What does nihilism tell us about modal logic?*†

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Abstract

Brauer (2022) has recently argued that if it is possible that there is nothing, then the correct modal logic for metaphysical modality cannot include D. Here, I argue that Brauer's argument is unsuccessful; or at the very least significantly weaker than presented. First, I outline a simple argument for why it is not possible that there is nothing. I note that this argument has a well-known solution involving the distinction between truth in and truth at a possible world. However, I then argue that once the semantics presupposed by Brauer's argument is reformulated in terms of truth at a world, we have good reasons to think that a crucial semantic premise in Brauer's argument should be rejected in favour of an alternative. Brauer's argument is, however, no longer valid with this alternative premise. Thus, plausibly Brauer's argument against D is only valid, if it is not sound.

1 Introduction

Let *metaphysical nihilism* be the view that absolutely nothing exists—no concrete objects, properties, propositions, states of affairs, and so on. According to Brauer (2022), this view is false, but it could have been true. In fact, Brauer argues that the very possibility of this view has startling consequences for the logic of metaphysical modality: if metaphysical nihilism is even possible, then the correct modal logic for metaphysical modality cannot be any stronger than the logic D. Here, I argue that Brauer's argument is unsuccessful; or at least significantly weaker than presented. In short, I argue that if we take care to formulate

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our modal semantics, then we have good reasons to think that Brauer's argument is valid only if it is unsound.

Here's how I proceed. First, I outline Brauer's (2022) argument as it is presented (§2). I then present some simple arguments for why, contrary to Brauer's claims, metaphysical nihilism is not possible (§3). I show that these arguments most plausibly suggest that we should carefully formulate our modal semantics in terms of the notion of truth *at* a world, not truth *in* a world (§4). Therefore, I reformulate Brauer's argument in terms of this notion (§5), but then argue that the reformulated argument is plausibly not sound—I outline a comparative case for why we should accept a competing semantic premise governing possibility over the crucial semantic premise in Brauer's argument (§§6–8).

2 Brauer's Argument Against D

First, I present Brauer's argument against D and some preliminary principles presupposed in his argument. Brauer begins by considering the following claim.

Nothing exists. (N)

(N) is not true; but Brauer maintains that (N) could have been; or at least, the possibility of (N) is a live enough one that we should be interested in what follows from its possibility (2022: 2751). Brauer names the claim that (N) is possible:

It is metaphysically possible that nothing exists. (PN)

The core of Brauer's paper then purports to establish that if (PN) holds, the correct logic for metaphysical modality cannot be as strong as D. What then is the logic D? The language of D is the language of propositional modal logic ($\mathcal{L}_\rho$) which we define recursively as follows from a countably infinite stock of propositional letters $p_1, p_2, p_3, ...$, with the usual abbreviations for the logical connectives $\wedge$, $\rightarrow$, and $\leftrightarrow$.

$$\phi := p_i \,|\, \neg p_i \,|\, p_i \vee p_j \,|\, \Box p_i \,|\, \Diamond p_i$$

We define the logic D as an extension of K. The logic K consists of the set of theorems ($\vdash \phi$) resulting from the following axiomatic base and rules of inference, where ϕ and ψ are both well-formed formulae of $\mathcal{L}_\rho$.

(PL) If ϕ is a tautology, then $\vdash \phi$.

(MP) If $\vdash \phi$ and $\vdash \phi \rightarrow \psi$, then $\vdash \psi$.

(NR) If $\vdash \phi$, then $\vdash \Box\phi$.

(K) $\Box(\phi \rightarrow \psi) \rightarrow (\Box\phi \rightarrow \Box\psi)$ is an axiom.

(OP) $\Box\phi \leftrightarrow \neg\Diamond\neg\phi$ is an axiom.

D extends K with the following axiom scheme.

(D) $\Box\phi \rightarrow \Diamond\phi$ is an axiom.

That is, the logic D is defined here to be set of theorems resulting from the axioms of K and (D) by zero or more applications of the inference rules of K.

How does Brauer shows that if (PN) is true, D is not the correct logic for metaphysical modality? There are two crucial ideas at play. First, I take it that Brauer's argument is assuming, as I think is correct, that a necessary condition for a modal logic being correct for metaphysical modality is that the theorems of such a logic should be true *simpliciter*, provided the modal operators are interpreted in terms of metaphysical modality, the logical connectives are interpreted as standard, and we uniformly replace sentences of the formal language with sentences of natural language. Let's call such a uniform substitution and interpretation of a theorem a *metaphysical instance*, or *instance* for short, e.g.,

$$\Box(\text{Sally is a cat}) \rightarrow \Diamond(\text{Sally is a cat})$$

is an instance of the distinctive axiom—and theorem—of D, whereas

$$\Box(\text{Sally is a cat}) \rightarrow \Diamond(\text{Sally is fat})$$

is not—in the latter case, ϕ is not uniformly replaced in the theorem. If D is the correct logic for metaphysical modality, then the former is true. Of course, we should also want

it that if D is the correct logic for metaphysical modality, then the former is *logically* true, see (Salmon, 1989: 29). However, for our purposes we focus only on the following simpler necessary condition for a logic $\mathcal{L}$ being correct for metaphysical modality.

If $\mathcal{L}$ is correct for metaphysical modality, then any instance of an $\mathcal{L}$-theorem is true (L)

I take it that little of this needs much motivation—if certain theorems of some logic $\mathcal{L}$ are false when appropriately interpreted, then $\mathcal{L}$ cannot be the correct logic for the modality involved in that interpretation.

The second crucial part of Brauer's argument against D is showing that if (PN) is true, there are false instances of theorems of D and thus, by (L), D cannot be the correct logic for metaphysical modality. Adopting a possible worlds semantics for metaphysical modality in which possible worlds are ersatzist maximally consistent states of affairs (2022: 2752), Brauer notes that it's possible that nothing exists, i.e., (PN) is true, only if there is a consistent state of affairs S and it is true relative to S that (N). Brauer then considers what must also be true in S:

> Since nothing exists, there cannot be any states of affairs, and in particular, there cannot be any maximal consistent states of affairs. That is, in S it is true that there are no possible worlds, and thus nothing is possible (Brauer, 2022: 2754)

In detail, Brauer assumes the following semantic clause for metaphysical possibility.[1]

$\Diamond\phi$ is true at w iff it is true at w that there is a world v and ϕ is true at v (P)

Here, ϕ is schematic for any natural language declarative sentences. Crucially, since S is a possible world where (N) is true, it follows from (P) that nothing is possible relative to S. That is, given (N), no states-of-affairs-cum-possible-worlds exist at S. Thus, by (P):

For any ϕ, $\Diamond\phi$ is false relative to S (No-P)

[1]Note that (P) is taken as a crucial element of a *philosophical* theory of modality—a theory which tells us the conditions under which modal claims in natural language are genuinely true or false. As such, world variables here range over genuine possible worlds—a special state of affairs. Note also that throughout (Brauer, 2022) and this paper, world quantification is understood as first-order quantification. It is beyond the scope of this paper to justify this first-order approach over a higher-order one; but I here simply follow suit with Brauer's approach. Thanks to an anonymous reviewer for noting this.

Now, as Brauer notes, (No-P) rules out D as correct. (No-P) entails, for instance, that

$$\Diamond\text{(The number two is even or the number two is not even) is false relative to } S \tag{1}$$

Since metaphysical necessity is truth at all possible worlds, (1) entails:

$$\neg\Box\Diamond\text{(The number two is even or the number two is not even)} \tag{2}$$

(2) entails that D cannot be the correct logic. It is a theorem of D that $\Box\Diamond\top$, where $\top$ is some tautologous sentence. Thus, by a simple application of (L), (2) is false, if D is the correct logic for metaphysical modality. However, Brauer has established that (2) is true; or at least, (2) is true if (PN) is true.

