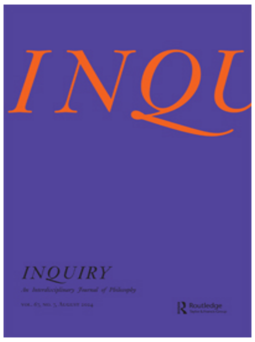

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Contingentism and fragile worlds*

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ABSTRACT
Propositional contingentism is the thesis that there might have been propositions which might have not have been something. Serious actualism is the thesis that it is impossible for a property to be exemplified without there being something which exemplifies it. Both are popular. Likewise, the dominant view in the metaphysics of modality is that metaphysical possibility and necessity can be understood – in some sense – in terms of possible worlds, i.e. total ways the world could have been. Here, I argue that, given some minimal assumptions, the conjunction of propositional contingentism and serious actualism entails that worlds are modally fragile – every world is ontologically dependent on every proposition. I then show that such a consequence is inconsistent with the claim that propositions true at all possible worlds are necessary.

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1. Introduction

Adapting the terminology introduced in Williamson (2013), serious propositional contingentism is the conjunction of the following two theses. First, propositional contingentism – the view that there might have been propositions which might have been nothing. Second, serious actualism – the thesis that it is impossible for a property to be exemplified without there being something which exemplifies it.

Propositional contingentism is typically taken to follow from contingentism – the view that there might have been some *things* which might have been nothing. Contingentism is highly plausible: for many, it is, as Stalnaker (2012, 43) considers it, a 'Moorean fact' that people

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and ordinary physical objects are things which might not have existed. It is, for example, both a contingent fact that my parents met and, had my parents never met, I would not have been. Propositional contingentists further claim that, had my parents never met, certain propositions which ontologically depend, for their existence, on my existence, would likewise not have existed. This view is defended at length in Prior (1967), Adams (1981), Fitch (1996), Stalnaker (2012) and Speaks (2012), and discussed in Fine (1977b, 1980), Menzel (1991, 1993) and Deutsch (1990). Recently, following Williamson (2013), propositional contingentism has been discussed as one species of so-called higher-order contingentism – the view that it is a contingent matter what higher-order entities like properties, propositions and relations there are. Most notably, the view is discussed extensively by Fritz (2016, 2017, 2018a, 2018b) and Fritz and Goodman (2016, 2017).

Serious actualism is similarly taken by many to be a compelling thesis in its own right, with many contingentists and non-contingentists alike defending some formulation of the thesis.[1] After all, as Williamson (2013, 353) asks, how could a thing be propertied, were there no such thing to be propertied? Or, as Adams (1986, 322) notes, it seems undeniable to hold that for something to exemplify a property, it must be a certain way; and to be a certain way, it must *be*. Interestingly, a lot rests on serious actualism: the view is presupposed in several prominent arguments, including Plantinga's influential (1983) argument against modal existentialism, Williamson's (2002) argument for necessitism, Merrick's (2015) argument for the existence of propositions, and, beyond metaphysics, serious actualism plays a crucial role in the debate in population ethics over the intelligibility of comparing the well being of future yet currently nonexistent people, see Greaves and Cusbert (2022).

Despite the popularity of the two parts of the view, recent work has done much to undermine the viability of serious propositional contingentism. First, several prominent arguments have highlighted the fact that serious propositional contingentists must plausibly deny compelling modal principles governing predicate abstraction and application, see Dorr (2017, 55–56) and Rayo (2021). Putting things loosely now, since I discuss such issues in more detail later in Section 4.1, abstraction

[1] A variety of formulations of serious actualism, and related theses, are discussed in literature: the Ontological Principle in Plantinga (1974), Property Actualism in Fine (1985), The Existence Requirement in Yagisawa (2005), the Modal Existence Requirement in Caplan (2007), and The Being Constraint in Williamson (2013). Note that necessitism, the view that necessarily everything necessarily exists, simply entails serious actualism.

principles tell us how many properties there are, and application principles tell us the conditions under which properties are exemplified and, often, how exemplification relates to the satisfaction of relevant predicates. In brief, the problem is that, even minimal and compelling abstraction principles for properties entail that there are properties such as the property of *being nothing*, i.e. being an x such that $\neg\exists y(y = x)$. Such properties, coupled with minimal and compelling modal application principles quite straightforwardly entail necessitism, if all properties are existence entailing: if, necessarily, x is nothing only if x exemplifies the property of being nothing, then everything must necessarily exist, see Fine (1985, 164–166), Pollock (1985, 126–129) and Masterman (2024a).

