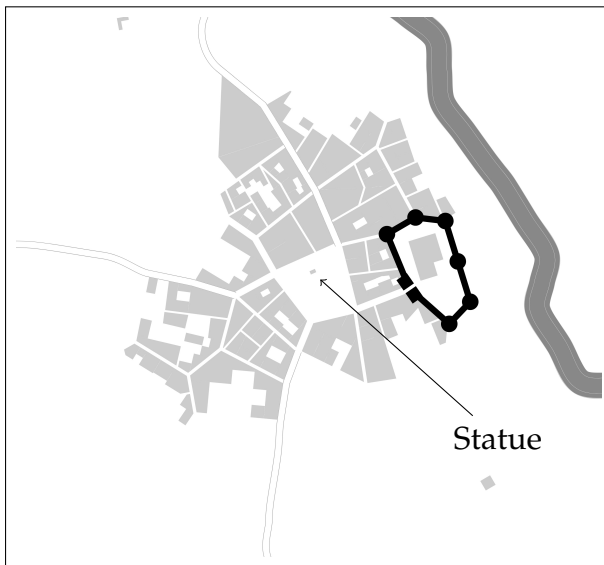


Figure 3: The Whole Map



Figure 4: A Mismatched Map

you know it's the same statue in each. And third, even if it *did* work, it would be a very special-purpose procedure; imagine trying the same thing after visiting a city where all the streets are laid out on a grid.

So it looks like identifying things across representations is crucial for stitching together separate bits of information. If there really are things, it is easy to see how we do this. The things are the pegs, and by realizing that certain pegs are the same, we pull the two maps together to create a new, big one. Realizing that each map's statue is the same tells you where to staple them together. But if there are no things, it's much harder to see what justifies us combining our maps. There are no smaller 'parts' of the map that we can learn about independently to justify some overlap. It seems that, to understand how to put the two maps together, you would have to first learn some much larger bit of information that included the entire map in it. Then you would know how to combine the maps, but by that point, combining would be worthless. You'd already have the whole thing in mind.

Here's another way to look at it. You can point to the statue on Tuesday's map, say '*That* statue...' then point to the statue on Wednesday's map and say '... is *that* statue'. When you do this, you don't have to keep in mind all the complex relations that the map represents the statue as standing in. You don't have to keep in mind that Tuesday's map puts its statue at a certain distance from the best pub in the village, for instance, or that Wednesday's map puts its statue due west of the castle. That is still stuff you know, but you don't need to be attending to it to figure out how to put the maps together. But if Global Nihilism is correct, there aren't any statues for you to indicate and identify. The only grip you have on 'the statue' is as

a node in a large complex structure, and if you aren't thinking about the structure, you aren't thinking about the node. The only way you can realize that 'this statue' and 'that statue' are identical is by thinking about the entire complex structure. To think about 'this statue' is to have the entirety of Tuesday's map in mind, and to think about 'that structure' is to have the entirety of Wednesday's map in mind. To realize that the two statues are the same is simply to think the entire map.

Consider a structural description of the information on Tuesday's map. It will say thing like 'there is a pub x and a statue y and x is 150 yards from y and ...'. We can identify the variable reserved for the statue and take away its existential quantifier, getting a formula that says

(14) x is a statue and there is a pub y and x is 150 yards from y and there is a vegetable stand z and ...

This formula describes Tuesday's map from the statue's point of view. Let's use 'Tuesday(x)' as a shorthand for (14). We can also take a structural description of Wednesday's map and create a similar formula 'Wednesday(y)', that will describe Wednesday's map from Wednesday's point of view.

Here's a compelling epistemic picture. When you made your maps, you came to believe

(15) $\exists x(\text{Tuesday}(x)).$
 $\exists y(\text{Wednesday}(y)).$

But that's not *all* you did. You also formed some singular thoughts about the things that made (15) true. You created some mental tags, ' a ' and ' b ', that picked out bits of the world, and then came to believe

(16) Tuesday(a).
 Wednesday(b).

Having done that, you could think about a and b without keeping all the structural information in (15) in mind.

Once you had these mental tags you could store new information about the tagged individuals. In particular, you could learn that they are the *same* individual.

(17) $a = b.$

When you learned (17), you didn't have to have any of the information in (16) in mind. But once you did recall that information, you could use it along with (17) to conclude

(18) $\exists x(\text{Tuesday}(x) \wedge \text{Wednesday}(x)),$

which is equivalent to the whole map itself. Thus you made your finished map.