Brauer's argument is simple, elegant, and, at first glance, convincing. Although Brauer is clear that his argument makes some assumptions, many of the assumptions involved in the argument are widespread. Of particular interest is the fact that these assumptions are less substantial than other assumptions used in extant arguments against strong modal logics—for instance, assumptions about origin essentialism in Salmon's (1989) argument against $\mathsf{S4}$ or assumptions about the determinacy of natural kind terms like 'unicorn' in Dummett's (1993) argument against B. Indeed, some of Brauer's assumptions are even dispensable—there is nothing, for instance, essential to Brauer's argument that worlds are *states of affairs*. The argument simply turns on the fact that were nothing to exist, possible worlds would not, regardless of what possible worlds are.

Brauer rigorously lays out this argument premise by premise, defending each premise in turn. However, for now, an overview of the premise-by-premise argument is not necessary. Instead, I want to pause and consider one aspect of Brauer's argument in more detail and that is the consistency of (N), since it instructively allows us to explore important issues about the notion of truth at play in Brauer's modal semantics.

3 (N) is inconsistent

Central to Brauer's argument is the claim that (PN) is true, i.e., the claim that (N) is consistent. After all, if we had good reason to deny the consistency of (N), it would be rather pointless understanding what followed from the consistency of (N). Now, for Brauer, *consistency* is not merely logical consistency, but instead a metaphysical kind of consistency. Brauer's claim that (N) is consistent can be understand as the claim that (N) is metaphysically possible—he writes that '[c]onsistency in the relevant sense really is nothing other than metaphysical possibility' (Brauer, 2022: 2752). Now, Brauer offers three considerations in favour of the consistency of (N), though here, I will not discuss these considerations in any detail, see (Brauer, 2022: 2755–59). Instead, I outline some simple arguments which are not considered by Brauer *against* (N)'s consistency.

An important question we should ask is what sort of entity '(N)' picks out. On this question, Brauer says very little. However, he does indicate at several points that '(N)' must pick out, at the very least, some truth-apt entity. That is, in spelling out the argument given in §2 above, Brauer writes that 'On its face, (N) is consistent, so there is a consistent state of affairs where (N) is true.' (Brauer, 2022: 2754). There are, then, two options for understanding (N), which together are exhaustive:

- '(N)' picks out a proposition.
- '(N)' picks out a sentence.

The problem, as I now argue, is that (N) is in fact *inconsistent*, understood either way.

First, let's assume that '(N)' picks out a proposition. Naturally, this is the proposition expressed by 'Nothing exists'. From here on, let's simply denote this with bracket notation as '$[(\mathrm{N})]$'. Now, a compelling modal principle governing propositions is the so-called necessitated truth schema, which we can express as the following scheme.

$$\Box(\mathrm{T}[\phi] \leftrightarrow \phi) \tag{T}$$

Here ϕ is schematic in (T) for any declarative sentence and we understand the relevant modality as metaphysical. One obviously relevant instance of (T) for the purposes of this

paper takes ϕ to be 'Nothing exists'. In other words:

$$\Box\big(\mathrm{T}[(\mathrm{N})] \leftrightarrow (\mathrm{N})\big) \tag{T^N}$$

Clearly, if we accept (T), we must accept that, necessarily, if $[(\mathrm{N})]$ is true, then nothing exists. However, if nothing exists, then nothing *including* the very proposition $[(\mathrm{N})]$ exists. That is to say the following, where $\ulcorner\mathrm{E}\urcorner$ is an existence predicate which we can either take as primitive, or defined in terms of existential quantification over the relevant domain, in this case the domain of propositions.

$$\Box\big((\mathrm{N}) \rightarrow \neg\mathrm{E}[(\mathrm{N})]\big) \tag{E}$$

Immediately, we can see that (T^N) and (E) entail that $[(\mathrm{N})]$ is true only if it does not exist. However, this is inconsistent with the so-called principle of serious actualism—the view that it is impossible for an object to exemplify a property and not exist.[2] This principle entails the following:

$$\Box\big(\mathrm{T}[(\mathrm{N})] \rightarrow \mathrm{E}[(\mathrm{N})]\big) \tag{SA^N}$$

(SA^N) and (E) jointly entail that $[(\mathrm{N})]$ is not possibly true. In conjunction with (T^N), this entails that $[(\mathrm{N})]$ is not metaphysically possible, i.e., $\neg\Diamond$(Nothing exists).

Now, of course, nothing mandates us taking '(N)' to pick out a proposition. An alternative is that '(N)' picks out a sentence. Understood in this way, '(N)' could either pick out a sentence token, some concrete inscription of 'Nothing exists', or a sentence type, some kind of abstract entity. In either case, though, it is straightforward to run the same argument as above. Suppose we think '(N)' picks out a sentence token, call it 'N_{to}'. Plausibly, again, we

[2]Serious actualism appears in the literature under many different guises, most notably Williamson has recently defended the principle under the label 'The Being Constraint', see (Williamson, 2013b: Chp. 6). Typically, the view is expressed as the following scheme, where R is schematic for any n-place predicate.

(SA) $\Box\forall x_1\Box...\forall x_n\Box(Rx_1...x_n \rightarrow \bigwedge_{i=1}^{n} \exists y_i(y_i = x_i))$

For prominent defences of (SA), see (Stephanou, 2007), (Williamson, 2013b), (Kment, 2014), and (Jacinto, 2019). Note, we can also motivate (SA^N) by appealing to the weaker idea that a *proposition* must exist to be *true*. This idea is endorsed in (Prior, 1957: 34), (Adams, 1981: 18, 1986: 322), (Plantinga, 1983: 15), (Loptson, 1996), (Williamson, 2002: 233-34), (Turner, 2005: 191), (Stalnaker, 2012: 42–51), and (Einheuser, 2012: 3–4).

can motivate the following two claims, where $\mathrm{T}(N_{\text{to}})$ and $\mathrm{E}(N_{\text{to}})$ are read as N_{to} is true and N_{to} exists, respectively.

$$\Box\big(\mathrm{T}(N_{\text{to}}) \rightarrow \mathrm{E}(N_{\text{to}})\big) \tag{3}$$

$$\Box(\mathrm{T}(N_{\text{to}}) \rightarrow \neg\mathrm{E}(N_{\text{to}})\big) \tag{4}$$

(3) again follows from serious actualism and (4) follows from the fact that necessarily if N_{to} is true, then *nothing at all* exists. (3) and (4) jointly entail that N_{to} is not possibly true. In the case where '(N)' picks out a sentence type, call it 'N_{ty}', nothing much is different, since Brauer is clear that if (N) is true, then nothing exists, including abstract objects. Thus, both of the following are true.

$$\Box\big(\mathrm{T}(N_{\text{ty}}) \rightarrow \mathrm{E}(N_{\text{ty}})\big) \tag{5}$$

$$\Box(\mathrm{T}(N_{\text{ty}}) \rightarrow \neg\mathrm{E}(N_{\text{ty}})\big) \tag{6}$$

(5) and (6) jointly entail that N_{ty} is not possibly true.[3]

Now, if neither N_{to} nor N_{ty} are possibly true, then plausibly neither are possible. Of course, for this further conclusion, we need some principle which connects the possible truth of N_{to} or N_{ty}, to the straight possibility of N_{to} or N_{ty}, respectively. For this, we need a sentential version of the (T) schema above. In formulating such a principle, we need to qualify these principles to avoid paradox, but the details can be left unspecified for our present purposes. That is, we need to appeal to the principle that, for any appropriate sentence token or type s, s is true if and only if s. It is clear that the relevant sentence token and type for our discussion are appropriate, i.e., not paradox prone.