Second, several other prominent arguments have shown that one compelling formulation of serious actualism in a suitable higher-order modal setting is inconsistent with propositional contingentism. In Section 2, I discuss higher-order modal languages in more detail, but for now, it suffices to note that higher-order languages are highly expressive formal languages, in which quantification is permitted into not only name position, but predicate, operator and sentence position. Such languages are typed, with each syntactic category of expression being associated with a certain type. Typically, expressions of primitive type e are singular terms. Then, for any types $\sigma_1, \ldots, \sigma_n$, $\langle\sigma_1, \ldots, \sigma_n\rangle$ is a type, where expressions of type $\langle\sigma_1, \ldots, \sigma_n\rangle$ take expressions of type $\sigma_1, \ldots, \sigma_n$ as argument. In the limiting case of $n = 0$, $\langle\rangle$ is the type for sentential expressions, i.e. formulae and variables in sentence position. Recently, Fritz (2023a) discusses a generalised formulation of Williamson's (2013) being constraint, in which predication of any grammatical type in the relevant higher-order language requires the existence of the predicated. As Fritz notes, in a higher-order setting, non-atomic formulae are standardly understood as predications in which the logical constants *themselves* serve as predicates, e.g. $p \to p$ is considered as a predication of p with the expression $\to$ of type $\langle\langle\rangle, \langle\rangle\rangle$ as the predicate. Coupled with a minimal background modal logic, the generalised being constraint entails propositional necessitism. In short, for arbitrary proposition p, if $p \to p$ necessarily requires that p exist, then the necessity of $p \to p$ requires the necessary existence of p, i.e. propositional necessitism (Fritz 2023a, 354–358).

Both clusters of arguments against serious propositional contingentism are compelling and do much to constrain how the serious propositional contingentist can, and cannot, coherently formulate their view.

But such objections are not decisive. Against the first cluster of arguments, some have argued that the serious propositional contingentist can avoid restricting abstraction principles, or complicating application principles, by appealing to the distinction between truth *in* a world and truth *at* a world, see Einheuser (2012) and Masterman (2024a), or Fine's (2005) notion of transcendental truths, see Rayo (2021).

Against the second cluster of arguments, one option for those sympathetic to serious actualism is to opt for a *syncategorematic* treatment of logical constants. On such a treatment, generally, logical constants signify nothing by themselves, but only serve to show how independently meaningful parts of language combine (MacFarlane 2017, Section 1). This treatment of logical constants is independently well-motivated and has a long pedigree, taking central place in the *Tractuatus*, as Wittgenstein's *Grundgedanke*, or fundamental idea: 'the "logical constants" are not representatives; that there can be no representatives of the *logic* of facts' (Wittgenstein 1933, 4.0312). The idea is also found in the work of Quine (1986, 17–27) and Dummett (1973, 19–22).[2] Presently, on a syncategorematic treatment of logical constants in a higher-order logic, formulae containing logical constants are not predications in which the logical constants themselves serve as predicates – given this, it is not a consequence of the generalised being constraint that $p \rightarrow p$ only if p exists.

As Fritz notes, such a response is costly, see Fritz (2023a, 359–363). But a separate and more important issue should be noted. That is, one should worry that the difficulties presented by Fritz are an artefact of thinking of *serious actualism* in terms of a generalised formulation of the being constraint in a higher-order setting. I do not wish to dispute that Fritz successfully shows that the generalised being constraint is inconsistent with propositional contingentism, nor that the generalised being constraint is an interesting theoretical claim in higher-order modal logic worth investigation. But the question we should be concerned with here is how directly such results have a bearing on whether we should accept serious actualism – a modal constraint governing properties.[3] Of course, one may wish to challenge the relevance of such results by simply rejecting higher-order modal logic as the right framework for formulating modal claims about properties, propositions and relations, see Hofweber

[2]Both eschew the terminology of syncategorematic vs. categorematic. Dummett (1973) considers logical constants as so-called particles – the means by which complex sentences are constructed from simple ones. Similarly, Quine discusses the distinction between lexicon vs. particle, though he notes that such a distinction is 'identifiable' with the syncategorematic vs. categorematic distinction (Quine, 1986, 27).

