

WHAT IN THE WORLD ARE POSSIBLE WORLDS?

A Thesis

by

MARK JOHN DONDERO

Submitted to the Office of Graduate Studies of  
Texas A&M University  
in partial fulfillment of the requirements for the degree of  
MASTER OF ARTS

May 2009

Major Subject: Philosophy

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## ABSTRACT

What in the World Are Possible Worlds? (May 2009)  
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Ted Sider writes that “many are impressed with the utility of possible worlds in linguistics and philosophy”, and this is true, in particular, of those with an interest in modal logic. However, in the midst of the marvelous milieu brought on by the development of possible world semantics, some have stopped to ask just what it is that possible worlds are. They certainly seem useful, and we seem to understand how to use them and talk about them, but what precisely is it that we’re talking about when we talk of possible worlds? In this thesis, I will attempt to outline the most significant and well-recognized view in this debate: that of David Lewis. Through my discussion of him, I will find occasion to discuss some alternative views that have arisen. After finishing my presentation of Lewis, I will discuss where people have begun to take this debate and address the question of whether progress can be made towards a substantive answer.

In Chapter I, I begin by presenting the motivation of the question of possible worlds found in the study of modal logic. I then present the major approaches taken to answering the questions that were raised, leading into my discussion of David Lewis’s famous and robust account. I present key features of Lewis’s view and then move into his criticisms of the other major responses. This much should suffice as a relatively thorough treatment of the answers that have come before.

In Chapter II, I discuss the current state of the debate. I begin by mentioning several problems that can be spotted in Lewis’s views in particular. I then move to Menzel’s account, which tries to answer the question of possible worlds from a new angle, jettisoning the direction taken by Lewis and his contemporaries. I explain why Menzel has taken this new approach, and then move into another new approach, this time given by Stephen Yablo. I discuss how these two approaches can help serve each other in helpful

ways. But, at last, I present several hurdles these two views would have to overcome in order to play together nicely.

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## CHAPTER I

## INTRODUCTION: WHAT SOME THINK

**1 The Logic**

The debate with which I will be concerned is intimately connected to the study of modal logic. Thus, I will begin by presenting some key facts about modal logic.

**1.1. The syntax and inference rules.** There is no one system that can lay claim to the title ‘modal logic’. Thus, the study of modal logic simpliciter typically concerns all of the systems of modal logic and none in particular.<sup>1</sup> Philosophical debate surrounding modal logic often consists of debate about which (if any) of the extant systems is appropriate in a given context. The context with which I will be concerned is the one in which the ‘ $\Box$ ’ symbol is taken to mean ‘it is necessary that’ where ‘necessary’ is meant to express alethic modality (or logical possibility). S5 modal logic is widely regarded as the appropriate modal propositional logic. What the appropriate quantified modal logic amounts to is considerably more controversial, but that shall not concern this discussion much. What I shall be concerned with instead is what metaphysical commitments underlie our semantics for S5, from which we will learn lessons that carry over trivially to quantified S5.

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This thesis follows the style of *Synthese*.

<sup>1</sup>Good presentations of modal logics are found in Garson (Winter 2008) and Cresswell & Hughes (1996). These texts form the basis of my presentation here.

Modal propositional logics are merely extensions of classical propositional logic. There are additions made to the language of propositional logic and corresponding additions made to the axioms of propositional logic. Well-formed formulae (wffs) of language of modal propositional logic are specified in the following way.

*Primitive symbols*

propositional variables:  $p_1, p_2, p_3, \dots$

monadic operators:  $\neg, \Box$

dyadic operator:  $\rightarrow$

brackets:  $(, )$

*Formation rules*

A propositional variable is a wff.

If  $\phi$  is a wff, so are  $\neg\phi$  and  $\Box\phi$ .

If  $\phi$  and  $\psi$  are wffs, so is  $(\phi \rightarrow \psi)$

*Definition<sup>2</sup>*

$$\Diamond\phi \text{ =}_{\text{df}} \neg\Box\neg\phi$$

To the inference rules of propositional logic, we can start by adding Necessitation (N) and the Distribution Axiom (K).

(N) If  $\phi$  is a theorem of this system, then so is  $\Box\phi$ .

(K)  $\Box(\phi \rightarrow \psi) \rightarrow (\Box\phi \rightarrow \Box\psi)$ .

The modal logic that results from the addition of merely (N) and (K) is  $\mathcal{K}$ . Other axioms that are of particular interest to philosophers who study modal logic with an eye towards necessity are (T), (4), and (5).

(T)  $\Box\phi \rightarrow \phi$

(4)  $\Box\phi \rightarrow \Box\Box\phi$

(5)  $\Diamond\phi \rightarrow \Box\Diamond\phi$

<sup>2</sup>When concerned with alethic modality, typically this is how ‘ $\Diamond$ ’ is defined. The notable exception here is Prior’s  $\mathcal{Q}$ . For a thorough treatment of  $\mathcal{Q}$ , see Menzel (1991).

There is an enormous amount of philosophical debate over the adequacy of logical systems that result from the addition of these axioms to  $\mathcal{K}$  for expressing necessity and possibility, and I shall not rehearse it here. What *is* relevant at the moment is the terms of such a debate. When two philosophers disagree about whether, e.g., (5) is a correct axiom, what will they say? Typically, the one who thinks (5) is correct will say “It is true that if it is possible that  $\phi$ , then it is necessary that it is possible that  $\phi$ .” If pressed, this might become “It is right that if there is a possible world such that  $\phi$ , then for every possible world it is possible that  $\phi$ .” This latter interpretation of the sentences of our modal language uses what is called ‘possible world semantics’. It is in the use and understanding of possible world semantics that the debate which is the focus of this thesis is seen.

**1.2. The semantics.** The impetus for the debate about the nature of possible worlds can be made clear when we look a bit at the formal semantics for S5. But before I present the semantics, I will make some prefatory remarks.

*1.2.1 Philosophical points about the semantics.* The semantics for the wffs of the language of modal logic is usually cashed out in terms of possible worlds. This is not to say that the only way philosophers try to make sense of talking about the sentences and inference rules of modal logic is by talking about possible worlds. Far from it.<sup>3</sup> However, what is apparently universal is the claim that a sentence is possibly true just in case certain conditions hold for something of a certain type, and a sentence is necessarily true just in case certain conditions hold for everything of that type. What that type *is* is a matter of much debate. Typically, the type in question is referred to as a possible world. Certainly, in treatments of modal logic without any philosophical implications, this is the standard. Perhaps this is because this was the convention chosen in the first proof for the completeness of many of our modal logics, found in Kripke (1959).

<sup>3</sup>A good and clear example is found in Plantinga (1976), where ‘it is necessary that’ is not interpreted as ‘every possible world is such that’ but as ‘every maximal possible state of affairs is such that’.



In any case, the debate I will be concerned with can be characterized by the question “What are possible worlds?”. But it is important to note that the question is seen by some as something more like “What are the entities required to define appropriate truth conditions for possible worlds?” and others see it as something more like “Of what type are the things upon whose existence depends possibility?”. In the context of the semantics for a modal logic intended to characterize alethic modalities, the term ‘world’ is only meaningful in the sense that it is a monosyllabic name for the type for things mentioned in the semantics that exist just in case something is possible. Some, as we will see, think that in order to understand alethic modality we must take the semantics for S5 at face value and believe in real worlds as the truthmakers for our modal claims. Others, as we will see, think that to take such semantics at face value gravely misunderstands the nature of alethic modality, and instead look to reinterpret what the worlds mentioned in the semantics are so that we can see what lesson is learned from S5. Even though I *am* concerned with using modal logic to understand alethic modalities, I want to peel away any bias towards some of the views we shall soon see (in particular, that of Lewis). Thus, instead of referring to ‘worlds’, I shall refer to ‘VPs’, short for ‘vehicles of possibility’, when I am reviewing the possible world semantics used for analyzing the wffs of the language of modal logic.

*1.2.2 The semantics for S5 and where it leads us.* Now, we are philosophically prepared to face the semantics, the truth conditions for wffs in a modal logic, directly. (I will avoid presenting the truth conditions for wffs in a quantified modal logic as that gets much more complicated and is not necessary at the moment to see the problems at hand.) All we need for a complete S5, the standard alethic propositional modal logic, is the following.

Let  $\mathcal{M} = \langle W, w, v \rangle$ .  $W$  is a non-empty, with  $w \in W$  singled out as a distinguished element of  $W$ .  $v$  is a valuation function such that for any atomic statement in our language  $A$  and any  $w^* \in W$ ,  $v(A, w^*) = T$  or  $v(A, w^*) = F$ . We then consider  $\bar{v}$ , the unique extension of  $v$  such that for any  $w^* \in W$  and any wffs of our language  $A$  or  $B$ ,

- ( $\neg$ )  $\bar{v}(\neg A, w^*) = T$  if and only if  $\bar{v}(A, w^*) = F$
- ( $\rightarrow$ )  $\bar{v}(A \rightarrow B, w^*) = T$  if and only if  $\bar{v}(A, w^*) = F$  or  $\bar{v}(B, w^*) = T$
- (5)  $\bar{v}(\Box A, w^*) = T$  if and only if for every  $w' \in W$ ,  $\bar{v}(A, w') = T$

We then say that a wff  $A$  in our language is true according to  $\mathcal{M}$  at  $w^* \in W$  just in case  $\bar{v}(A, w^*) = T$ .