Thus, regardless of which kind of truth-apt entity we take '(N)' to pick out, we cannot

[3]There is an alternative argument for the inconsistency of (N). For this, we appeal to two plausible principles. These principles could be seen as consequences of (T) above, but here we distinguish between a sentence token and sentence type version, where for convenience we write $[N_{\text{ty}}]$ and $[N_{\text{to}}]$ for the proposition expressed by N_{ty} and N_{to}, respectively.

(7) $\Box(N_{\text{ty}}$ is true iff $[N_{\text{ty}}]$ is true)

(8) $\Box(N_{\text{to}}$ is true iff $[N_{\text{to}}]$ is true)

Yet, the proposition [Nothing exists] is not possibly true. Thus, neither N_{ty} nor N_{to} are possibly true.

take (N) to be possible—that is, (N) is inconsistent. The arguments presented here against the consistency of (N) only appeal to a few, otherwise compelling principles about truth, propositions, and sentences, and the thesis of serious actualism which is widely accepted in the literature. Moreover, such principles do not introduce any untoward assumptions about possible worlds. However, it's important to stress that I raise this argument against the consistency of (N), not to undermine Brauer's argument *per se*, but to show that the modal semantics presupposed in Brauer's argument must be carefully formulated to avoid these issues. As I will argue, it is complications which arise for this reformulated modal semantics which ultimately casts doubt on whether Brauer's argument is successful, but first we should spend some time thinking about how to outline an acceptable semantics that allows for the consistency of (N).

4 Securing the consistency of (N)

In the last section, I argued that (N) is inconsistent. The argument I raise is not discussed by Brauer, though Brauer does discuss a similar objection to the consistency of (N) which assumes that a *state of affairs* must exist to obtain (Brauer, 2022: 2758–59). Brauer concludes that, although he feels the intuitive pull of the idea, it is coherent to deny that a state of affairs must exist to obtain. Moreover, intuitions alone do not adequately settle matters. Fundamentally, Brauer is instead concerned with charting 'the modal-logical implications of accepting or rejecting such intuitions' (2759). What's interesting, however, is that the kind of argument I raise against the consistency of (N) above is strikingly similar to worries ones encounters with so-called possible singular negative existentials, i.e., possible claims about some individual in particular not existing, and the dominant response to such problems is to draw a distinction between truth in, and truth at, a possible world. That is, such arguments are typically taken to have a direct bearing on how we ought to set up a possible worlds semantics and thus a direct bearing on how we understand the very modal-logical implications of the possibility of nihilism. It is presently important, then, to better understand the implications of the argument in §3—how should we establish the consistency of (N)?

First, consider the problem posed by singular negative existential propositions. Consider

the proposition [John does not exist]. Many so-called propositional contingentists think that such a proposition only contingently exists. In particular, a common idea is that a proposition like [John does not exist] only exists if John himself exists. More generally, if any proposition is singularly about some objects, then that proposition only exists if those objects themselves exist.[4] Accordingly, if we accept that some things only contingently exist and there are propositions singularly about them, we must conclude that some propositions themselves only contingently exist.[5] Now, there are various ways of motivating this idea, but the details are unimportant for the purposes of this paper. What I want to emphasise here is that we very quickly encounter parallel problems to those raised for (N) in §3 but in this case for singular propositions about contingent existents. Here's the idea. [John does not exist] is true, plausibly, if and only if John does not exist. After all, [John does not exist] is the proposition *that* John does not exist. However, [John does not exist] itself exists if and only if John himself exists. Supposing, as we did in §3, that propositions can only be true if they exist, we must therefore conclude that the proposition [John does not exist] is not possibly true: if [John does not exist] is true, John exists and thus [John does not exist] is false and if John does not exist, then [John does not exist] does not exist and so cannot be true. As such, contrary to our robust intuitions about contingency, it is thus not possible that John does not exist.[6]

Why is this problem for singular propositions about contingent existents relevant to our concerns here? It's relevant because a lot of philosophers have converged on a now well-known solution and, I contend, this solution has a direct bearing on how we should set up a possible worlds semantics for modality that can secure the consistency of (N) and therefore

[4]There are different ways of spelling out this dependence between proposition and object, depending in part on the particular account of singular proposition in play. Some, e.g., (Fine, 1980), (Kaplan, 1989), (Salmon, 1986), and (Soames, 1987), take propositions to be structured, containing the very objects they are about as constituents. Others, e.g., (Williamson, 2002) and (Speaks, 2012), assume that a propositions singularly about an object are essentially singularly about that object, and thus cannot exist without it. One also finds this view motivated by a view of the meaning of names being at least partially determined by their referents, see (Loptson, 1996) and (Speaks, 2012).

[5]This view—often know as propositional contingentism—has a long pedigree. It is found early in the work of Prior, see (Prior, 1967), and rigorously explored in (Fine, 1980). Defences of the view can be found in (Adams, 1981), (Fitch, 1996), (Cartwright, 1997), (Nelson, 2009, 2013), and (Speaks, 2012). For a recent, rigorous exploration of this view as a species of higher-order contingentism, see the work of Fritz (2016, 2017, 2018a, 2018b) and Fritz and Goodman (2016, 2017).

[6]For a nice discussion of this kind of problem, see (Turner, 2005), (Stalnaker, 2012), and (Einheuser, 2012).

the possibility of there being nothing. The crucial question these problems—the problem of singular propositions and the problems for the consistency of (N) in §3—raise is: how can we understand the metaphysical possibility of a claim without requiring that the claim be possibly true? The now well-known answer I want to discuss involves drawing a distinction between those propositions which are true *in* a possible world and those which are true *at* a possible world.

In broad strokes, here's the idea. A proposition is true *in* a world just in case it would be true, were that world actual. Since the truth of a proposition requires its existence, as we have assumed throughout, a proposition is only true in a world if it exists relative to that world. In contrast, a proposition can be true *at* a world without existing therein. It is common for this notion of truth at a world to be first outlined with the help of several metaphors. Most commonly, a proposition is said to be true at a world *from the perspective* of the actual world. Thus, Kit Fine famously draws the distinction as follows.

> We may put the distinction in terms of perspective. According to the outer notion [truth at a world], we can stand outside a world and compare the proposition with what goes on in the world in order to ascertain whether it is true. But according to the inner notion [truth in a world], we must first enter with the proposition in the world before ascertaining its truth (Fine, 1985: 194).[7]

Others have appealed to this idea that evaluating truth at a world involves a change of 'perspective', see (Adams, 1981: 22, 1986: 322), (Deutsch, 1990: 98), (Nelson, 2009b: 139–40), (Turner, 2005: 198–9). Alternatively, the idea is sometimes expressed as us having the propositions 'here', and thus we can settle their counterfactual status even in cases where they would not exist, see (Almog, 1986: 220) and (Cartwright, 1997: 77). Sometimes, the notion of truth at a world is taken to involve 'characterising' a world correctly, rather than what is strictly true in the world, e.g., (Werner, 2021: fn. 10)—the notion of truth at a world allows us to decide what a world 'implicitly' represents, see (Adams, 1981: 22), (Einheuser, 2012: 9), and (Kment, 2014: 102–3).