[3]Fritz himself is careful to note that his arguments only strictly establish that the generalised, higher-order being constraint is inconsistent with propositional contingentism, see Fritz (2023a, 358).

(2022) and Menzel (2024). In my own view, this is a mistake. But regardless, *even if* higher-order modal logic is the right framework for understanding properties, propositions and relations, there is a separate question of whether a *generalised* being constraint is the right way of understanding serious actualism within such a framework.

After all, as discussed above, it is already well-known that contingentists must reject principles for predicate abstraction and application to maintain serious actualism. The upshot is that they must thereby either *limit* how many properties there are, or complicate the conditions under which properties are exemplified. The immediate worry is that a higher-order formulation *of serious actualism* generalised to constrain predication involving all grammatical types – up to and including logical relations between propositions – is in tension with the more constrained view any serious propositional contingentist must endorse about properties. Such a formulation suggests a conception of properties with few substantive constraints on the conditions under which properties exist or are exemplified – a conception which will be unconvincing to any serious propositional contingentist. We strengthen the case against serious propositional contingentism if we offer arguments which rely on less controversial instances of the generalised being constraint, i.e. instances involving simple and uncontroversial cases of predication, rather than instances involving logical constants or sentential operators.

Here, I propose to do precisely that, by thinking about what serious propositional contingentist can say about possible worlds – total ways the world could be – and the often used semantic machinery of a possible worlds semantics for modality. In particular, I argue that, provided possible worlds play a minimal, relatively uncontroversial theoretical role, serious propositional contingentism entails that possible worlds are modally fragile – every world ontologically depends on every proposition. I then show that, given minimal assumptions, this is incompatible with understanding metaphysical modality in terms of possible worlds, since it entails that the following is false:

Worldism (W): For any proposition, *p*, if *p* is true at all possible worlds, then *p* is necessary.

As such, even a relatively non-committal understanding of metaphysical modality in terms of possible worlds is incompatible with serious propositional contingentism.

I take this argument to be significant for three reasons. Firstly, related to the discussion above, the argument to follow can be given consistently alongside a syncategorematic treatment of logical constants and, furthermore, it relies on only a select number of uncontroversial instances of a higher-order formulation of serious actualism. Secondly, a corollary of my argument is that any solution to extant problems for the serious propositional contingentist which appeals to distinctions one may draw using the machinery of possible worlds is problematic. As I noted above, some have argued that such distinctions can circumvent issues for the serious propositional contingentist arising from too generous property abstraction and application principles. Indeed, I myself argued as much in Masterman (2024a). Of crucial importance is that the argument I present in this paper requires only presupposing a minimal theoretical role for possible worlds. At the very least, then, my argument shows that serious work must be done to explain how worlds are consistently understood by serious propositional contingentists, before such machinery is put to use to provide solutions to other issues.

Finally, my argument improves on other recent work which has highlighted the tension between varieties of propositional contingentism and minimal claims about possible worlds. Fritz (2016, 141) shows that propositional contingentists cannot account for generalised quantifier expressions over worlds. More recently, in my own work, I show that propositional contingentists, with or without a commitment to serious actualism, can only secure the necessitated Leibnizian biconditional, i.e. necessarily, possibly ϕ if and only if there is a world at which ϕ, by rejecting plausible *de re* modal claims, see Masterman (2022, 2024b).[4] Whilst Fritz's results explicitly raise problems for understanding possible worlds as maximally strong non-trivial propositions, following Stalnaker (1976), it is unclear how such results generalise to other conceptions of worlds. Moreover, neither (Fritz 2016) nor my earlier paper are concerned with contingentist views consistent with serious actualism. Although I do present limitative results consistent with serious actualism in Masterman (2024b), the argument there is conducted in a first-order setting, and it is unclear that such results translate to a higher-order setting. The argument presented here shows that serious propositional contingentism and (W)

[4]All of this is in contrast to the situation for necessitism – the view that necessarily everything, propositions and non-propositions alike, is necessarily something. Necessitists can readily accept the existence of world-like entities and prove, under minimal assumptions, that theoretically useful connections between worlds, modality, and propositions hold, see Menzel and Zalta (2014), Dorr, Hawthorne, and Yli-Vakkuri (2021, 46–52), Masterman (2022, Section 1.2) and Fritz (2023b).

above are jointly inconsistent, given only minimal claims about *worlds*, given in a higher-order setting, which ought to hold for any conception of possible worlds as abstract entities.