The Global Nihilist can't accept this picture. The picture relied on there being things for us to have singular thoughts about, and the Global Nihilist thinks there are no things.

What *can* the Global Nihilist say? He can make sense of you believing (15). He can even grant that your beliefs are in an important sense accurate: they follow logically from the Ramsey sentence that goes with the complex rod structure he placed. But he has no story at all about how we could have singular beliefs such as (16) or (17). To believe these is to stand in a cognitive relation to a thing, and on his view there are no things to bear cognitive relations to.

In lieu of the singular '*a*' and '*b*', the Global Nihilist could use definite descriptions. 'The *x*: Tuesday(*x*)' and 'the *y*: Wednesday(*y*)' are perfectly good definite descriptions, and the global Nihilist can make sense of them by appealing to the usual Russellian elimination strategy. He can replace your singular beliefs (16) with

(16') Tuesday(the *x*: Tuesday(*x*)).

Wednesday(the *y*: Wednesday(*y*)).

And he can replace (17) with

(17') The *x*: Tuesday(*x*) = the *y*: Wednesday(*y*).

And he can note that (16') and (17') entail (18).

But while this is true, it misses the point. The inference to (18) from (16') and (17') isn't like the one from (16) and (17). In the latter, both premises are needed. In the former, (16') is superfluous, and (17') is equivalent to (18).¹⁴ The Nihilist's surrogate for learning that *this* statue is *that* statue is simply learning the whole map itself. In this case, knowledge of the identity can't be used to *make* the map, because to know the identity just is to know the whole map. This is what I mean when I say that you can't learn about the world a little at a time. You can learn (15), sure. But there is no inferential route from this plus some other 'local' information to the whole map. You have to get the whole map all on its own, without appeal to the Tuesday and Wednesday maps.

This isn't anything special about maps, of course. Holmes learns that Mr. Hosmer Angel is Mr. Windibank; astronomers learn that Hesperus is Phosphorus; Luke learns that Vader is Anakin Skywalker. In each case, the learner uses this information to infer some further information. If there are things, we understand what they are doing. But if the Global Nihilist is right, it's implicit holism makes their inferences very puzzling indeed.

¹⁴Actually, it is slightly stronger, being equivalent to $\exists x(\text{Tuesday}(x) \wedge \text{Wednesday}(x) \wedge \forall z((\text{Tuesday}(z) \wedge \text{Wednesday}(z)) \rightarrow z = x))$.

Epistemic objections in metaphysics often run: “If your theory is right, there are a bunch of extra contents, but it is very difficult to see how we could know these extra contents. So boo to your theory.” One standard reaction is: “So what? Nobody promised me I could know everything.”¹⁵ But the present objection is different. It runs: “If your theory is right, a bunch of contents that we need for learning ordinary things about the world have been removed. And our lost knowledge isn’t about some *recherché* metaphysical realm, but about ordinary things, like the layout of Nihilmore or whether our father is a Sith lord.”

The Nihilist might still object. “Who promised you easy knowledge of the ordinary?” And I guess he might be right. Still, the my epistemic complaint has the hint of Moore to it. I feel a lot more confident that I learn about the world a bit at a time than I do about high-falutin’ complaints against theoretical idleness. Maybe picking up the rod structure and dropping it on different pegs doesn’t change what the world is like. I would still like to keep the pegs around, because I think they help me learn about the rod structure a little at a time.

9 CONCLUSION

I’m not yet ready to buy Global Nihilism. This isn’t thanks to any high-church worries about simplicity but thanks instead to a deep issue about our epistemic contact with the world. If Global Nihilists can get that sorted out, I might reconsider. But Nihilists unimpressed by such issues ought to give the Global version a close look. It preserves the basic Nihilist motivations, with pieces of theory that each correspond to the basic picture the theory is trying to capture. One set of expressions let us glue rods together, and another lets us ‘place’ those rods without hanging them on pegs. There’s no extra theory hanging around to make us worry we’ve smuggled in something untoward. It is a lean, clean form of Nihilism, and if you’re in the market you ought to give it a try.¹⁶

APPENDIX: EQUIVALENT PREDICATES OF \mathcal{T}_γ

Let $\mathcal{L}_{\gamma\delta}$ be an infinitary language and \mathcal{T}_γ the corresponding transposition language. We are assuming the axiom of choice, so the cardinal γ is also an ordinal. We suppose an indexing of the variables of $\mathcal{L}_{\gamma\delta}$ by γ . We assume the standard model

¹⁵Cf. Lewis 2009: 211.