Now, when most metaphysicians look at the semantics of  $S_5$ , they acknowledge that they seem to mirror facts about modal reality quite well.<sup>4</sup> However, when they start to articulate what it is that the semantics are mirroring, we begin to get conflicting accounts. Metaphysicians opining about the semantics will usually say something along the following lines.  $\mathcal{M}$  reports what there is that is relevant to alethic modality.  $W$  is a set of VPs.  $\bar{v}$  is identifying the true and false propositions of the VP related to the actual world,  $w$ , and the alternative VPs (i.e., alternative possible worlds), the other members of  $W$ . But the disagreements about how all this is working comes to the fore when one notes the many disagreements about what VPs are.

We see the significance of these disagreements when we reflect a bit on  $v$ .  $v$  can do nothing more than enumerate the truth assignments of our atomic sentences (propositional variables), i.e. just give us rows of a truth table. But we can't simply consider all possible truth table rows if we take our atomic statements to be real propositions. Here is an example that demonstrates why. If  $v$  were to just identify the rows of a truth table, then it would be possible for the atomic sentences  $A$  and  $B$  to single out *Jerry was a race car driver* and *Jerry never set foot on a racetrack* and for  $v$  to call them both true at some world. After all, 'racetrack' might have meant 'disco dance floor'.

So we must restrict the unacceptable rows of a truth table in order to make our valuation function accurately reflect modal reality. How can we restrict them? Well, by making them accord with the facts of our VPs. Then, the debate about what a VP is becomes interesting. It becomes the question of what grounds modal truth.

<sup>4</sup>In the case of modal propositional logic, this claim is admittedly a bit strained as quantified statements about the objects in our world are absent. But we certainly think that the languages used in propositional logic can be used to express the truths of a good chunk of our actual world, and so certainly modal propositional logic should accordingly be able to reflect a chunk of the modal facts about our world.

## 2 Abstractionists vs. Concretists

In van Inwagen (1986), we see an exceptionally lucid presentation of the debate that formed out of trying to understand these semantics in the sense that they . We have, on the one side, those who think that VPs are worlds every bit as real and concrete as the one in which we reside. These are the concretists. We have, on the other side, those who think that VPs are something else. These are the abstractionists. Broadly construed, abstractionists think that VPs are propositions, states of affairs, or possible states of affairs.

Lewis's argument for concretism can be construed as an indispensability argument<sup>5</sup>, as we see in Lewis (1986).<sup>6</sup>

- (1) We ought to believe in the entities indispensable to our best theories.
- (2) Concrete possible worlds are indispensable to our best theories of alethic modality.
- (3) Therefore, we ought to believe in possible worlds.

Of course, the abstractionist objection is to (2). In particular, we see that an acceptance of the views presented in Plantinga (1976) might<sup>7</sup> lead to the following altered argument.

- (4) We ought to believe in the entities indispensable to our best theories.
- (5) States of affairs are indispensable to our best theories of alethic modality.
- (6) Therefore, we ought to believe in states of affairs.

Given my change from possible worlds to VPs, we get the following version of the argument, which has a far weaker conclusion than any of those given above.

- (7) We ought to believe in the entities indispensable to our best theories.
- (8) VPs are indispensable to our best theories of alethic modality.
- (9) Therefore, we ought to believe in vehicles of possibility.

<sup>5</sup>I will follow the presentation of indispensability arguments as seen in Colyvan (Fall 2008).

<sup>6</sup>Lewis's focus is on getting us to believe that his concretism provides the best theory of alethic modality. Lewis never directly endorses the indispensability argument, but he certainly claims that our desires for "theoretical unity and economy" force us to accept his concretism, to which possible worlds are indispensable.

<sup>7</sup>I say 'might' because Plantinga simply takes it as obvious that states of affairs exist. He sees no reason to argue for this belief.

And here we should recall that VPs are the things that ground modality, the things that have a certain feature just in case something is necessary and at least one of which has a certain feature just in case something is possible. The abstractionists and concretists are each trying to determine the type for these things, but they believe, in common, that there are VPs and that they have the basic quantificational properties that we see in the semantics of modal logic. Thus, the debate turns on what theory (or class of theories) of modality satisfies the first premise of our indispensability argument. The nature of theory choice in science has been extensively debated, but the same cannot be said for theory choice in metaphysics. In what will proceed, there will be clashes over what the virtues are for a theory of alethic modality (e.g., elegance, truth, plausibility, reduction) and whether or not particular theories possess these virtues. And what distinguishes the views presented in this chapter from the views presented in the next is whether the view is committed to (8).

### 3 Lewis's Concretist Account

**3.1. The general view.** In Lewis (1986), Lewis gives his concretist account. He prefers to use the phrase 'modal realism' to describe his position. According to Lewis, we are forced to accept modal realism because it provides us with a "philosopher's paradise" despite its conflicts with common sense. As he puts it on page 4,

It offers an improvement in what Quine calls ideology, paid for in the coin of ontology. It's an offer you can't refuse. The price is right; the benefits in theoretical unity and economy are well worth the entities.

However, on page 135, Lewis goes further.

Modal realism ought to be accepted as true. The theoretical benefits are worth it.

Provided, of course, they cannot be had for less.

Abstractionism is a theory (or class of theories) that might be had at a much lower price. However, Lewis thinks it lacks many of the core theoretical benefits of concretism, and

should thus be rejected. There are four key features worth highlighting in his presentation before I recount those concerns directly.

*3.1.1 Cost-benefit analysis.* Lewis does not attempt to give a knock-down argument for concretism over abstractionism. Instead, he is attempting to offer *reasons* to accept concretism over abstractionism. These reasons are simply what Lewis sees as theoretical benefits to the concretist approach and theoretical shortcomings to the abstractionist approach. As I review Lewis's criticisms and perspectives, it is important to keep this in mind at all times. When Lewis is saying that another theory has a problem, he is not necessarily saying that it is internally incoherent or resting on a false principle. Instead, he is saying that it lacks a feature that would belong to the ideal theory, and usually he feels that his concretist theory has that feature. This is how Lewis attempts to establish that his theory is best, thus getting his indispensability argument off the ground.

*3.1.2 The unintelligibility of the abstract/concrete distinction.* An important feature of Lewis's account is flagged early in his presentation.

Because I say that other worlds are of a kind with this world of ours, doubtless you will expect me to say that possible worlds and individuals are concrete, not abstract. But I am reluctant to say that outright. Not because I hold the opposite view; but because it is not at all clear to me what philosophers mean when they speak of 'concrete' and 'abstract' in this connection.

Lewis goes on to explain that he is confounded by four ways<sup>8</sup> that people try to distinguish the abstract from the concrete for him in the context of VPs or possible worlds. I will later discuss the effectiveness of Lewis's points made here, but for now I will offer them without criticism.

**The Way of Example** Using the Way of Example, someone would say "concrete entities are things like donkeys and puddles and protons and stars, whereas abstract

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<sup>8</sup>He ignores a fifth way offered in Dummett (1973)

entities are things like numbers". Lewis has two key complaints for this Way. The first is that "we have no uncontroversial account of what numbers are". So, using the Way, one does not produce a genuinely informative answer about what VPs are. The second complaint is that it would seem that some parts of a concrete world might not be paradigmatically concrete, such as empty space-time or even "the universals or tropes" which are parts of "worlds composed of ordinary particulars".

### **The Way of Conflation and the Negative Way**

[T]he Way of Conflation: the distinction between concrete and abstract entities is just the distinction between individuals and sets, or between particulars and universals, or perhaps between particular individuals and everything else. . .

Third, the Negative way: abstract entities have no spatiotemporal location; they do not enter into causal interaction; they are never indiscernible one from another.

Lewis at first argues against the use of these Ways simultaneously; he thinks that the abstract things mentioned in the Way of Conflation do not always satisfy the criteria for abstract objects laid out in the Negative Way. First, Lewis claims that some entities that some sets do not lack spatiotemporal location, such as a set of located individuals. Such a set would, according to Lewis, have a spatiotemporal location, even if it is, in some sense, divided. Thus, something is abstract due to one Way, but concrete due to the other. Second, it would seem that some entities abstract by the Way of Conflation are capable of entering into causal interaction. In particular, Lewis claims that a set of events could cause or be caused by another event, thus again showing a disagreement between these two Ways. Third, it would seem that there would need to be some indiscernible sets, such as the singleton sets of indiscernible concrete individuals, so Lewis thinks there is no way someone could hold that both of these Ways allow us to effectively distinguish the abstract from the concrete.

Lewis goes on to object that possible worlds, according to the Negative Way, should still come out concrete. Firstly, while other worlds do not stand in spatiotemporal or causal relations to us, this does not make *us* abstract. There needs to be something about the worlds that makes them abstract and does not make us abstract, and if we just take 'concrete' to be an indexical term, then there is no difference in kind between the actual world and possible worlds. This then necessitates wondering if "other worlds and their parts stand in spatiotemporal and causal relations to anything?" Lewis concludes that they must stand in such relations to their own parts, lest we begin to think that whole worlds cannot stand in relations to their parts and must then be abstract. But this then makes the actual world abstract, which seems clearly wrong. Thus the parts of worlds stand in spatiotemporal relation to themselves, and the whole worlds "inherit concreteness from their parts". And as for indiscernability, while Lewis is not sure that there are indiscernible worlds, there are certainly indiscernible parts of worlds, "for example indiscernible epochs of a world of two-way eternal recurrence". Thus, according to the Negative Way, Lewis argues that worlds still come out concrete.