I present the central argument against serious propositional contingentism in Section 3. But before that, some further remarks about formulating serious propositional contingentism in a higher-order modal setting are made in Section 2. In Section 4, I discuss three objections one might raise and clarify the import of the argument presented.

2. Formulating serious propositional contingentism

For contingentists, there might have been something which might have been nothing. Typically, however, contingentists accept more than this. First, contingentists typically accept that there *is* at least something which might not have existed. Second, and importantly for our concerns here, contingentists often also accept that various properties, propositions and relations contingently exist – a view often known as *higher-order contingentism*. We express one aspect of higher-order contingentism – propositional contingentism – as follows, where p and q are sentential variables in a typed higher-order language:

$$\exists p \Diamond \neg \exists q (p = q) \qquad (\mathrm{PC}^+)$$

Throughout this paper, ⌜$\Diamond$⌝ and ⌜$\Box$⌝ are always interpreted as metaphysical possibility and necessity, respectively. As briefly noted earlier, (PC^+) is typically motivated by appealling to essentialist theses about propositions which entail that certain propositions ontologically depend, for their existence, on the existence of objects which are themselves contingent. Following Fritz (2023a, 357), we can distinguish two broad ways of spelling out this ontological dependence: *aboutness* views and *distinction* views. According to the first, certain propositions are directly or singularly about other individuals and, as such, ontologically depend, for their existence, on the existence of such individuals.[5] According to the second view, part of what makes a proposition *that very* proposition is the set of distinctions it makes in logical space. Some propositions make distinctions in terms of specific individuals and, as such, in the absence of those

[5]The aboutness view is the most common way of formulating propositional contingentism, see Prior (1957, 1967), Fine (1980), Adams (1981), Menzel (1993), Loptson (1996), Cartwright (1997) and Turner (2005).

individuals, the proposition does not exist.[6] Now, these two ways of motivating propositional contingentism are fundamentally different, resulting in different patterns of contingency (Masterman 2022, 20). We should be careful not to conflate them. My argument to follow here assumes little in detail about propositional contingentism, and remains neutral with respect to these two different motivations for the view.

Serious propositional contingentism is the view which accepts (PC^+) and serious actualism. Loosely put, serious actualism is the claim that it is impossible for a property to be exemplified without being exemplified by something.[7] Typically, serious actualism is formulated using a first-order scheme, i.e. serious actualism is usually taken as the view that each instance of the following scheme is true.

$$\Box\forall x_1 \cdots \Box\forall x_n \Box(Rx_1 \cdots x_n \rightarrow \exists y_1 \cdots \exists y_n(y_1 = x_1 \wedge \cdots \wedge y_n = x_n)) \quad \text{(SA)}$$

Here $\ulcorner R \urcorner$ is schematic in (SA) for any n-place relation and $\ulcorner \Box\forall x_1 \cdots \Box\forall x_n \urcorner$ abbreviates an uninterrupted string of appropriately many, interleaved first-order universal quantifiers and necessity operators. On this understanding, to be a serious actualist is to accept every instance of (SA). However, in the present context, a first-order scheme problematically places no constraints on higher-order entities like propositions, properties and relations. That is, in a higher-order setting, this formulation leaves open questions such as whether serious actualists should accept as a consequence of their view, as they typically do, that propositions cannot be true and not exist, see Adams (1981, 18) and Fine (1985, 165–166).[8]

To remedy this, we formulate serious actualism more generally here using a higher-order modal language. First, then, I pause to outline the language used in this paper, $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$. Here, I do not aim to be comprehensive, but to just give enough detail so that the arguments of this paper are clear. $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$ is a highly expressive quantified modal language. The language is typed, and so specifying the syntax involves specifying the available types which are in turn associated with certain syntactic categories of expressions in $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$. Typically, in setting up a higher-order language like $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$, we start with one primitive type e. Here, however,

[6]This formulation of propositional contingentism is discussed in Fine (1977b, 1980) and Stalnaker (2012), and explored extensively by Fritz (2016, 2017, 2018a, 2018b) and Fritz and Goodman (2016, 2017).

[7]For defence, see Stephanou (2007), Plantinga (1983, 11–15, 1985, 316–323), Williamson (2013, 148–158), Kment (2014, 79) and Jacinto (2019). Increasingly, the literature has been critical of serious actualism, see Rayo (2021), Fritz (2023a), Masterman (2023, 2024a).