¹⁶This paper began life as comments on a paper by Ted Sider; thanks to him, Erica Shumener, and an audience at the APA for helpful conversation. Thanks also to Jeff Russell for helping me out with polyadic algebra logics.

theory for $\mathcal{L}_{\gamma\delta}$ (cf. Dickmann 1975), where $\mathcal{M}, a \models \phi$ means that ϕ is true on \mathcal{M} relative to the variable assignment a .

We still need to define satisfaction for predicates of \mathcal{T}_γ . Where $\langle M, I \rangle$ is a model for $\mathcal{L}_{\gamma\delta}$, a *sequence* A is a function from γ to elements of M where $A(\alpha)$ is called the ' α -th' member of the sequence and written $[A]_\alpha$. For a sequence A , $d_{\alpha\beta}(A)$ is the sequence B where $[B]_\alpha = [A]_\beta$, $[B]_\beta = [A]_\alpha$, and $[B]_\delta = [A]_\delta$ otherwise.

We write the satisfaction of a complex predicate Π relative to A and \mathcal{M} as $\mathcal{M}, A \models \Pi$, defined by:

- (i) $\mathcal{M}, A \models =$ iff $[A]_1 = [A]_2$.
- (ii) $\mathcal{M}, A \models \Pi$ for n -placed atomic Π iff $\langle [A]_1, \dots, [A]_n \rangle \in I(\Pi)$.
- (iii) $\mathcal{M}, A \models \sim\Pi$ iff $\mathcal{M}, A \not\models \Pi$.
- (iv) $\mathcal{M}, A \models \bigwedge S$ iff for every $\Pi \in S$, $\mathcal{M}, A \models \Pi$.
- (v) $\mathcal{M}, A \models \mathbb{T}_{\alpha\beta}\Pi$ iff $\mathcal{M}, d_{\alpha\beta}(A) \models \Pi$.

We want to show that every formula of $\mathcal{L}_{\gamma\delta}$ using only negation and conjunction has an equivalent predicate in \mathcal{T}_γ . What do we mean by 'equivalent'? Intuitively that when the objects assigned to the variables also get assigned to the right sequence, the variable assignment makes true the formula exactly when the sequence satisfies the predicate. More precisely, if a is a variable assignment and A a sequence, say they *match* iff $a(x_\beta) = [A]_\beta$ for $\beta < \gamma$. (Thus matching is relative to our ordering of the variables.) We want to show

Theorem: If ϕ is a formula of $\mathcal{L}_{\gamma\delta}$ made using only \sim , \bigwedge , and predicates (including identity), there is a complex predicate Π where, if a and A match, $\mathcal{M}, a \models \phi$ iff $\mathcal{M}, A \models \Pi$.

To show this, we define a translation t from formulas of $\mathcal{L}_{\gamma\delta}$ made using only those resources to predicates of \mathcal{T}_γ by

- (i) $t(x_{\alpha_1} = x_{\alpha_n}) := \mathbb{T}_{1\alpha_1}\mathbb{T}_{2\alpha_2} =$.
- (ii) $t(\Pi x_{\alpha_1} \dots x_{\alpha_n}) := \mathbb{T}_{1\alpha_1} \dots \mathbb{T}_{n\alpha_n}\Pi$ for simple Π .
- (iii) $t(\sim\phi) := \sim t(\phi)$.
- (iv) $t(\bigwedge S) := \bigwedge \{t(\phi) : \phi \in S\}$.

Assume that a and A match. We show by induction that $\mathcal{M}, a \models \phi$ iff $\mathcal{M}, A \models t(\phi)$. In the base case, we reason:

$$\begin{aligned}
\mathcal{M}, a \models \Pi x_{\alpha_1} \dots x_{\alpha_n} &\text{ iff } \langle a(x_{\alpha_1}) \dots a(x_{\alpha_n}) \rangle \in I(\Pi) \\
&\text{ iff } \langle [A]_{\alpha_1} \dots [A]_{\alpha_n} \rangle \in I(\Pi) \\
&\text{ iff } \langle [d_{1\alpha_1} \dots d_{n\alpha_n}(A)]_1 \dots [d_{1\alpha_1} \dots d_{n\alpha_n}(A)]_n \rangle \in I(\Pi) \\
&\text{ iff } \mathcal{M}, d_{1\alpha_1} \dots d_{n\alpha_n}(A) \models \Pi \\
&\text{ iff } \mathcal{M}, A \models \mathbb{T}_{1\alpha_1} \dots \mathbb{T}_{n\alpha_n}\Pi
\end{aligned}$$