### **The Way of Abstraction**

[T]he Way of Abstraction: abstract entities are abstractions from concrete entities. They result from somehow subtracting specificity, so that an incomplete description of the original concrete entity would be a complete description of the abstraction.

Lewis questions what abstract entities might turn out to be according to this Way. He rejects that they would be universals or tropes (as in the Way of Conflation), since certainly we could construct abstractions of "highly extrinsic aspect[s] of something", such as "the surname it bears... or its spatiotemporal location", and such things "are unsuitable candidates for genuine universals or tropes". Lewis also rejects that such abstractions consist in anything like simple sets (as in the Way of Example) for the following reason. The obvious way of thinking of such abstractions, in terms of equivalence classes, requires us to say that some worlds are sets which are genuine equivalence classes and

some are not, but “most sets are equivalence classes only under thoroughly artificial equivalences”. What’s more, with abstractions taken to be these equivalence classes, the content of the Way of Abstraction seems to lose its relevance as concrete entities would no longer be required to be objects of abstraction. Lewis then rejects that abstractions accord with the Negative Way as abstractions of location

will not be unlocated; rather, there will be nothing to it except location.

Likewise if we can abstract the causal role of something, then the one thing the abstraction will do is enter into causal interactions.

Lewis’s conclusion is that “[a]ccording to the Way of Abstraction, I say that worlds are concrete. They lack no specificity, and there is nothing for them to be abstractions from.”

3.1.3 *The Benacerraf problem for modality.* Benacerraf (1973) is a classic paper in which was posed a challenge that has come to be known as “Benacerraf’s epistemological problem”. Quoting Lewis intermittently quoting Benacerraf,

‘[A]ccounts of truth that treat mathematical and nonmathematical discourse in relevantly similar ways do so at the cost of leaving it unintelligible how we can have any mathematical knowledge whatsoever; whereas those which attribute to mathematical propositions the kinds of truth conditions we can clearly know to obtain, do so at the expense of failing to connect these conditions with any analysis of the sentences which shows how the assigned conditions are conditions of their *truth*.’ The trouble is that knowledge requires some sort of causal connection between the knower and the subject matter of his knowledge. But a standard, straightforward account of mathematical truth ‘will depict truth conditions in terms of conditions on objects whose nature, as normally conceived, places them beyond the reach of the better understood means of human cognition (e.g. sense perception and the like’...

So Benacerraf insists that in an account of the meaning of mathematical discourse we have a choice between:



(a) making sense of how we come to know things and possibly denying some of the things we already seem to know (this is typically construed as the anti-realist or perhaps nominalist or perhaps intuitionist choice);  
 and (b) accepting all the things we clearly seem to know, even though there seems to be no way to make sense of how we came to know them, how to account for the cause of our knowledge (this is the realists' choice).

Both sides are thus in some way unsatisfactory. Benacerraf is arguing that there is no way, in accounting for mathematical truth, that we can have our cake and eat it too. Analogously, modal truth works the same way for VPs as mathematical truth works for mathematical objects. With this in mind, Lewis continues.

I think it is very plain which horn of Benacerraf's dilemma to prefer. To serve epistemology by giving mathematics some dubious semantics would be to *reform* mathematics. . .

So mathematics will do as a precedent: if we are prepared to expand our existential beliefs for the sake of theoretical unity, and if thereby we come to believe the truth, then we attain knowledge. In this way, we can even attain knowledge like that of the mathematicians: we can know that there exist countless objects causally isolated from us and unavailable to our inspection. Causal accounts of knowledge are all very well in their place, but if they are put forward as *general* theories, then mathematics refutes them.

And on *this* point, Lewis and the abstractionists concur. They both think there are VPs of some sort. The nature of them is under dispute, but their existence is not and our causal relationship with the suggested entities, as we will see, seems doomed to be mysterious. Lewis is very consciously making this choice. We will see where this might lead us as we discuss Menzel's account and more recent developments.

3.1.4 *Ersatzism*. Just as Lewis does not refer to his own position as “concretism”, he does not refer to his opponents as “abstractionists”. In fact, one of Lewis’s great achievements on this topic is that he perhaps framed his opponents better than any of them themselves ever did.

Lewis refers to the position of his opponents as *ersatz modal realism* or *ersatzism*, for short. These ersatzists are trying to get the benefits of his philosopher’s paradise “on the cheap” by refusing to believe in a plurality of concrete possible worlds, but instead only one actual concrete world and a host of non-concrete worlds that serve as VPs. Lewis divides the ersatzists into three camps: linguistic ersatzists, pictorial ersatzists, and magical ersatzists. Linguistic ersatzists think that VPs are sentences, pictorial ersatzists think that VPs are pictures, and magical ersatzists think that VPs are more amorphous than either sentences or pictures (“they just represent, it is simply their nature to do so, and there’s nothing more to be said about how they do it”).

It is worth noting that, prior to Lewis, there was no such categorization of abstractionists. Lewis seemed to be trying to describe what he saw as the possible views for ersatzists, not the announced views. It is clear that he was trying to anticipate and reject as many forms of abstractionism as he could.<sup>9</sup> As a result, we see the position of linguistic ersatzism turn into a large and varied sort, where sentences should not be taken literally as having anything to do with any natural language, but only some “system of structures that can be parsed and interpreted”.<sup>10</sup> Thus, a position where VPs are sets involving points in three-dimensional real space, such as what we see in Quine (1968), is interpreted by Lewis as linguistic ersatzism, *not* pictorial ersatzism, even though the view seems highly motivated by visual intuitions. At any rate, I will now turn my attention towards completing my presentation of Lewis’s account by summarizing his arguments against each ersatzism.

**3.2. The ersatzists and their critic.** Here I shall present a more complete exposition of the alternative ersatzisms proposed by Lewis and his criticisms of each. My aim in

<sup>9</sup>Lewis (1986) p. 141.

<sup>10</sup>This quote is from Lewis (1986) p. 144. A recent example of such a view is found in Sider (2002).

this thesis is not to defend the ersatzists from Lewis's arguments directly but to explain how some have attempted to deflect the arguments. Thus, I will not be deeply critical in my presentation of this stage of Lewis's account, which runs the risk of making me appear glib. However, all I intend to emerge from this exposition is that Lewis has two main courses of objection for each ersatzism, with a special one each for pictorial and magical ersatzism. The responses to Lewis's position that I will entertain will not directly respond to his arguments presented in the following.

3.2.1 *Linguistic ersatzism.* As mentioned above, linguistic ersatzism is the position that VPs are sentences of some sort. Lewis explains that such sentences should certainly not be taken to be the sentences of some natural language (if so, there would be an obvious flaw: a natural language would not be able to express all the different possible worlds), but instead "system[s] of structures that can be parsed and interpreted". Thus it is probably best to think of the VPs of a linguistic ersatzist as some sort of models for a modal language, or less formally as sets of sentences, usually referred to as "maximal consistent sets".

Lewis thinks that linguistic ersatzism is the best prospect for the ersatzist, and, indeed, many have directly defended the view or something like it. But Lewis has two key complaints against linguistic ersatzists. The first is that the linguistic ersatzists are incapable of providing an account of VPs without presupposing a notion of modality (I will call this the "Problem of Primitive Modality", or POPM), and the second is that, in some instances, the linguistic ersatzist will be unable to appeal to an account of VPs as sentences in order to explain similar possibilities (the "Problem of Description", POD).

Lewis argues that there are at least two reasons why any flavor of linguistic ersatzism must have a POPM. The first is that if a VP is a maximal consistent set of sentences, then modality is present in the notion of consistency, for a set of sentences is consistent just

in case its members *could* all be true.<sup>11</sup> The second is due to implicit representation. In linguistic ersatzism, a set of sentences implicitly represents something, and

this implication is *prima facie* modal: a set of sentences implies that so-and-so iff those sentences, as interpreted, *could* not all be true together unless it were also true that so-and-so; in other words, if it is *necessary* that if those sentences are all true together, then so-and-so.

Lewis argues that there are also at least two good reasons why any account of linguistic ersatzism has a POD. The first is that there might be indiscernible individuals that pose a problem for linguistic ersatzists.

Imagine a full description of a world of eternal recurrence, with a certain role—say, that of a conqueror rather like Napoleon—filled once in every indiscernible epoch. There are infinitely many indiscernible possibilities for filling the Napoleonic role in such a world. Or so it surely seems. But no: there is only the one ersatz individual, only the one linguistic description of a filler of the role.

The second good reason why the linguistic ersatzist has a POD is in having to deal with alien properties, properties not instantiated in any worlds other than the non-actual ones. Both abstractionists and concretists would (likely) agree that there are some properties not instantiated in the actual world. Lewis can say that they exist because they are instantiated in some possible world. But he claims the linguistic ersatzist cannot. The linguistic ersatzist can only say that *some* property not instantiated in this world would be instantiated in another, but linguistic ersatzism would have to have a funny way of representing this property or this knowledge. If the actual world doesn't have the property in question, then it shouldn't have the word for it, and so it would appear that linguistic ersatzists cannot properly describe all the possible worlds. Lewis is not convinced the linguistic ersatzist can get around either version of the POD by employing

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<sup>11</sup>It might be argued that, with the right proof theory for the statements true at a given world, one could define consistency non-modally. Lewis argues that the POPM for this approach rears its head in the axioms themselves, where the linguistic ersatzist cannot hope capture all and only the modal facts with a proof theory that doesn't have primitive modality. His full arguments begin on p. 154 of Lewis (1986).

a Lagadonian language as indistinguishable ersatz individuals and alien properties either do not seem to be abstract in the sense of any of the four Ways given in §3.1.2 or would require an account like that of the magical ersatzists, which will be seen in §3.2.3 to be unsatisfying to Lewis.