Regardless of how one spells out the notion metaphorically, the core idea is that we formulate our modal semantics in terms of a notion of world-relative truth which does not re-

[7] Fine's own terminology for the distinction has 'truth *in* a world' as 'outer truth' and 'truth *at* a world' as 'inner truth'. Here I have changed the terminology accordingly.

quire the existence of propositions at those worlds where they are true. Thus, we formulate a notion of metaphysical possibility which allows us to decouple the question of whether it is metaphysically possible for John to not exist from the question of whether it is metaphysically possible for the *proposition* that John does not exist to be true. Naturally, given how closely the problem arising from singular propositions and the problem of the consistency of (N) are, it's unsurprising that we can apply the notion of truth at a world in response to the issues I raised in §3—this solution seems ready-made for this kind of worry. The crucial idea: we decouple the question of whether it is metaphysically possible for there to have been nothing from the question of whether it is metaphysically possible for the *proposition* [Nothing exists], the sentence token N_{to}, or the sentence type N_{ty} to be true. That is, we accept that (N) cannot be true: its truth requires that it exists, ruling out its truth. However, (N) still captures something right about a counterfactual situation where nothing exists and (N) is true *at* such a world.

Of course, we can only connect the truth of (N) at a world with the *consistency* of (N) if we formulate our possible worlds semantics for modality in terms of truth at a world. In turn, then, we also need to reassess Brauer's argument against the backdrop of this reformulated modal semantics. This is the task of the next sections.

5 Reformulating Brauer's Argument

Earlier, I outlined a streamlined version of Brauer's argument. In this section, I outline Brauer's argument in detail and discuss how it should be understood now that it is clear that the possible worlds semantics employed by Brauer must appeal to the notion of truth *at* a world and not truth *in* a world.

The first premise of Brauer's argument remains unchanged. That is,

1. (N) is consistent Premise

Of course, we only accept (1.) because we accept that (N) is true *at* some possible world which, as Brauer understands them, is some maximal consistent state of affairs S. Thus, we make it clear in Brauer's second and third premise, that (N) is **true at** some state of affairs S and that S qualifies as a possible world:

2. (N) is **true at** some maximally consistent state of affairs S From 1

3. There is some possible world u such that (N) is **true at** u. From 2

Brauer's fourth premise is taken by Brauer to be a simple part of the possible worlds semantics—the principle (P) governing possibility outlined earlier:

(P) It is true at w that $\Diamond\phi$ just in case it is true at w that there is a possible world v such that ϕ is true at v (Brauer, 2022: 2754).

With the distinction between truth in and truth at a world in mind, however, (P) can be understood in two ways, depending on how we think about truth. First:

(P′) It is **true in** w that $\Diamond\phi$ just in case it is **true in** w that there is possible world v such that ϕ is **true in** v.

Alternatively, however, (P) can be understood to involve truth *at* a world. This is how I will understand it going forward. After all, Brauer needs a univocal notion of world-relative truth throughout the argument for it to be valid and we've seen that (1.) fails, unless talk of what goes on at worlds is talk of what is true *at* them.

The rest of Brauer's argument can largely be formulated as it stands in its original form, but we should be mindful that by 'true at' we mean 'true *at*':

5. It is not **true at** u that there is a possible world v such that $\top$ From 3

6. It is not **true at** u that $\Diamond\top$ From 4 and 5

7. If D is a sound modal logic, $\Diamond\top$ is **true at** every possible world.[8] Logic

8. D is not a sound modal logic From 6 and 7

The question of whether Brauer's argument is successful is now the question of whether *this* reformulated argument is successful.

[8]Note: Brauer formulates (7.) using 'true in' rather than using 'true at' as in the other parts of the argument.

6 Does the reformulated argument work?

Clearly, the reformulated argument is valid. Yet, whether it is sound depends on how we should think about the status of *modal* claims *at* possible worlds, i.e., whether (4) is true. Brauer's argument essentially turns on the idea that there are no true modal claims at any world where (N) is true. In other words, Brauer's argument turns on the following, where ϕ is an claim and w any world:

$$\text{If it is true at } w \text{ that (N), then it is true at } w \text{ that } \neg\Diamond\phi \qquad \text{(No-P}')$$

Here, (No-P′) is simply a generalisation of (No-P) in §2. Of course, it is clear that (P) entails (No-P′). But what can be said in favour of (No-P′), or more broadly (P)?

Of course, were some world w at which (N) is true actual, there would be nothing at all, and thus there would be no possible worlds. But we have already seen that we must utilise a notion of truth *at* a world which floats somewhat independently from what *would* be the case, were the world in question actual. Even still, however, there is something plausible about (No-P′) at first glance. Truth at a world is a notion which allows us to talk about what goes on at worlds somewhat independently of what *would* be the case, were the world actual. But not *completely independently*. That is, if it is true at a world that nothing exists, then, one might readily think, it must also be the case that it is true at the same world that there are no possible worlds. The thought would then go: unless we say that $\Diamond\phi$ is false at w, we are saying something which does not adequately characterise w. After all, there are no possible worlds *at* w, so how could there be modal truths at w?

I don't deny that this thought is intuitive, but we should be careful because other seemingly equally compelling intuitions pull in the opposite direction. One might think, for instance, that what is crucial to the truth of a modal claim at a world is how that world relates to other possible worlds, regardless of other claims which hold true at w—what matters, one might suppose, is not whether there exists a world at w, but whether there exists a world in some broader space of possible worlds (Turner, 2005: 205).

As I understand it here, this idea—that possibility at a world depends on there being an appropriate world in some broader space of possible worlds—motivates the following

alternative semantic clause for claims about possibility at worlds.

$$\Diamond\phi \text{ is true at } w \text{ iff there is a possible world } v \text{ and } \phi \text{ is true at } v \qquad (\text{P}^*)$$

The important difference between (P*) and (P) concerns *scope*—(P*) does not require, for $\Diamond\phi$ to be true at w, that there is a relevant world from within the scope of what goes on at world w. The difference between (P*) and (P) can be framed in terms of domains: (P) takes the domain of quantification to only be the domain of worlds which exist at w, whereas (P*) takes the relevant domain for quantification over worlds to be some broader domain of possible worlds. Of course, there is a clear formal difference between (P*) and (P). But the crucial difference here is analogous to what we had to say about about evaluating propositions at worlds in §4: (P*) does not require that claims of possibility are evaluated relative to an empty set of possible worlds at worlds where nihilism is true. If nihilism were true, there would be no worlds—just like if John were not to exist, there would be no propositions about John—but in evaluating claims of possibility *at* a world w where nihilism holds, we do not shift perspective and only consider worlds *which exist* at w—just as we do not only ask which *existent* propositions are true at worlds where John does not to exist, see (Mitchell-Yellin and Nelson, 2016: 1552–1553).[9]

The choice between (P*) and (P) matters, first of all, because construing possibility at worlds in terms of (P*) does not entail that there are no true possibility claims at worlds where (N) is true. Suppose w is an arbitrary world at which (N) is true. Of course, at w, there are no possible worlds. However, this *alone* does not entail that at w there are no true possibility claims. Assuming, (P*), there are true claims of possibility $\Diamond\phi$ at w if there exists world at which ϕ is true—some world in a broader domain than the worlds which exist at w. The choice over (P) and (P*) directly bears on Brauer's argument.