(The reasoning for $=$ is essentially the same.) For the induction step, we have two cases. First, $\mathcal{M}, a \models \sim\phi$ iff $\mathcal{M}, a \not\models \phi$ iff (by the induction hypothesis) $\mathcal{M}, A \not\models t(\phi)$ iff $\mathcal{M}, A \models \sim t(\phi)$ iff $\mathcal{M}, A \models t(\sim\phi)$. Second, $\mathcal{M}, a \models \bigwedge S$ iff for each ϕ in S , $\mathcal{M}, a \models \phi$ iff (by the induction hypothesis) for each $\phi \in S$, $\mathcal{M}, A \models t(\phi)$ iff $\mathcal{M}, A \models \bigwedge \{t(\phi) : \phi \in S\}$ iff $\mathcal{M}, A \models t(\bigwedge S)$. QED.

REFERENCES

- Azzouni, Jody (2017). *Ontology Without Borders*. Oxford: Oxford University Press.
- Bacon, John (1985). "The Completeness of a Predicate-Functor Logic." *The Journal of Philosophical Logic* 2: 323–339.
- Barnes, Elizabeth (ed.) (2017). *Current Controversies in Metaphysics*. New York: Routledge.
- Chalmers, David (2009). "Ontological Anti-Realism." In Chalmers et al. (2009).
- Chalmers, David, David Manley and Ryan Wasserman (eds.) (2009). *Metametaphysics*. Oxford: Oxford University Press.
- Dasgupta, Shamik (2009). "Individuals: An Essay in Revisionary Metaphysics." *Philosophical Studies* 145: 37–67.
- (2017). "Can We Do Without Fundamental Individuals? Yes." In Barnes (2017), 7–23.
- Dickmann, M. A. (1975). *Large Infinitary Languages*. New York: Elsevier.
- Donaldson, Thomas (2015). "Reading the Book of the World." *Philosophical Studies* 172: 1051–1077.
- Halmos, Paul R. (1962). *Algebraic Logic*. New York: Chelsea Publishing Company.
- Hawthorne, John (O’Leary-) and Andrew Cortens (1995). "Towards Ontological Nihilism." *Philosophical Studies* 79(2): 143–165.
- Kuhn, Steven T. (1983). "An Axiomatization of Predicate Functor Logic." *Notre Dame Journal of Formal Logic* 24: 233–241.
- Ladyman, James and Don Ross (2007). *Everything Must Go: Metaphysics Naturalized*. Oxford: Oxford University Press.
- Langton, Rae (1998). *Kantian Humility: Our Ignorance of Things in Themselves*. Oxford: Oxford University Press.

- Lewis, David (2009). "Ramseyan Humility." In David Braddon-Mitchell and Robert Nola (eds.), *Conceptual Analysis and Philosophical Naturalism*, 203–222. Cambridge, Mass.: MIT Press.
- Quine, Willard Van Orman (1940). *Mathematical Logic*. Cambridge, Mass.: Harvard University Press.
- (1960). "Variables Explained Away." *Proceedings of the American Philosophical Society* 104: 343–347. Reprinted in Quine 1966: 227–235.
- (1966). *Selected Logic Papers*. Cambridge, Mass.: Harvard University Press.
- Rosen, Gideon (2010). "Metaphysical Dependence: Grounding and Reduction." In Bob Hale and Aviv Hoffman (eds.), *Modality: Metaphysics, Logic, and Epistemology*, 109–135. Oxford: Oxford University Press.
- Russell, Jeffrey Sanford (2017). "Qualitative Grounds." *Philosophical Perspectives* 30(1): 309–348.
- Schaffer, Jonathan (2009). "On What Grounds What." In Chalmers et al. (2009).
- Strawson, P. F. (1954). "Particular and General." *Proceedings of the Aristotelian Society* 54: 233–260.
- (1963). *Individuals*. London: Methuen.
- Turner, Jason (2011). "Ontological Nihilism." In Dean W. Zimmerman and Karen Bennett (eds.), *Oxford Studies in Metaphysics*, volume 6. Oxford: Oxford University Press.
- (2017). "Can We Do Without Fundamental Individuals? No." In Barnes (2017), 24–34.
- Williamson, Timothy (2013). *Modal Logic as Metaphysics*. Oxford: Oxford University Press.