3.2.2 *Pictorial ersatzism.* The pictorial ersatzist claims that worlds are pictures. Unlike its sibling ersatzisms, pictorial ersatzism has earned no notable supporters, so it is difficult to expand on this intuitive notion of picture. However, despite its dearth of supporters, pictorial ersatzism has earned a notable detractor in David Lewis. He claims that it is even less desirable than linguistic ersatzism because it has its own versions of the POPM and the POD, and yet another problem in that it seems to devolve into his own concretism.

Lewis begins by demonstrating that pictorial ersatzism has a POPM.

To see why, let us try to analyse the modal statement that there might be a talking donkey. That is so iff there is some ersatz world according to which there is a talking donkey. Such an ersatz world is one that has a part – an ersatz possible individual – which is an ersatz talking donkey. But what does it mean to call something an ersatz talking donkey? After all, it is *not* isomorphic to any talking donkey, because there is no talking donkey for it to be isomorphic to. At any rate, there is none within the one and only concrete world the ersatzer believes in. The picture represents falsely; the ersatz talking donkey, and likewise the ersatz world it is part of, are unactualised. What makes the thing an ersatz talking donkey is just that it *could* have been isomorphic to a talking donkey that was part of the concrete world, and it *would* have been if the concrete world had been different, and it *couldn't* have been isomorphic to any part of the concrete world that was not a talking donkey.

Lewis shows that the pictorial ersatzist has a POD with a thought experiment.

Suppose the concrete world undergoes eternal recurrence, with a Napoleonic conqueror in every epoch. Consider one of these conquerors: Napoleon himself. He is isomorphic to *all* those indiscernible ersatz individuals. So, we have plenty of indiscernible possibilities for him, as we should; but instead of actualising one of them, he actualises them all! That is not right.

The pictorial ersatzist has to explain away what appears to be a fundamental confusion: actual entities each actualise precisely one possible entity; but, in cases such as these, there is no relation between any particular possible entity and the actual entity that does not also hold for every other possible entity under consideration; thus, an actual entity can actualise more than one possible entity; contradiction. Lewis denies that we can just take the possibilities to be equivalence classes under indiscernibility since “that gives back unique actualisation at the cost of conflating the indiscernible possibilities”.

Lewis’s final objection to pictorial ersatzism returns us to his Ways from §3.1.2, for it would appear that the pictures of the pictorial ersatzist are not abstract according to any of the Ways. They fail on all the criteria. For the Way of Example, the objects in pictorial VPs are meant to be very much like their concrete counterparts, not very much like sets or numbers. For the Way of Conflation, it is clear that pictorial ersatz worlds cannot be universals. They “have to be particular individuals, but abstract even so”, which means that they fail to be distinguished from the concrete by this criterion of this Way. For the Negative Way, it would seem that the parts of pictorial ersatz worlds do stand in spatiotemporal relations to each other, and could even count as entering into causal relations under the appropriate counterfactual analysis<sup>12</sup>, and “an ersatz world that pictures two-way eternal recurrence will have indiscernible parts”. So the Negative Way does not seem to save the pictorial ersatzist. Left with the Way of Abstraction, Lewis thinks that pictorial ersatz worlds do not sufficiently lack in specificity to be considered abstract in this way, but it still seems like the best shot for the pictorial ersatzist, who

<sup>12</sup>Lewis warns us here to be sure to have an independent reason if we “insist on denying that parts of ersatz worlds are located or enter into causal interaction, for the very reason that they are not concrete”. This would then have to be either a new Way or at least an addendum to one of them.

might say that the ersatz world might lack something that the concrete world has: “vim” (or, as I might like to say it, some sort of substance or stuff). But Lewis strongly suspects that this is cheating; vim seems to amount to nothing more than concreteness itself. Thus, in every Way, Lewis thinks that pictorial ersatz worlds are just concrete entities.

3.2.3 *Magical ersatzism.* Magical ersatzists frustrate Lewis. Magical ersatzists suppose that VPs

have no relevant inner structure. We may as well suppose they have no structure at all. They are not sets, so they have no members. They are mereologically atomic, so they have no proper parts. They are simples.

And they are abstract simples. In what way ‘abstract’? – Presumably the Negative Way. For *ex hypothesi* they are not sets, in particular not equivalence classes. Nor are they to be understood as non-spatiotemporal parts – universals or tropes – of the particles or donkeys or whatnot that are parts of the concrete world; because surely there are not enough of those to supply as many ersatz worlds as we need. But the ersatz worlds are not *sui generis* among abstract entities; they are distinguished members of a broader class of abstract simples. You might prefer to give these simples some tendentious name, but I shall call them simply elements.

These elements (whose more “tendentious” names are things like states of affairs, ways things might be, possibilities, propositions, or structures) can be *selected* depending on how the world is, and maximal elements select an entire world. Lewis dislikes this selection relation, hence the word ‘magic’: magical ersatzists do not seem to give an adequate account of how elements are selected. He cites Plantinga, Stalnaker, van Inwagen, Slote, Prior and Fine, and Forrest as noted “magicians”.

Lewis’s core objections to magical ersatzism revolve around this selection relation. Lewis asks if the selection relation is internal, based on facts inherent in elements, or external, based on the relations between elements. If internal, then it would seem that

elements ought to have more structure than the magical ersatzists let on. If external, then Lewis worries that this might be a cause for a POPM of an especially repugnant sort, whereby structureless elements bear a necessary connection to objects that seems hardly necessary. However, magical ersatzists are overt primitivists (which will be discussed more later), so they might not be troubled by this charge. Lewis is not sure that they have a POD, but he is not sure of much about magical ersatzists, other than that they claim to be genuinely offering a candidate for VP-hood. As he summarizes things:

Is its ontology more credible than my own? – It is certainly quite different. And we are told so little that incredulity cannot gain a foothold.

I suppose that is one way to gain credibility. It is not a good way.

**3.3. Objections worth mentioning.** I will not defend the ersatzists from Lewis as I will be entertaining an objection to all VP-responses in the next chapter. However, there are a few objections to Lewis's account that are worth mentioning before we move on.

*Methodology.* The first is a methodological complaint.<sup>13</sup> As already mentioned, Lewis is not attempting to provide knock-down arguments for his theory. Instead he is trying to demonstrate that his is the best theory available. As he writes,

Why believe in a plurality of worlds? – Because the hypothesis is serviceable, and that is a reason to think that it is true.<sup>14</sup>

But is that really a reason to think that it is true? If we consider the debates in the philosophy of science, many have argued that our scientific theories might be chosen on the grounds of their utility, but then these are almost always the same who argue that the utility of a theory does not entail the truth of a theory. Metaphysical theories seem even less likely to have their utility count for their truth. Why shouldn't we suppose that our metaphysical theories are merely useful fictions? Consider our project of defining 'best' in the first premise of the indispensability argument seen in §2. If being the best theory

<sup>13</sup>A good part of this objection was inspired by a conversation with Geoff Anders. It is slightly different from the one he discussed, but he is certainly the one to credit with giving me the idea to attack Lewis's methodology.

<sup>14</sup>p. 3 Lewis (1986)



is tantamount to being the most useful theory, then it seems that (7) would be simply false, rendering our argument unsound. On the other hand, if the best theory is the theory that most approximates truth, *then* we would seem to be committed to believing in the *truth* of the existence of the entities essential to the theory. But Lewis never seems to argue with this version of 'best' in mind. He instead argues that his theory is the most useful, serviceable, elegant, and fruitful. On those counts, he may be right. But Lewis doesn't seem to give us enough reason to think that the theory is true.

*The Benacerraf choice.* Goodman, in Goodman (1955), wrote that perhaps when Hume suggested that our faculty of induction was based on a habit, Hume was not suggesting that this justified induction, but he was just trying to explain the process of inductive reasoning. It appears to me that something like that is in the intent of those who take the epistemological route when answering the Benacerraf problem. While Lewis thinks we should not lose the metaphysical truths that we have come to know, even if we cannot explain how we know them, the opposition is trying to explain how we come to know things even if it costs us some truths. Especially given the (occasionally completely overt) use of primitive modality by the ersatists, it might be argued that they are attempting to answer a very different question from the one Lewis is trying to answer. It might be said that Lewis wants to explain and find metaphysical truths about reality, but abstractionists are trying to explain and find metaphysical truths about modal reasoning. They occasionally employ different primitive concepts, but they almost always seem to be better able to explain how we reason from one modal truth to another much better than Lewis does. They might have a difficult time arguing absolutely that the entities they employ are the only genuine VPs, but they seem well equipped, given the force with which we seem to understand their primitives, to explain how we reason modally. We certainly do not seem to consult concrete possible worlds in our modal reasoning!

*The concrete and the abstract.* That Lewis does not understand the abstract/concrete distinction in the context of VPs can easily be met with a fair bit of incredulity. This is especially so for some of his arguments (the idea that sets of located objects are located

seems to conflate sets and mereological sums; the idea that abstractions of location are not unlocated just seems crazy). Lewis was an extraordinarily gifted philosopher, so one might be led to think that he is merely playing with his ability to defend implausible views and draw subtle distinctions.