Moreover, (P*) isn't an arbitrarily chosen alternative semantic clause for possibility—it is

[9]There is, of course, the question of *which* worlds are included in this broader domain. A common thought in the literature is that we can appeal to the actually existing possible worlds—in line with the idea that in evaluating propositions at worlds, we evaluate from the perspective of the actual world. Indeed, if we subscribe to actualism—the view that only actual things exists—then these worlds are all the worlds that there are, see (Mitchell-Yellin and Nelson, 2016: §1.2). It is not, however, essential to my proposal here that the domain of worlds invoked by (P*) be thought of this way and I, thus, remain neutral on this question. What is important here is the crucial formal feature of (P*)—that the relevant domain of worlds at any world where nihilism is true does not have to be empty. Thanks to an anonymous reviewer for noting this.

one in step with well-entrenched approaches to possibility in the literature. With respect to this difference of scope, (P*) is much closer than (P) to how possible worlds semantics is typically formulated for modal logics. Typically, the semantics for modal logics is defined using models featuring a non-empty set W of 'worlds'. Modal formulae relative to $w \in W$ are understood in terms of quantification over W, not quantification over some some domain of w.[10] Indeed, in the philosophical literature, many argue against construing possibility in line with (P), adopting instead (P*), or claims like it—-the consensus is that this approach is unduly restrictive, and that modal truths at worlds should not so closely depend on what exists at the world in question, see (Turner, 2005: §6), (Einheuser, 2012: 15–17), and, most recently, (Mitchell-Yellin and Nelson, 2016: 1545–1554).[11]

The choice between (P*) and (P) matters for the success of Brauer's argument. But how, then, should we adjudicate between the two? There is only a brief discussion given by Brauer for why we should formulate a possible worlds semantics with (P). Brauer correctly notes that (P) allows one to dispense with relations of accessibility in modal semantics, whilst still capturing an important notion of relative possibility:

> In the present formulation, the notion of relative possibility that Kripke models capture with an accessibility relation is instead captured the modifier [*sic*] 'possible' when we quantify over range [*sic*] of possible states of affairs that exist from the perspective of a given world. Instead of using an accessibility relation to model relative possibility, we talk about relative possibility explicitly. (Brauer, 2022: 2753)

Two comments are in order, one about this as an argument for (P) and another about how the inclusion or exclusion of accessibility relations might complicate our comparison of (P) and (P*).[12] First, whilst I agree that (P) *allows* us to formulate a clause for possibility which captures a notion of relative possibility without accessibility relations, it is not essential to

[10] A survey of textbooks on modal logic confirms this, see (Chellas, 1980: 68), (Hughes and Cresswell, 1996: 29), (Fitting and Mendelsohn, 1998: 13), (Boolos, Burgess, and Jeffrey, 2007: 329), and (Priest, 2008: 22).

[11] Adams (1981) is sometimes understood as arguing that modal truth at worlds depend on what possible worlds exist at the world in question, see (Einheuser, 2012: 15–16). However, there is little explicit in (Adams, 1981) to warrant this claim. It is difficult to directly compare Adams's approach to the issues discussed here, since Adams's frames his modal semantics idiosyncratically and is primarily concerned with *singular* modal propositions, appearing to be motivated by the idea that singular modal propositions are really singular modal predications, see (Menzel, 1993: 130–136) for discussion.

[12] Thanks to two anonymous reviewers for pushing me to clarify the relevance of accessibility relations here.

Brauer's argument that accessibility relations are sidelined. We can formulate an equivalent semantic clause to (P), provided we enforce a restriction on accessibility. That is, loosely put, if we require that:

For any worlds w_1, w_2: w_2 is accessible from w_1 only if w_2 exists at w_1

then it follows that (P) is simply equivalent to

$\Diamond\phi$ is true at w iff there exists a world v: Rwv and ϕ is true at v

Thus, Brauer's considerations don't function as an argument for (P)—nor do I take Brauer to intend that they do. More needs to be said for (P).

Second, do accessibility relations complicate our comparison? It is important to note that the key difference between (P) and (P*) is orthogonal to questions about the inclusion or exclusion of accessibility relations *per se*. Of course, a legitimate dialectical worry could be that, since (P*) is unqualified by accessibility, it directly entails S5, and thus my focus on (P*) is irrelevant to Brauer. However, I think this is a distraction to our concerns here.

If required, we can think of (P*) as qualified so that $\Diamond\phi$ is true at w just in case there is an *accessible* possible world at which ϕ is true. However, here, for convenience, I will simply focus on (P*) as written above and, crucially, nothing in the argument I present hinges on this. The key difference between (P) and (P*) does not rely on the inclusion or exclusion of accessibility relations, nor can we only formulate (P) by eschewing accessibility relations. After all, as Brauer himself notes, accessibility relations figure in modal semantics as a formal device for representing facts about how what is possible may change from world to world, see (Brauer, 2022: 2752). The disagreement between (P) and (P*) concerns a disagreement about the extent of the variation of possibility from world to world and how this relates to the ontology of worlds. It should not matter for our discussion how this dependence is represented. If we formulate (P*) using accessibility relations, we would not tie the accessibility of any given world from some w to what exists at w—not doing so preserves the idea that possibility is about the existence of a relevant possible world in some wider space of possible worlds. If we formulate (P) using accessibility relations, on the other hand, we

would tie accessibility from w to what exists at w. In short, then, although neglected here, the inclusion of accessibility does not dissolve the disagreement, and thus the choice, over (P) and (P*). Thus, to simplify matters, I ignore accessibility relations in the arguments to follow.

Now, nothing I have so far discussed is decisive either way. All that I have claimed is that (P*) is, at the outset, a perfectly legitimate alternative clause to (P)—the central disagreement is about the appropriate domain for quantification over worlds. There are various ways we might motivate (P*), but not all ways will be equally convincing. For a start, I think it is clear that merely intuitive arguments will not carry significant weight here. There are compelling intuitive stories for why both (P) and (P*) are the right way of understanding possibility. As I noted earlier, (P*) is often motivated by appealing to initial metaphors motivating the intelligibility of truth at a world. As Turner writes:

> ... on the model of "standing outside" of a world looking into it, it is not implausible to think that we should be able to 'see' the entire space of possible worlds. (Turner, 2005: 205)

Again, this is evocative; but it is difficult to cash out the metaphors here into a concrete argument—this is a task for a different paper. I contend that what we need here are instead *systematic* considerations in favour of one over the other—not merely competing intuitions or metaphors. We can make progress on the question of (P) over (P*) by developing systematic considerations and this requires us to compare the two proposals about the semantics of possibility in terms of how they they interact with other elements of a modal semantics, considering what the resulting semantic frameworks entail when *taken as a whole*.

To this end, I think it is particularly illuminating to compare how the two proposals interact with what we should most plausibly say about metaphysical necessity. Although Brauer doesn't discuss metaphysical necessity in much detail, my contention is that it is key to understanding the *kind* of semantics underpinning his argument against D. The important detail to consider is how necessity works at worlds at which (N) is true. Understanding *this* is one route in to better understanding the comparative strengths and weakness of (P) and (P*)—and thus a better understanding of Brauer's argument.

7 Two Approaches to Necessity

There are two exhaustive options I will discuss. Briefly, according to the first option:

(i) All statements of the form $\Box\phi$ are true at any world at which (N) is true.

In contrast, according to the second option:

(ii) Some statements of the form $\Box\phi$ are false at worlds at which (N) is true.

For the most part, I will discuss (i) and (ii) independently of what Brauer says about necessity and the argument to follow should not be construed as imputing on Brauer commitments not found in (Brauer, 2022). I do this for two reasons. First, Brauer has little explicit to say about necessity. Of course, a key premise in Brauer's argument is

(7) If D is a sound modal logic, $\Diamond\top$ is true at every possible world.

and (7) is only true, if necessity is understood as truth at every possible world—only then is the consequent in (7) equivalent to the claim that $\Box\Diamond\top$. Moreover, in discussing the prospect of substitutional quantification over worlds, Brauer writes:

> On the substitutional approach, what is necessary or possible is tied to the expressive capacity of a language, since 'necessarily ϕ' is true just case 'in world t, ϕ' is true for every term 't' used to denote a possible world. (Brauer, 2022: 2761)

It is natural here to conclude that Brauer thinks of necessity in terms of *some form* of universal quantification over worlds. However, neither of these claims are sufficiently detailed to adjudicate between (i) and (ii) convincingly. After all, in the context of Brauer's argument, which establishes even weak logics like D to be problematic, given the possibility of nihilism, it would be rash to conclude too much about Brauer's commitments regarding modal semantics generally, especially if these commitments are not explicitly stated. More importantly, though, the second reason for bypassing a longer discussion of Brauer's commitments about necessity is that (i) and (ii) are *exhaustive* options: for any possible worlds semantics, either (i) or (ii) must be true. This, I take it, warrants the more general discussion of the consequences of (i) and (ii), and how those consequences relate to Brauer's argument, particularly his assumption of (P).