[8]Some notable exceptions of higher-order formulations of serious actualism include Dorr (2017), Jacinto (2019) and Fritz (2023a). See Fritz (2023a, 349–350) for more of a discussion on formulating a sufficiently strong version of serious actualism.

there are two primitive types: e and ω. The latter will be the type associated with variables ranging over possible worlds. The set of available types Σ is thus defined:

Set of Types Σ: Σ is the smallest set which (i) contains the primitive types e and ω such that (ii) if $\sigma_1, \ldots, \sigma_n$ are types, then $\langle \sigma_1, \ldots, \sigma_n \rangle$ is a type.

Each type is associated with a certain category of expressions. We associate e with singular terms (first-order variables), ω with variables ranging over possible worlds, and we associate the empty type $\langle\rangle$ with formulae and propositional variables, as in (PC^+) above. Further associations are naturally built up. For instance, since we associate $\langle e \rangle$ with monadic first-order predicates, we associate $\langle\langle e \rangle\rangle$ with second-order monadic predicates taking first-order monadic predicates as arguments, and we associate $\langle e, \langle\langle e, e \rangle\rangle\rangle$ with a two-place relation which holds between a singular term (a term of type e) and a second-order predicate which takes two-place first-order relations (terms of type $\langle e, e \rangle$) as an argument. If required, I use superscripts to indicate type, e.g. we distinguish first-order identity $=^{\langle e,e \rangle}$ from propositional identity $=^{\langle\langle\rangle,\langle\rangle\rangle}$ from world identity $=^{\langle \omega,\omega \rangle}$.

With this in mind, the lexicon of $\mathcal{L}^{\Diamond}_{\text{HOL}}$ consists of denumerably many variables for each type in Σ, a stock of the usual logical connectives, quantifiers $\forall^{\sigma}$ and $\exists^{\sigma}$ for each type σ, a relation of identity $=^{\langle \sigma,\sigma \rangle}$ for each type σ, and the usual modal operators. Distinctively, the lexicon contains denumerably many world variables w_n, v_n, u_n of type ω, for each natural number n, and world quantifiers $\forall^{\omega}$ and $\exists^{\omega}$ of type $\langle\langle \omega \rangle\rangle$. $\mathcal{L}^{\Diamond}_{\text{HOL}}$ also contains:

- A two-place relation $\triangleright^{\langle \omega,\langle\rangle \rangle}$. We read '$w \triangleright p$' as '$p$ is true at w'.
- A one-place predicate $\mathcal{A}^{\langle \omega \rangle}$. We read '$\mathcal{A}w$' as '$w$ is actual'.

Well-formed formulae are constructed as follows. For any types $\sigma_1, \ldots, \sigma_n$, if α is an expression of type $\langle \sigma_1, \ldots, \sigma_n \rangle$, where $n>0$, then $\alpha(\beta_1, \ldots, \beta_n)$ is a well-formed formula, provided β_1 is an expression of type σ_1, β_2 is an expression of type σ_2, and so on.[9]

[9]The presentation of the syntax of $\mathcal{L}^{\Diamond}_{\text{HOL}}$ closely follows the presentation of the syntax of higher-order languages in Dorr, Hawthorne, and Yli-Vakkuri (2021, Section 1.2).

With $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$, we now can express a more general version of (SA) as follows.

$$\Box\forall x_1^{\sigma_1}\cdots\Box\forall x_n^{\sigma_n}\Box\big(R^{\langle\sigma_1,\ldots,\sigma_n\rangle}x_1^{\sigma_1}\cdots x_n^{\sigma_n}\rightarrow\exists y_i^{\sigma_i}(y_i^{\sigma_i}=^{\langle\sigma_i,\sigma_i\rangle}x_i^{\sigma_i})\big)\qquad(\mathrm{SA}^+)$$

$\ulcorner\Box\forall x_1^{\sigma_1}\cdots\Box\forall x_n^{\sigma_n}\urcorner$ abbreviates an uninterrupted string of appropriately many, interleaved universal quantifiers and necessity operators, as before; $\ulcorner\sigma_1,\ \ldots,\ \sigma_n\urcorner$ is schematic in (SA$^+$) for any types, $\ulcorner R^{\langle\sigma_1,\ldots,\sigma_n\rangle}\urcorner$ is schematic for any n-place expression of type $\langle\sigma_1,\ \ldots,\ \sigma_n\rangle$ in $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$, and $\ulcorner\exists y_i^{\sigma_i}(y_i^{\sigma_i}=^{\langle\sigma_i,\sigma_i\rangle}x_i^{\sigma_i})\urcorner$ stands for a conjunction of such quantifier expressions for each variable $x_1^{\sigma_1},\ \ldots,x_n^{\sigma_n}$, as may be required.