But even if all that can be thrown away, Lewis still seems to be giving abstractionists the short end of the stick. This is because he seems to cripple them by assuming that any abstract object proposed as a VP must fit in nicely with our notions of some other abstract object. For instance, the magical ersatzists are clearly proposing that elements are not a subset of any other abstract objects we've seen. This frustrates Lewis as he can not then classify them easily. But what is wrong with that? At the base level, we have difficulty articulating what a set is, what a number is, and so on. Lewis is willing to accept that those are paradigmatically abstract, but not that elements are. He seems to assume that they either must exist as abstract objects we've already seen or not exist at all. That the magical ersatzist offers neither disjunct seems to cause Lewis's incredulity. But Lewis seems willing to accept that numbers and sets are abstract but distinct kinds. Why not elements?

**3.4. Why Lewis thinks the price of concretism is lower than the price of abstractionism.** As we see in the above, the force of Lewis's argument that his concretism is victorious in a cost-benefit analysis stands, for the most part, on four legs. The first is that it provides a reductive analysis of modality, i.e. one that does not take modality as a primitive, whereas every other view is not a reductive analysis of modality. The second is that linguistic or pictorial abstractionists will fail to capture certain modal facts correctly (i.e., they have a POD). The third is that any abstractionist view will call upon entities which are abstract, whose distinction from concrete objects Lewis has argued is vague or, in the case of magical ersatzism, suspect. The last and most obvious leg is that his view gets the facts of modality right; if Lewis's account is resting on false claims about modality, then its cost is, if not prohibitively high, then out of balance with its worth. For who wants to pay full price something that doesn't work?

## CHAPTER II

### WHAT OTHERS HAVE BEGUN TO THINK

#### 1 Menzel's View

What distinguishes Menzel's view in Menzel (1990) is that it attempts to avoid the ontological commitments of both concretists *and* abstractionists. The view has been called the "no-world view" because it seeks to analyze modal statements without appeal to anything like worlds or states of affairs. In fact, Menzel explicitly avoids the issues surrounding VPs. He claims that a correct notion of truth for our modal statements need no such ontologically suspect entities, and thus the indispensability argument for VPs only forces us to accept, as we will see below, the existence of perfectly respectable mathematical entities that we already think exist.

Menzel's view, if it works, would truly hit Lewis where it hurts. Ignoring Lewis's central thesis that questions concerning VPs are, in a certain sense, misguided, Menzel provides an axe with which one can chop away at each leg of Lewis's argument.

A caveat: Our discussion will now be shifting a bit. Earlier we were talking about possible worlds. Now, we will be talking about possible objects. The relevance might be questioned, but the reader need not worry. The connection between possible objects and possible worlds lies in the fact that possible objects are the true parts of possible worlds (even Plantinga's magical, structureless ersatz worlds have parts, and we will hear about those parts in a moment). Thus as go one's beliefs about possible objects, so go one's beliefs about possible worlds, and vice versa.

**1.1. Menzel’s account.** Menzel is an actualist, i.e. one who thinks that the only entities that exist are entities that actually exist, i.e. things exist only either as concrete objects in our concrete world or as abstract entities. Some have claimed that such a view cannot be reconciled with possible world semantics, that any commitment to possible world semantics requires *possibilia*, entities which are merely possible but not actually existing. Whence comes this view? To answer this question best, we will need to at last open up our discussion about modal logic to the world of quantified modal logic.

Unlike propositional modal logic, the valuation function for statements in the language of a quantified modal logic will require an augmented Tarskian theory of truth . That is, we must be able to discuss objects at different VPs, and so a valuation function that merely assigns truth or falsity to atomic statements won’t do. Instead, for a quantified modal language that is meant to express genuine modal truths about the genuine world, it would seem that we will need something like from the following excerpt of Menzel (1990):

The cluster of all [VPs] forms the basis of a distinguished possible worlds model  $M^\diamond = \langle W^\diamond, @^\diamond, D^\diamond, P^\diamond, Dom^\diamond, Ext^\diamond \rangle$  . Thus, in  $M^\diamond$ ,  $W^\diamond$  is—really and truly—the set of all possible worlds;  $@^\diamond$  is the actual world;  $D^\diamond$  the set of all possible objects—actual and otherwise;  $P^\diamond \dots$  is the set of all  $n$ - place relations;  $Dom^\diamond$  assigns to each world  $w$  the set of all objects in  $D^\diamond$  that exist in  $w$ , i.e., those objects that would have been actual had been  $w$ ; and  $Ext^\diamond$  assigns, for each world  $w$  and  $n$ -place relation  $p_n \in P_n^\diamond$ , the correct extension of the latter in the former. Truth for interpreted modal languages generally can therefore be defined simply as truth in  $M^\diamond$ .

The debate I’ve outlined surrounding VPs is thus nothing more than the debate surrounding the nature of  $M^\diamond$ , or, more precisely, the debate over the kind of things in  $W^\diamond$ . Lewis argues that they are concrete worlds, Plantinga argues that they are possible states of affairs, etc. Furthermore, Lewis argues that the objects in  $D^\diamond$  are the concrete individuals in each  $w \in W^\diamond$  while Plantinga (see Plantinga (1976)) argues that the objects in  $D^\diamond$

are individual essences. Such debates can rage on. Menzel provides a novel answer to this question, but we will need to build things up a bit before we can get to it.

*1.1.1 Primitive modality.* Menzel presents a view that rejects that Lewis's standard charge against ersatzists is at all problematic, i.e. Menzel sees no reason for complaint about using possibility as a primitive in analyzing statements about possibility. Part of this is because Menzel is aiming his energy directly at defining truth conditions for modal statements, whereas Lewis is focused more directly on VPs, but I will return to that in a moment. My focus now is that Menzel not only accepts that his account takes modality as a primitive, but claims that there *is no correct account of modality that does not take modality as a primitive*. According to Menzel, one of the core facts about possibility is that it is ultimately unanalyzable (we also see this view in van Inwagen (1986)). An analysis of modal claims can give us useful truth conditions, but it cannot give us a genuine reduction.

In Sider (2003), we see it written that

*Primitivism*, the view that modality is unanalyzable, is an important and legitimate alternative to reductionism, and is favored by many because of the difficulty of finding an adequate reduction.

But surely primitivists come to their position for more of a reason than simply the difficulty of making the reductionist account work. Menzel provides some of his own rationale.

Modality—the very paragon of intensionality— [is] an irreducible and essential primitive in my story... Thus, I count the modal operators in the same semantical company with quantifiers and connectives: we offer no deeper analysis of 'every' or 'not' than the ordinary meanings of the words; to take modality as primitive is simply to accord the same status to 'possibly' and 'necessarily'.

This is something less than an argument, and Menzel accordingly directs the reader elsewhere for primitivist arguments. But there is certainly quite a bit of sense to the idea

that the truth conditions of modal logic should mirror the truth conditions of ordinary first order logic, taking the ordinary notions of its quantifiers as primitive. Reductionists are trying to find a way to skip over such a process, and it is understandable for one to think that such a step is bound to fall on air.

Such a view takes the force out of the complaints found in the first leg (recall the “legs” from §3.4) of Lewis’s argument and attacks the fourth directly. If Lewis is wrong that a full reduction of modal truth is possible, even if it is theoretically more elegant, it should not matter in the cost-benefit analysis of his view. The price of buying a view of modal truth that doesn’t work is, much like taking a clearly erroneous scientific theory, far too high.

1.1.2 *The main idea.* The idea behind Menzel’s direct response to the debate is contained in the following.

Suspend your skepticism for the moment and take [Lewis]’s vision of modal reality at face value; imagine, that is to say, that there really is a standard model  $M^\diamond$  replete with possible worlds and their (in general) merely possible inhabitants. At the same time, however, like Plantinga and McMichael [in McMichael (1983)], allow that modality is primitive, not analyzable in terms of primitive worlds. Every modal statement thus yields at most an *equivalent* statement about worlds and their denizens, but no such statement is to be considered an *analysis* of the modal statement. Consider a model  $M_4 = \langle W_4, @_4, D_4, P_4, Dom_4, Ext_4 \rangle$  isomorphic to  $M^\diamond$ , but constructed only out of unproblematic (relatively speaking!) necessary beings; pure sets, say. In virtue of the isomorphism, of course,  $M_4$  would do just as well as  $M^\diamond$  for defining truth for modal languages; structurally,  $M_4$  represents modal reality no less than  $M^\diamond$ . Now, while retaining your belief in the primitiveness of modality, reinvoke your skepticism about worlds. The standard model drops

away, but  $M_4$  endures with only pure sets in place of worlds and possibilities, as accurate a representation of modality as before.

From this, we see that Menzel is only concerned with *representing* modal reality, not explaining it, whereas Lewis is *clearly* focused on explaining modal reality, which is why he's trying to divine the "true" VPs. As we see on p. 90 of Lewis (1986), Lewis accepts that there is probably a correspondence between his concrete worlds and VPs built out of mathematical entities, but rejects that such ersatz VPs are the real vehicles of possibility. But Menzel actually *concedes* this.

Nonetheless, it might be felt that something is still missing, that truth conditions of the sort we've given don't really account for the truth value of modal statements... Rather, there must be objects to serve as the "ground" of modal truth, entities in virtue of whose properties and relations our modal statements are true or false. McMichael seems to have something like this in mind when he claims that, in a "good" semantical account of truth, "there are real entities [as opposed to mere formal constructs] which exhibit the given semantic structure," i.e., the structure abstractly characterised in the formal semantics proper. And a similar thought seems to lie behind Plantinga's insistence that the actualist "*must* appeal to essences" in order to give acceptable truth conditions for [the sentence "Possibly, there exists something distinct from every actually existing thing."]. . .