First, focus on (i). (i) is of course a *natural* way for Brauer to understand necessity at worlds where (N) is true. If possibility at arbitrary w is understood as truth at *some* possible world (in the domain of w), as Brauer urges, then metaphysical necessity should be understood as truth at *all* possible worlds (in the domain of w). Thus, at any world at which (N) is true, any ϕ is vacuously necessary—ϕ is true at *all* possible worlds, since there are no possible worlds. However, though natural, (i) is problematic. In particular, it follows that even contradictions are necessary at worlds where (N) is true, and thus it follows from (i) and the possibility of nihilism that all contradictions are *metaphysically possibly metaphysically necessary*, i.e., for any ϕ, $\Diamond\Box(\phi \wedge \neg\phi)$ is true.

This consequence should give us pause. In my view, it should be taken as a firm test for proposals about metaphysical modality that no contradiction is even *possibly* necessary. After all, the $\Box$ and $\Diamond$ operators are not meaningless symbols, but rather have a fixed interpretation as 'It is necessary that...' and 'It is possible that...', respectively. A possible worlds semantics which entails that $\Diamond\Box(\phi \wedge \neg\phi)$ is true, for any ϕ, fails to do justice to a very minimal, but warranted grasp which we have on a notion like metaphysical modality. Indeed, prior to more sophisticated theorising, we very plausibly have access to a certain informative degree of understanding about modality and, moreover, such an understanding warrants us to reject $\Diamond\Box(\phi \wedge \neg\phi)$, once we understand that $\Diamond$ and $\Box$ are interpreted in terms of an alethic modality like metaphysical modality.[13] Thus, I think, it is difficult to take (i) as adequate, if we also take seriously the possibility of nihilism.

I want to be clear about what I am, and what I am not, arguing for here. First and foremost, I should stress that my argument here does not rely on our having some inviolable understanding of metaphysical modality, however minimal. It is simply a fact that even the most closely held theoretical views may turn out to be false. Rather, I claim that we have a perhaps defeasible, but nonetheless justified and firm grasp on some basic features of metaphysical modality. Thus, we should want principles which do justice to our understanding of what is minimally understood about metaphysical modality. After all, questions about

[13]Here, negation is classical, i.e., it's truth conditions can be defined by a truth tables with two exhaustive and non-overlapping truth values. There is no suggestion in (Brauer, 2022) that negation should be understood otherwise, nor is it a good idea to complicate matters by allowing for different treatments of negation. I thus ignore any potential dialethist considerations for a possibly necessary contradiction.

the correct modal logic are not done entirely in isolation from the '...established standards, acknowledge experts, and accepted elementary principles' (Williamson, 2013b: 426) which govern the collective enterprise of understanding the metaphysics and logic of modality. In short, not everything is up for grabs.

At the very least, not every theoretical claim about modality is *equally* up for grabs. That is, in order to overturn this minimal understanding of the nature of metaphysical modality, we would require significant argument for why our previous understanding of the notion turned out to be so wrong. As Brauer himself discusses, we cannot simply stipulate that our modal semantics delivers the correct verdicts (Brauer, 2022: 2761). Rather, there is a genuine possibility of a semantics getting things substantively wrong.[14] My contention here is that the project of formulating a modal semantics should be seen as specifying the right truth conditions for claims involving metaphysical modality—a notion of which we have a prior, although minimal, understanding.[15] We are here concerned with *metaphysical modality* and there should be care to not endorse principles which only force us to accept that we have in fact changed the subject.

At its core, my argument here is minimal: we should not adopt (i), however natural, without substantive argument, since it violates basic and widely accepted features of metaphysical modality. Of course, there are ways one might resist this conclusion. One might worry that requiring that no contradiction be possibly necessary is tantamount to thinking that we should add $\neg\Diamond\Box(\phi \wedge \neg\phi)$ as an *axiom* of our preferred modal logic. This is problematic, since adding $\neg\Diamond\Box(\phi \wedge \neg\phi)$ as an axiom results in a system almost as strong as D. Indeed, if we consider $\neg\Box(\phi \wedge \neg\phi)$ as an axiom—a claim as plausible it would seem as $\neg\Diamond\Box(\phi \wedge \neg\phi)$—the result is simply an alternative axiomatization of D.[16] However, this misconstrues the nature of my objection here. I claim that we have good reasons to think that

[14]Brauer is here discussing the potential for the semantics to get things wrong if world quantification is understood substitutionally, but his comments naturally extend to non-reductive modal semantics in general.

[15]To be maximally clear here, my argument assumes that we have a minimal and justified grasp on the nature of metaphysical modality *as a species of alethic modality*. Of course, metaphysical modality is itself a controversial notion. However, insofar as we have a grasp on it at all, we understand it as an alethic modality. A discussion of Brauer's argument should hold fixed that there is a notion of metaphysical modality to be discussed. My argument here assumes that, given this notion, we minimally understand its relationship to truth in such a way that contradictions are not possibly necessary.

[16]Thanks to an anonymous reviewer for raising this objection, as well as the second objection to follow.

$\neg\Diamond\Box(\phi \wedge \neg\phi)$ is false *simpliciter*, for any ϕ. Of course, this entails that $\Diamond\Box(\phi \wedge \neg\phi)$ is not *logically* true; but this claim does not entail that $\neg\Diamond\Box(\phi \wedge \neg\phi)$ is therefore logically true. My argument here does not problematically presuppose the validity of D.

One might also worry that, although the idea of a contradiction being possibly necessary is surprising, the fact that contradictions are only possibly necessary because they are in an important sense *trivially* necessary significantly reduces the force of my argument above. In my view, however, it is far from clear that appealing to this notion of a trivial necessity accurately enough locates the central issue here. Whether contradictions are possibly necessary trivially or non-trivially is not the issue: the problem is the fact that they are *possibly necessary* and that this violates a core element of how we understand an alethic modality like metaphysical modality. A consequence of this first option for understanding modality is that there are ways the world could have metaphysically been such that contradictions are necessarily the case.[17] Without substantive argument for the semantic clauses which entail this, we should not consider this option further.

What, then, of (ii)? According to (ii), we instead think that some statements of the form $\Box\phi$ are false at some w at which (N) is true. Here, the details of *why* claims of this form are false at certain worlds are unimportant. Later in the paper, I will discuss this in more detail. But now, I simply focus on (ii) as a potential general feature of a modal semantics. Here, I won't argue that anything interesting or problematic follows from (ii) *alone*, unlike in the case of (i). Rather, I want to focus on one consequence of a modal semantics satisfying (ii) *alongside* incorporating Brauer's (P). Later, this will play a significant role in our overall comparative assessment of (P) and (P*).

Crucially, (ii) and (P) jointly entail that we must reject the *duality* of metaphysical possibility and necessity. More precisely, (ii) and (P) jointly entail a rejection of:

Duality: Metaphysical possibility and necessity are dual notions. That is, necessarily, it is

[17] It's worth noting that such a consequence also violates a minimal understanding of what *possible worlds* are. Though there are significant disagreements about *which* entities are worlds, it's widely accepted that possible worlds are in some sense ways the world could have been. But in what sense *could* the world be in a such a way that a contradiction is necessary? Of course, in the model theory for modal logics, we allow models for weak logics to allow for contradictions to be necessary. However, in such models, 'worlds' are not really *worlds*: they are, rather, points of evaluation. In the case of philosophical accounts of modality in terms of worlds, we appeal to a richer notion of world. It is far from clear that this richer notion is at all compatible with contradictions necessary at worlds.

necessary that ϕ if and only if it is not possible that $\neg\phi$, i.e., $\Box(\Diamond\phi \leftrightarrow \neg\Box\neg\phi)$.

Here's the argument. Suppose w is an arbitrary world at which (N) is true. We know for some ψ that $\Box\psi$ is false at w and thus $\neg\Box\psi$ is true at w. That is, we know that there is some false necessity claim at w and we let $\Box\psi$ be that claim. We know that $\neg\Diamond\neg\psi$ is true at w, given (P). If duality also holds, then $\Box\psi$ is true at arbitrary w if and only if $\neg\Diamond\neg\psi$ is true at w. Thus, assuming duality, both $\Box\psi$ and $\neg\Box\psi$ are true at w. That is, assuming duality, a modal semantics which incorporates (P) and allows some claims of the form $\Box\phi$ to be false at w violates a fundamental constraint on possible worlds—that worlds should be possible in the sense that for no claim ϕ is it the case that a world w both has ϕ and $\neg\phi$ true at w. Thus, any possible world modal semantics combining (P) and (ii) must reject the duality of metaphysical possibility and necessity.

8 The Comparative Case Against (P)

Where have we got to? Brauer's argument hinges on a particular way of thinking about possibility at worlds, i.e., (P). I identified an alternative principle governing possibility (P*), according to which Brauer's argument fails. I noted that there is little *intuitive* reason which should carry much weight for deciding between (P) or (P*). Rather, what we needed was systematic argument. To this end, I outlined two exhaustive options for thinking about necessity at worlds at which (N) is true, i.e., (i) and (ii). I argued that (i) requires us to radically revise our understanding of metaphysical modality. This, I took, to be sufficient reason to bracket off (i) from our considerations. I then noted that (ii) *and* (P) jointly entail that metaphysical possibility and necessity are not dual notions.

I now want to draw this all together and make a comparative case against (P), arguing that we have good reasons to prefer a modal semantics which incorporates (P*). Call a modal semantics incorporating (P) *P-Semantics* and one incorporating the alternative (P*) *P*-Semantics*. As I argued, the most plausible formulation of P-Semantics accepted (ii) and thus the failure of duality. So, this is how I understand P-Semantics going forward.

Before I continue, it is worth stressing that my claim here is not that Brauer *explicitly* commits to this most plausible version of P-semantics—one which incorporates (ii) as well

as (P).[18] Rather, my focus now on P-Semantics follows from my trying to better understand the *most plausible* way of fleshing out a semantics incorporating (P). It is then in assessing the most plausible form of P-Semantics against the alternative P*-semantics which allows for a better systematic understanding of the comparative strengths and weaknesses of (P) and an alternative principle (P*). I'll argue that we should prefer (P*) over (P), given how the most plausible formulations of semantics involving them fare when taken as a whole. Of course, I do not intend my argument to foreclose on the possible response that it is, in fact, more plausible to combine Brauer's (P) with (i), not (ii). But such a response would require, I urge, substantive argument in its favour.

To begin, then, an observation: neither the problem of vacuous necessities at worlds nor denying duality arise for P*-Semantics, all other things being equal. If we accept (P*), we can likewise take necessity at worlds to be dependent on all possible worlds in the wider domain. Moreover, (P*) is consistent with duality, since accepting (P*) does not entail that all claims of the form $\Diamond\phi$ are false at any w at which (N) is true. The question which should now concern us: do such differences furnish us with good reasons to reject P-Semantics in favour of P*-Semantics?

It will be tempting for some to think that the failure of duality alone is a decisive point against P-Semantics. If necessity is simply truth at all worlds in *some* domain and possibility is truth at some worlds in the same domain, then duality follows from the duality of the quantification over possible worlds. Likewise, one may well worry that the failure of duality only allows for logics for metaphysical modality which are very weak, non-normal modal logics, i.e., logics which are not extensions of K and typically such logics are considered inadequate as logics for metaphysical modality. Of course, this would entail rejecting D and so the worry is not that P-Semantics could not be used to undermine D *per se*. Rather, the worry is that P-Semantics would establish too much. The result would be confining ourselves to excessively weak modal logics.

However, such arguments are too quick. To begin with, according to P-Semantics, necessity at worlds cannot be understood as plain truth at all worlds. Rather, we must accept some instance of the following schema, where $\mathcal{C}$ is whatever extra condition is required for

[18]Thanks to two anonymous reviewers for pushing me to clarify this.

necessities to be true at worlds—it is whatever condition fails in cases where a claim of the form $\ulcorner\Box\phi\urcorner$ fails to hold at some w at which (N) is true.

(N*) $\Box\phi$ is true at w if and only if

(i) it is true at w that, for every world w' at w, ϕ is true at w'; and

(ii) some further condition $\mathcal{C}$ holds at w.[19]

Thus, we cannot make convincing so simple an argument for duality. Moreover, there is precedent in the literature for rejections of duality—Arthur Prior (1957: 48–9), in developing his modal logic Q, argues against duality, as does Robert Adams (1981) in developing his logic for contingent existents. Whilst this may be a drawback to these logics, it would be an error to ignore the deep arguments given for rejecting duality, simply closing our eyes to them and insisting, almost under our breath, that necessity *just is* the dual of possibility. As Menzel notes in his discussion of Prior's logic Q, if duality 'cannot be incorporated in a logic that, on analysis, gets the modal facts right, we have no choice but to do without it' (Menzel, 1991: 346).

For some, this will all seem too cautious and the mere failure of duality and complication of necessity at worlds will be enough to dismiss P-Semantics. However, this is by the by, since there are other plausible reasons to hand for preferring, all things considered, P*-Semantics over P-Semantics. That is, we can appeal to theoretical virtues which the results of good theoretical inquiry should display. We should want our theoretical claims to be simple, elegant, strong, unifying, and fitting with the simple data, and so on, and these criteria should guide our decisions in both theoretical modal semantics, as well as any other theoretical science. I think such considerations are pertinent in a dispute such as this, where there is little to tell apart (P) and (P*), and it's unclear what more could be said in favour of one or the other, apart from these kinds of considerations. At the very least, I can see no good reason why such considerations should not play this role.

This style of argument draws much inspiration from the increasingly popular view in

[19]Note that it is open whether $\mathcal{C}$ is a condition satisfied by the relevant world alone, or satisfied by the relevant world and formula. Note also that there are some constraints on what $\mathcal{C}$ could amount to, since a crucial move in Brauer's argument is that because $\Diamond\top$ is false at some w, $\Box\Diamond\top$ is false at the actual world. Thus, $\mathcal{C}$, whatever it is, must hold at the actual world.

the philosophy of logic, so-called Anti-Exceptionalism.[20] This is the view that logic is fundamentally continuous with the sciences insofar as it is not an *a priori* discipline, and theory choice in logic should be guided by the very same principles as theory choice in any science—theories are chosen on the basis of their simplicity, elegance, strength, fit with the data, and so on. To be clear, however, the following considerations do not presuppose anti-exceptionalism about logic. For one, the dispute between (P) and (P*)—and thus P-Semantics and P*-semantics—is a metaphysical one. It has *consequences* for what we take to be the correct logic for metaphysical modality, but (P) and (P*) are about the conditions under which true modal claims at worlds are true *simpliciter* and not about anything particularly logical. Here, I appeal to these theoretical virtues, not because of a commitment to anti-exceptionalism about logic, but because such theoretical virtues are pertinent in theoretical disputes *in general*. As Priest (2014: 217) notes,

> Given any theory, in science, metaphysics, ethics, logic, or anything else, we choose the theory which best meets those criteria which determine a good theory.