There is something to this. It seems quite reasonable that what is possible, or necessary for that matter, must in *some* sense be grounded in what exists, be it haecceities and their properties, combinatorial relations that could obtain between the most basic elements of the physical universe, or the power of God. But I haven't been so ambitious as to try to answer *that* question. My claim has only been that, if we are going to take modality in the broadly logical sense at face value, then there is no reason to ask for any more than a homophonic theory of modal truth

conditions: for a modal statement to be true—just as in the nonmodal case—is for things to be as the statement says. Granted, this answer to the question of the form of modal truth conditions does not answer any questions about the metaphysical ground of modal truth, whatever that might be. But no surprise; it's a different question.

And so clearly Menzel is not attempting to tell us what VPs are, or even acknowledging *that* they are. He is merely attempting to construct a way for us to express in our semantics all that modal claims say while not ever committing himself to mere possibilia, thus not contradicting his actualist bent. But Menzel's response is not ignoring the question entirely. There is a very good reason why he eschews discussion of VPs directly: he thinks that it is, in some sense, genuinely misguided. He gets at this by looking at the argument that is occasionally advanced in support of the idea that actualism is not consistent with possible world semantics. Here is Menzel's presentation of it:

The proponents of any semantic theory are committed to the existence of whatever entities are appealed to in its account of truth. Possible world semantics appeals to possible worlds and (merely) possible objects. It follows that the proponents of the former are committed to the existence of the latter.

Menzel points out that

[t]here are two important assumptions in the argument that can be challenged: first, the tacit assumption that a theory of truth for modal languages requires a distinguished model; and second, that the distinguished model singled out must contain mere possibilia.

The distinguished model would be our  $M^\diamond$ , as discussed earlier. The typical approach for the actualist has been to challenge the second assumption. Plantinga, for instance, does precisely this. For him, the entities in  $D^\diamond$  are pure essences, haecceities, which are necessary beings, and thus actual beings.

Menzel wants to take a different approach and challenge the first assumption



which I will call the *extensionalist fallacy*: that, as [for the definition of truth in a model for the “plain vanilla” first-order semantics of our nonmodal discourse], modal truth must be defined relative to a distinguished, intended model. This assumption seems to me to be the crux of the issue of ontological commitment in the semantics of modality. I will argue, by way of counterexample, that it is false.

In trying to assess the truth of nonmodal statements, we could use “plain vanilla” first-order semantics in such a way that truth in a model just amounts to truth plain and simple. The model, of course, would contain nothing more and nothing less than the actual objects existing in the world and their actual relations. The extensionalist fallacy, as Menzel defines it, is just to think that there is some “*modal world*” that serves the same purpose for modal language as the *concrete* world does for nonmodal first-order language. The abstractionists and the concretists both think that this “*modal world*” is the world of the VPs, and that we need this world in order to have a proper account of the truth of modal claims.

Now the relevance of Menzel’s idea as described above is clear. If one is already a primitivist, then one need not ask for a distinguished model. There are oh-so-many models that could serve equally well as representations of the modal facts, and plenty of them involve no dubious ontological commitments. The primitivist’s notion of the ultimate unanalyzability of modality gets them remarkably sane ontology while still giving us some account of what is needed for modal statements to be true.

In this way, Menzel’s view does not fall by the second and third legs of Lewis’s core argument (again, as presented in §3.4). He can represent possibilities just as surely as Lewis can. In fact, his structures mirror Lewis’s worlds precisely, giving us all the same truth conditions. They do not ground modality, but, for a primitivist, why should they? And these structures do not involve any bizarre entities. They do not presume to be fundamental sets of sentences or models, they are not as specific as pictures, and they are not distinguished as magical elements are.<sup>1</sup> Menzel’s story is that the best we can do

<sup>1</sup>There might be a point worth making about whether Menzel’s view is a sort of magical ersatzism that presupposes no particular sort of element (in fact some things chosen as elements may be permitted to

is build such structures to mirror what we know to be characteristic of modal reality; we do not need to understand *why* it is that way to understand *that* it is that way. To say anything more would seem, to echo Lewis when speaking of the Benacerraf problem, to reform modality.

With no leg to stand on, Lewis's argument seems far weaker. In particular, it would seem that more theoretically beneficial than accepting the existence of concrete possible worlds would be accepting that modality is primitive, which, by Lewis's methodology, would require us to choose a view that takes modality as primitive over Lewis's reductionist account! It seems that primitivist theories are more serviceable, and thus, in Lewis's own words, they seem more likely to be true.

## 2 Yablo's Idea

Stephen Yablo, in Yablo (2009), asks a good question: "Must existence-questions have answers?". The sorts of questions he is interested are many of the key questions of ontology in metaphysics: Do numbers exist? Do possible worlds exist? Do mereological sums exist? Do sets exist? etc. Why is this a good question in our context? To answer that, let's revisit the problem outlined earlier. When we ask "What are VPs?", a response comes. That response points towards a type of entity. It would seem that if that response is even going to begin to be right, then the entity pointed towards ought to exist. Thus, with Lewis pointing towards concrete possible worlds, linguistic ersatzists pointing towards sets of sentences, the pictorial ersatzist pointing towards abstract pictures, and the magical ersatzist pointing towards elements (or propositions, or states of affairs, or whatever the magical elements really are), their answers are not even candidates for being right if the entities they point towards don't exist.

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have some structure) where the selection relation is external, determined by the facts about an embedding function and possibility itself. This might mean that Menzel's approach has the POPM "of a particularly pernicious form" that bothers Lewis, but it would seem that the primitivist should think we can do no better than it. What's more, if we are merely giving truth conditions and not attempting to ground modality, it seems unnecessary for us to worry about how deep our POPM is. So long as we can identify which statements are true and which false in an intelligible way, it would seem that our semantics have served their purpose.

There are different ways these answers can be taken. Perhaps the entities pointed towards exist, but when we're talking about VPs, we're not referring to them. Or perhaps we're referring to them, but they don't actually exist, much like Sherlock Holmes or the planet Vulcan or the King of France. In the case of Holmes, Vulcan, or the KoF, we think we know what we're referring to, and we more or less know how to check whether or not they exist (it's hard to check for non-existence even of concrete objects in fact, but we can certainly accomplish this to our satisfaction). But what of numbers or sets or possible worlds? Where will debates about their existence end up?

It is common that when I introduce the problem of VPs to people and tell them some of the responses offered over the decades, they think it silly that people could purport to know such a thing as that concrete possible worlds exist, that states of affairs exist, or the like. But I tell them that at least Lewis is well aware of this difficulty. That's why he takes the approach of an indispensability argument (as do many who are concerned with the existence of numbers), where we are committed to the entities' existence by our commitment to the theory that needs them. We do not know how to get at the truth of their existence any other way. This is a straightforward response someone concerned with this debate can give to what Yablo calls the practical question of *futility* for a given entity X: "[A]re debates about the existence of Xs as futile and pointless as they can sometimes seem?".

In his paper, Yablo is going a step further and asking the questions of *vacuity*: "[I]s anything genuinely at issue in debates about the existence of Xs? [I]s there a fact of the matter to be right or wrong about?" If the answer is 'no', then the VP debate is in serious jeopardy. If there is no fact of the matter about the existence of sets, possible worlds, or other fuzzy entities, then futility is an unavoidable *result* of vacuity. It begins to seem funny to call upon such entities in an explanation of VPs, and it begins to make the whole VP debate seem very meaningless.

By now, the reader is surely eager to hear what Yablo thinks. To kill the suspense, I will let you know right now: he thinks the answer to the question of vacuity is no. Why

does he think this? Well, to answer *that* question, we will need to get through quite a few details.

**2.1. The details.** First, we will need a few definitions. The concept of a presupposition is important to Yablo's account, so I will begin by giving it its standard interpretation (my construal).

A presupposition of a sentence  $\phi$  is a statement or sentence that is not a necessary truth, but whose truth is still entailed by both  $\phi$  and  $\neg\phi$ . In our discussion, the typical sort of presupposition we will see will be for sentences of the form 'S is P', 'Ss are Ps', or 'The S is a P', all of which have as a presupposition the statement 'There exists something that is an S' (as long as we understand 'Ss are Ps' to be something like 'Some Ss are Ps').

There is a strong (but not *entirely* accurate) intuition that if a statement has a false presupposition, then it itself is false. With this in mind, Yablo defines the concept of what it means for a sentence  $\psi$  with presuppositions  $\pi$  to *count as false*, while being  $\pi$ -free:

$\psi$  is  $\pi$ -free if it is false for reasons independent of  $\pi$  — for reasons that could still have obtained even had  $\pi$  been true. If by a falsity-maker for  $\psi$  we mean a truth-maker for its negation,  $\psi$  is  $\pi$ -free iff its falsity-makers are always compatible with  $\pi$ .

Of course, true sentences can also be  $\pi$ -free, and so we have the definition:

$\phi$  counts as true iff its negation implies  $\pi$ -free falsehoods, *while  $\phi$ 's  $\pi$ -free implications are one and all true.*

So a sentence need only imply one  $\pi$ -free falsehood to count as false and only  $\pi$ -free truths to count as true *plus* have a negation that counts as false. This condition is preferred over ' $\phi$  counts as true iff its negation counts as false' as it prevents a sentence such as 'The author of *Principia Mathematica* was bald' counting as both true and false.<sup>2</sup>

<sup>2</sup>A  $\pi$ -free implication of 'The author of *Principia Mathematica* was bald' is that all *PM* authors are bald and a  $\pi$ -free implication of its negation is that all *PM* authors are not bald. But both of these implications are

Once we have defined both counting as true and counting as false, we see that there are sentences such as ‘The King of France is bald’ which will count as neither true nor false. Thus a further category of sentence is defined.