Of course, this is not the paper to defend wholesale this virtue-based methodology for theory selection in metaphysics, or philosophy more broadly; nor is this the paper to rehearse arguments for the value of particular virtues. Instead, here I simply apply this methodology as it is standardly understood, since I think it highlights at least one interesting way of adjudicating between the competing semantics and shedding light on the commitments Brauer's argument involves, i.e., (P). With these caveats on the table, let's look, then, at what can be said for the two proposals on this basis.

The most obvious first virtue to consider is *elegance*. If we adopt P*-Semantics, then we can consistently maintain that necessity is just truth at a world. In contrast, on P-Semantics, necessity must plausibly be more than straight truth at a world, i.e., it must be understood as (N*). Now, of course, the details of what this further condition $\mathcal{C}$ will consists in is left open. However, it's clear that regardless of details, *structurally* this proposals fails to be as elegant as the alternative—requiring more than plain truth at all worlds for necessity. The same

[20] In (Williamson, 2013b), Williamson applies this methodology throughout to argue for a distinctive view in modal metaphysics, necessitism—the view that necessarily everything necessarily exists. He defends the methodology more broadly in (Williamson, 2013a) and (Williamson, 2017). The methodology is also defended in (Russell, 2015) and (Priest, 2016). See also (Hjortland, 2017) for an excellent discussion.

point can be made when considering the *simplicity* of the competing proposals, though simplicity can be understood in a variety of ways. One way of understanding simplicity could be dubbed *logical simplicity*. Generally, the idea is that a theory consisting of structurally simple claims which posit little in the way of primitive notions, is a virtuous theory. Consider, for instance, the following argument from Timothy Williamson against complicating quantificational reasoning in modal contexts by adopting a free quantifier modal logic:

> The restrictions on instantiation (for $\forall$) and generalisation (for $\exists$) complicate quantificational reasoning, at least in modal contexts, and the intended effect is a loss of logical power. Since both simplicity and strength are virtues in a theory, judged by normal scientific standards, these restrictions in contingentist logic should give one pause. (Williamson, 2013b: 43)

The same considerations, I contend, should apply against a semantics incorporating (N*). We should, of course, not misunderstand the argument here. It is not simply: (N*) is more complicated than ordinary truth at all worlds, *therefore* it is false. Rather, the idea is that on balance, we should prefer simpler theories to more complicated ones.

An alternative way of thinking about simplicity is *ontological*: does the theoretical proposal require us to posit as little as possible in the way of ontology. Those sympathetic to Brauer may worry that a change in the semantics, or for instance an adoption of a stronger modal logic for metaphysical modality than D will force, by Brauer's arguments, the impossibility of there being nothing and, as a consequence, a less simple ontology. I am sympathetic to this worry. However, it should be stressed that this worry does not apply to the debate at this juncture: P^*-Semantics allows for the possibility of nothing. There is no trade off between ontological and logical simplicity when comparing P^*- and P-Semantics. Both are consistent with the possibility of nothing. However, P^*-Semantics allows for logically simpler clauses for necessity.

Whilst we can make similar points about simplicity and elegance against P-Semantics in that it fails to validate duality, the most important consideration in favour of the alternative semantics which preserves duality is the idea that we should want *stronger*, *rather than weaker, theories in general*. This consideration comes in two flavours. First of all, we should want our theories to be logically strong. Insofar as P-Semantics fails to validate duality, it fails to be consistent with *any* normal modal logic and is only consistent with notoriously

weak logics.[21] However, as Williamson notes, simple comparative logical strength is often an inappropriate dimension to compare scientific theories—we 'typically have to chose between mutually inconsistent but individually consistent theories, none of which entails any of the others' (Williamson, 2013b: 276). Rather, we are interested in the less formal notion of strength as *informativeness*. It is clear that a modal semantics which preserves duality is more informative than one without duality: the thesis of duality allows us to transform statements about possibility into equivalent statements about necessity, telling us both how the world could be, but also how the world is not necessarily like. This can be a powerful tool for modal theorising.

Each of these considerations—the simplicity, elegance, and strength of P*-Semantics compared to P-semantics, all things considered—are individually far from decisive. Yet, collectively they give us good reasons to prefer an alternative P*-Semantics outlined over P-Semantics, i.e., one which incorporates the key semantic claim (P) in Brauer's argument against D. I should stress, these reasons are defeasible and I am not claiming that the idiosyncratic features of such a semantics are in and of themselves sufficient to dismiss his argument or proposals. Rather, my claim here is that if we systematically judge the kind of semantics which plausibly results by incorporating Brauer's (P) by the usual scientific standards we ought to hold our theoretical claims to, we find that there is much wanting and much that is controversial in what seemed to be, at first glance, an innocent premise in a deeply compelling argument against even a weak modal logic such as D.

9 Conclusion

Here, I have argued that Brauer's argument that the mere possibility of nothing rules out D as the correct logic for metaphysical modality is plausibly unsuccessful; or at least significantly weaker than it is presented. Ultimately, I argued that we have good reasons, consistent with standard scientific practice, for preferring an alternative semantic clause for possibility compared to the one presupposed by Brauer's argument.

[21] Note that there are subtleties here which I will not discuss at length. In particular, not all logics which fail to validate duality are obviously inappropriately too weak for metaphysical modality, e.g., in intuitionistic modal logic, the modal operators are not interdefinable, see (Wolter and Zakharyaschev, 1999). Throughout, I have assumed that negation behaves classically, see (fn. 13), and so I put this consideration to one side.

This discussion is connected to a broader philosophical point which should be made about Brauer's argument. Brauer's goal is to establish only the conditional claim that *if* we accept the possibility of nihilism, then we must accept that D cannot be correct. What this discussion has shown is that the situation is more complicated. In particular, Brauer takes as a stable backdrop his modal semantics, but we have now seen reason to question this. That is, the modal semantics presupposed in his argument is *itself* up for grabs. Brauer rejects the idea of jettisoning a possible worlds modal semantics in response to his argument (Brauer, 2022: 2761), arguing that the possible worlds semantics is 'exceedingly plausible' and that abandoning it should be a move of last resort. I am inclined to agree, but my argument here is not for a wholesale rejection of possible worlds semantics. Instead, I have argued that there are good reasons to reject *the particular way* Brauer formulates his possible world semantics.

This shifts the import of Brauer's arguments. Brauer does not show that possible worlds semantics, the possibility of nihilism and D as the correct logic for metaphysical modality form an inconsistent package. Rather, Brauer shows that the possibility of nihilism and D as the correct modal logic form an inconsistent package of views when coupled with a *particular* modal semantics incorporating at least (P). This is still, of course, interesting. We must, if we want to accept any two of these claims, reject the third. However, I have also argued that there is at least one alternative to (P) which we have independently good reasons for preferring, consistent with normal scientific practice—it is simpler, more elegant, and stronger. Moreover, doing away with Brauer's (P) allows us to avoid two potentially uncomfortable conclusions: we do not have to accept that the pure logic of metaphysical modality rules out as impossible an ontological thesis like nihilism, nor do we have to accept that the mere possibility of nihilism rules out the applicability of large swathes of standard modal logic. Of course, I agree with Brauer that the import of his argument is that each step of it is plausible enough and should thus be taken seriously. Here, I have tried to better understand at least one aspect of Brauer's argument and see what could be said against it or in its favour. Only by doing so can we expect to fully understand the logical implications of the possibility of nihilism.

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