$\phi$  counts as gappy iff it counts neither as true nor as false. . .

$\phi$  counts as gappy iff its  $\pi$ -free implications are all true and the same holds of its negation. This makes good intuitive sense; a sentence so tainted by its association with  $\pi$  that there is nothing left for it and its negation to disagree about when  $\pi$  is stripped away is not making an evaluable claim. When  $\phi$  makes no claim as a result of  $\pi$ 's failure, we say its presupposition fails catastrophically. This is the case where, as Strawson puts it, “the whole assertive enterprise is wrecked” by  $\pi$ 's falsity.

The reader will note that, to this point, Yablo has been talking about *counting as true* and *counting as false*, but he has been ignoring genuine truth and falsity. Thus he defines a bridge principle that helps to get from “counting as” to “being”.

BRIDGE PRINCIPLE:  $\phi$ 's assertive (allegational, at-issue) content is the sum total of its  $\pi$ -free implications; equivalently  $\psi$  is part of  $\phi$ 's asserted (...) content iff  $\psi$  is a  $\pi$ -free implication of  $\phi$ .

The reason having a false  $\pi$ -free implication makes  $\phi$  count as false is that something false is *asserted*. Recall that  $\phi$  makes a claim iff at least one of  $\phi$ ,  $\sim\phi$  counts as false; let's now add that *the claim  $\phi$  makes* when this condition is met is its assertive content. Then the above explanations of counting as true (false, gappy) boil down to this:

(C)  $\phi$  counts as true (false) iff  $\phi$  makes a true (false) claim.  $\phi$  counts as gappy iff it makes no claim.

...The charge [that “counting as” is not the same as “being”] is correct but it ignores that  $\phi$ 's counting as true (false) goes with the genuine truth (falsity) of the claim  $\phi$  makes.

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false as Russell was not bald and Whitehead was. So, without the more careful condition for counting as true, ‘The author of *Principia Mathematica* was bald’ would have counted as both true and false.

With all this terminology defined, we get to Yablo's main point: When the existence of ontologically unsuspecting entities is presupposed in a statement, the presupposition usually fails catastrophically. However, for the entities of interest in metaphysical ontology, we see when their existence is presupposed their presuppositions seem *never* to fail catastrophically. Yablo gives a model here.

Suppose that our interest in *Xs* stems mainly from the role *X*-expressions play in sentences of a certain type: *X*-sentences, let's call them. Suppose that *Xs* are presupposed by *X*-sentences and that the presupposition is fail-safe in the following sense: if  $\phi$  is an *X*-sentence, then  $\phi$ 's assertive content is the same, and has the same truth value, whether *Xs* exist or not. Then there is nothing to determine whether the *X*-expressions in *X*-sentences refer, and to that extent, nothing to determine whether *Xs* exist.

This last step might puzzle the reader. How could an *X*-sentence's not referring show that there is nothing to determine whether *Xs* exist? How is he going beyond mere the mere futility of determining reference to the deep vacuity of determining existence? Yablo has a reason for saying this. He thinks that if it's indeterminate that a term refers, then it's an odd thing to say that its candidate referent determinately exists. If it determinately exists, then it would seem that the term *must* either refer or not refer. So the mere fact that the term does not determinately refer, that its existence or non-existence does not change the truth value of a sentence, seems to entail that there must simply be *no fact of the matter whether the entity mentioned exists*. There are several entities that fit into this model. The two that will be of most concern to us are numbers and, of course, possible worlds.

For numbers, Yablo provides the example 'The number of planets is odd'. This has the presupposition that there is a number that represents how many planets there are, and it has as a  $\pi$ -free implication 'There is exactly one planet or there are exactly three planets or there are exactly five planets or etc. ...' whose truth depends on just how many planets there are, not on whether or not numbers exist.

For Lewisian possible worlds, Yablo provides the example ‘There is a possible world where pigs fly’. This has the presupposition that there are Lewisian possible worlds, and it has the  $\pi$ -free implication ‘It is possible for pigs to fly’ whose truth depends solely on whether or not it’s possible for pigs to fly, not on whether or not there are Lewisian possible worlds. This is great news for the Menzelian view.

### 3 Of Mice and Men?

If Yablo is correct, then we may learn something interesting about the relevance of Menzel’s view. Menzel’s account gives us truth conditions for modal statements that do *not* presuppose the existence of funny entities like the possible worlds of either Lewis or the ersatzists. If there is no fact of the matter about the existence of such entities, then, perhaps, to get a fully coherent view of modality, the *best we can do* is use truth conditions much like those laid out by Menzel. Menzel would be vindicated in claiming that there does not appear to be a distinguished, correct model upon which modal reality is founded. Such would be grand. However, there are some objections to this that may be quite serious.

**Is indispensability a workaround?** One of the legitimate complaints about Lewis was that his approach, in particular the use of an indispensability argument, is not likely to get us to truth. An indispensability argument tells us what we are committed to, or what we ought to be committed to, but it does not tell us what exists.

While this in one sense seems damning, perhaps this gives Lewis and his kind a way out. Perhaps they are not so much interested in what *does* exist, but they are interested *only* in what we are committed to or what we ought to be committed to. They can concede that Yablo or Menzel have pointed out that there is no fact of the matter about the correctness of their sorts of responses, but perhaps they are still right in saying that we are committed to the existence of certain entities. All that would be needed to entail *that* is that their theories are the best theories and that the indispensability argument is valid. I think that Menzel’s account gives us good reason to think that a primitivist

theory is more powerful, correct, and thus better than a theory such as Lewis's, and thus the sort of theory we might be committed to by way of an indispensability argument, but I might be able to be moved from this position.

**Can Menzel and Yablo work together?.** Menzel's truth conditions do not presuppose the existence of the possible worlds of Lewis or the possible states of affairs of Plantinga. This much is certainly true. However, they *do* presuppose the existence of something like numbers or sets. Menzel thinks that these objects are less ontologically untoward than the funny entities used by Lewis or Plantinga. However, on Yablo's model, numbers and sets *are* every bit as ontologically suspect as the ones Menzel is trying to avoid. This is problematic. Perhaps the correct reformulation of the indispensability argument can get Menzel some entities that will have enough structural similarity to numbers and sets that he will be able to keep his truth conditions. Or perhaps one can argue that the indispensability argument is still sound for numbers and sets but not for the VP candidates (that Menzel's theory of modal truth is minimal seems to be evidence of the second point, as mentioned just a moment ago). But this is an important puzzle. I think Chalmers gives us a useful answer that I will cover below.

**Are all VP-responses excluded by Yablo's model?.** Is it true that every suggestion for a VP has no fact of the matter about its existence in Yablo's model? What about those who claim that VPs are propositions or sentences of the correct sort? It's unclear to me that a sentence which presupposes the existence of propositions or sentences could have any  $\pi$ -free implications. Given that, it would seem we would not be able to exclude such VP-responses on the charge of having indeterminate existence. At best, Yablo's model might then just give us that any sentences about such claims are gappy. This would be nice, but it would seem to be not nice enough, or perhaps only cute.

**Does Yablo's account make sense?.** There are two potential worries for Yablo's account, but there seem to be ways to get around them.<sup>3</sup>

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<sup>3</sup>Though part of the response here is mine, Professor Yablo gets the credit for showing me that these objections are not successful.



Yablo thinks that ‘The number of planets is odd’ has ‘There is exactly one planet or there are exactly three planets or there are exactly five planets or...’ as a  $\pi$ -free implication. But is that really a  $\pi$ -free implication? Does the latter sentence not presuppose the existence of numbers? Yablo is drawing a distinction between ‘There exists a number such that it bears a relationship to a quantity’ and ‘There exists a quantity’. But are quantity-hood and numberhood really that distinct? It seems there is room to argue that they are not. However, this objection can be easily met by the fact that sentences such as ‘There are exactly three planets’ can be expressed easily in first-order logic with identity, to wit ‘ $\exists x \exists y \exists z ((Px \& Py \& Pz) \& (x \neq y \neq z) \& \neg \exists v (Pv \& v \neq x \neq y \neq z))$ ’, and this expression clearly does not presuppose the existence of numbers.

The problem I think might seem even stronger when one turns attention towards the concrete possible worlds of Lewis. Lewis does not merely say ‘There is a possible world where pigs fly’, but he also says that ‘It is possible that  $\phi$  iff there is a possible world wherein  $\phi$  is true’. Yablo says that ‘There is a possible world where pigs fly’ has ‘It is possible for pigs to fly’ as a  $\pi$ -free implication. But, for Lewis, it would appear that this implication is *not*  $\pi$ -free, as, on Lewis’s account, it itself implies that there is a possible world where pigs fly. This objection is met, however, when it is recalled that a key aspect of Yablo’s account is that the  $\pi$ -free implications are *analytic implications*. Now, Lewis would indeed say that ‘Possibly pigs fly’ means nothing more than ‘There is a possible world where pigs fly’, which would seem to imply that the relationship between the two statements is analytic entailment. But the fact that it is actually not analytic entailment reveals itself in noticing that Lewis arrives at that meaning through an indispensability argument (whose premises are of a completely contingent flavor), not by pure deduction. If a better and more serviceable theory comes along, Lewis would be forced to admit it and allow the theory to supplant his own, and he would obediently argue that we are committed to a different meaning of ‘Possibly  $\phi$ ’ that does not involve the existence of concrete possible worlds.

**3.1. Help from Chalmers.** As an answer to the question of whether Yablo and Menzel can work together, I think we get an interesting response from Chalmers.

Chalmers (2009) presents a position in league with that of Yablo. He calls the idea that there is no fact of the matter about certain ontological existence questions “ontological anti-realism”. The rationale Chalmers uses for this view is that he thinks the ‘ $\exists$ ’ is misunderstood in a key sense. Ontological realists think that there is an ‘ $\exists$ ’ such that it can quantify over absolutely everything, or, in particular, a certain metaphysically fundamental domain of entities. When one asks if numbers exist in the big picture way of metaphysics, she is asking if numbers are in that domain. When one asks if there are Lewisian possible worlds, or if there are mereological sums, or if there are entities that ground modal truth, then the question becomes “Is it true that  $\exists x(x$  is [one of the entities in question])?”, where the quantifier is ranging over this absolute domain.

Chalmers thinks that the concept underlying this sort of quantifier is defective for he doesn’t think that there really is such an absolute domain. As he writes:

Once things are cast this way, one can see that the ontological realist is committed to a very strong claim about the fundamental structure of reality. On this view, the fundamental structure of reality involves, or at least determines, an absolute domain of entities. By contrast, the ontological anti-realist holds that the fundamental structure of reality is less rich than this: it does not involve or determine an absolute domain of entities. The world may have structure of many sorts, but an absolute domain is not among that structure.

In any case, it is clear that there is no straightforward argument from logical semantics to the determinate truth of quantified statements. If anything, once things are viewed this way, it appears that the ontological realist is faced with a potential explanatory mismatch between semantic theory and metaphysics, one that requires a strong further commitment to resolve.

It is obvious that this is quite a different approach from that of Yablo. But no matter, the important point is that it is the same sort of view with the same sort of demand: “If we’re not convinced about VPs, then how can we understand the truth of modal claims?”. Chalmers realizes this and begins to sketch out his own view using something he calls a *furnishing function*. The details of this, though fascinating, are not particularly relevant here. What *is* relevant is that we are seeing an ontological anti-realist explicitly using mathematical objects in his semantics. This is precisely the sort of conflict that concerned me for an ontological anti-realist interested in Menzel’s truth conditions. Here is how Chalmers attempts to explain this away.

In response: ontological realism about these entities is not required. When I have discussed these entities, I have been making ordinary existence assertions, not ontological existence assertions. When I have done so, I have been working within a liberal framework with a furnishing function that admits all sorts of abstract objects. In fact, whenever I do philosophy (and especially the philosophy of language), I work within such a framework.

Just as it is hard to do mathematics without appealing to numbers, it is hard to do philosophy without appealing to abstract entities.

But doesn’t this give up the game to the likes of Lewis? If our best philosophical theories require such a framework, are we not committed to these sorts of entities mentioned within them? Chalmers writes:

Perhaps there is some indispensability argument that starts from the premise that appeal to abstract objects is indispensable in various areas of science, mathematics, and philosophy, and concludes that ontological realism is true of abstract objects. At the moment, however, I cannot see how such an argument would go. Such an argument might reveal the indispensability of working within a liberal framework in order to do science, mathematics, and philosophy. But that is a very different conclusion.

And this is an interesting insight that seems fully in the spirit of the objection to Lewis's use of an indispensability argument, Menzel's objection to the position that there is a distinguished model for modal truth, and the ontological anti-realists denial of there being absolute domain. Why should we be committed to the existence of funny entities just because of the way we talk? Philosophers, mathematicians, and scientists frequently use all sorts of metaphor and analogy to express themselves, but this is usually not considered their genuine work. But where precisely can that line be drawn? If the primitivist is right, we can at best characterize modality, we cannot analyze it. The entities we use for a characterization hardly seem to be the sorts of entities to whose existence we are committed. We postulate them and manipulate them, but are we ever required to think they really exist?

For instance, a mathematician talks about numbers. But, when scrutinized, it can be seen that the mathematician is usually only directly talking about sets of a certain sort in order to stay relevant to the axioms of ZFC. There is a fair bit of choice about which sets to choose, and no philosophically acute mathematician thinks those sets are numbers (see Benacerraf (1965)). However, mathematical theorizing does seem to be about something, though it seems we have difficulty talking about it directly. But in this sort of theorizing we are merely defining our terms to communicate within our framework. We may be interested in a framework of that sort due to some beliefs held outside of it, but that does not mean we are committed to the existence of the entities within the framework, only the facts they reflect about the beliefs held outside it.

Thus, we can think of Menzel's truth conditions as relying on modal intuitions outside the framework of mathematical objects, but employing mathematical objects to illustrate that naïve possible world semantics do not commit us to possibilia. Mathematical objects are not essential to his story; any structure that could be employed to mirror modal facts would do just as well. Perhaps one could demonstrate that there are no objects besides mathematical ones that could illustrate this sort of point, but this seems unlikely and beside the point. Chalmers seems to be on to something to say that an indispensability argument never be able to counter the claim that we are not committed

to the existence of the entities essential to our theorizing, only the entities essential to our theories. And the ontological anti-realist has no particular theory about the entities of reality. Thus it would appear that Menzel's truth conditions do not by any necessity run counter to the intuitions of the ontological anti-realist, but do provide a useful way for her to talk about modal truth.

## CHAPTER III

## CONCLUSION

My goal in this thesis has been to lay the groundwork for an understanding of what may be lacking in a response to the question of what are VPs, the things that ground modality, that assumes that VPs exist (or are at least knowable in some meaningful way). To do this, I presented Lewis's important view, and along the way I found occasion to sketch the views of his opponents who disagree with him about what VPs are. I then moved to discuss those who might think that both Lewis *and* his opponents are barking up the wrong tree with their response to the question "What are VPs?". According to Menzel, such a response might be misguided for assuming that there is a distinguished model of VPs. According to Yablo, such a response might be misguided for assuming that the entities purported to be VPs are capable of having a fact of the matter about their existence. These two views, in some senses, seem like they can play along with each other quite well. *Prima facie*, the one gives credence to the other and forces us to accept that the best we can have are minimal truth conditions for modal statements. But, upon closer examination, the two views might not work perfectly together. I ended with trying to answer some potential objections to one who wants to hold Yablo's view that there is no fact of the matter about the existence of VPs, while still thinking that, for the reasons Menzel presents, the semantics of S5 correctly mirror the modal facts. It seems to me that the challenges coming from Menzel and Yablo force us to think more carefully about what we think we know about modal reality in a fruitful way. To continue examining these views and rethinking the VP debate should be a fruitful pursuit.

## REFERENCES

- Benacerraf, P. (1965). What numbers could not be. *Philosophical Review*, 74, 47–73.
- Benacerraf, P. (1973). Mathematical truth. *Journal of Philosophy*, 19, 661–79.
- Chalmers, D. (2009). Ontological anti-realism. In D. Chalmers, D. Manley, & R. Wasserman (Eds.), *Metametaphysics: New essays on the foundations of ontology*, pages 77–129. Oxford: Oxford University Press.
- Colyvan, M. (Fall 2008). Indispensability arguments in the philosophy of mathematics. In E. N. Zalta (Ed.), *The Stanford encyclopedia of philosophy*.  
URL <http://plato.stanford.edu/archives/fall2008/entries/mathphil-indis/>
- Cresswell, M. & Hughes, G. (1996). *A new introduction to modal logic*. London: Routledge.
- Dummett, M. (1973). *Frege: Philosophy of language*. New York: Duckworth.
- Garson, J. (Winter 2008). Modal logic. In E. N. Zalta (Ed.), *The Stanford encyclopedia of philosophy*.  
URL <http://plato.stanford.edu/archives/win2008/entries/logic-modal/>
- Goodman, N. (1955). *Fact, fiction, and forecast*. Cambridge, MA: Harvard University Press.
- Kripke, S. (1959). A completeness theorem in modal logic. *Journal of Symbolic Logic*, 24, 1–14.
- Lewis, D. (1986). *On the plurality of worlds*. Oxford: Basil Blackwell.
- McMichael, A. (1983). A new actualist modal semantics. *Journal of Philosophical Logic*, 12, 97.
- Menzel, C. (1990). Actualism, ontological commitment, and possible world semantics. *Synthese*, 85, 355–389.
- Menzel, C. (1991). The true modal logic. *Journal of Philosophical Logic*, 20(3), 331–374.
- Plantinga, A. (1976). Actualism and possible worlds. *Theoria*, 42, 139–60.
- Quine, W. V. O. (1968). Propositional objects. *Critica*, 2, 3–22.
- Sider, T. (2002). The ersatz pluriverse. *Journal of Philosophy*, 99, 279–315.
- Sider, T. (2003). Reductive theories of modality. In M. J. Loux & D. W. Zimmerman (Eds.), *The Oxford handbook of metaphysics*, pages 180–208. Oxford: Oxford University Press.

- van Inwagen, P. (1986). Two concepts of possible worlds. In P. French, T. E. Uehling, Jr., & H. K. Wettstein (Eds.), *Midwest studies in philosophy xi: Studies in essentialism*, pages 185–213. Minneapolis: University of Minnesota Press.
- Yablo, S. (2009). Must existence-questions have answers? In D. Chalmers, D. Manley, & R. Wasserman (Eds.), *Metametaphysics: New essays on the foundations of ontology*, pages 507–526. Oxford: Oxford University Press.



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