At this juncture, it would typically be asserted that to be a serious actualist is to think that each and every instance of (SA$^+$) is true. However, as I noted in Section 1, I want to remain neutral here on whether a *fully generalised* higher-order formulation of serious actualism is acceptable. As understood here, then, to be a serious actualist is to accept a suitably large number of instances of (SA$^+$). Of course, this is vague and unsatisfactory. But, importantly, in what follows, I utilise only minimal instances of (SA$^+$) which ought to be acceptable to the serious actualist and relatively uncontroversial. In presenting my argument in Section 3, I will not *defend* these instances as acceptable, but in Section 4, I will return to this issue and address this.

3. The argument

The central claim of this paper is that serious propositional contingentism is incompatible with any theory which, at the very least, commits to the *truth* of claims like (W). Of course, the mere *truth* of claims like (W) does not involve any further claim about the status of this connection between world-talk and ordinary modal talk – whether modal-talk is grounded in, reduced to, world-talk, or whether the latter explicates the meaning of the former. Here, the target is broad: theories of modality according to which (W) must at least be true.

It goes without saying that there are various approaches to possible worlds in the literature. Most take possible worlds to be some sort of abstract entity: sets of propositions (Adams 1981), sets of sentences (Roy 1995), individual maximally strong propositions (Fine 1977a), individual sentence types (Sider 2002), maximal states of affairs (Plantinga 1974), or maximal properties, see Stalnaker (2012) and Forrest (1986). Worlds, according to all of these approaches, are maximal, in some sense, possible, in some other sense, and represent propositions as being true or false *at* them, however this is understood.

Here, I follow suit in taking possible worlds to be abstract entities, but I do not want to rely on any particular conception of possible worlds. I want to make *general* arguments. The arguments presented here are formulated in $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$, where talk of worlds is achieved via expressions of their own special type. This prevents us from smuggling in any substantive assumptions into our theorising about worlds in $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$. In what follows, I first discuss some minimal principles worlds should satisfy. I then show that serious propositional contingentism in conjunction with such minimal principles about worlds entails that all possible worlds ontologically depend on all propositions – a thesis I show to be jointly inconsistent with serious propositional contingentism and (W).

In a slogan: serious propositional contingentism entails that possible worlds are *highly modally fragile*. That is, perhaps surprisingly, the serious propositional contingentist must maintain that every possible world ontologically depends on every proposition: were any actual proposition to not be, no actual possible world would be. In $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$, we express this thesis as follows, where $\ulcorner \mathrm{E}^{\sigma} x^{\sigma} \urcorner := \ulcorner \exists v^{\sigma}(v^{\sigma} =^{\langle \sigma,\sigma \rangle} x^{\sigma}) \urcorner$, with variable v^{σ} distinct from x^{σ}.

(MF) $\forall p \forall w \Box(\mathrm{E}^{\omega} w \rightarrow \mathrm{E}^{\langle\rangle} p)$

(*To be read*: For any proposition p and possible world w, it is metaphysically necessary that if w exists, then p exists.)

Surprisingly little is needed to show that serious propositional contingentism entails (MF). The entailment holds, if we assume the following two claims about worlds. The first is the fact that possible worlds are maximal. In $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$:

(M) $\forall p \forall w(w \rhd p \vee w \rhd \neg p)$

(*To be read*: For any proposition p and possible world w, either p is true at w or the negation of p is true at w.)

After all, what is supposed to distinguish a world-like possible state and any old possible state of the world is that the former, not the latter, is required to be total. Each possible world decides or takes a stance on every proposition such that, for each proposition p, either p or $\neg p$ is true at w. The second assumption is about how possible worlds relate to certain propositions.

(E) $\forall w \forall p(w \triangleright p \rightarrow \Box(\mathrm{E}^{\omega} w \rightarrow w \triangleright p))$
(*To be read*: For any possible world w and proposition p, if p is true at w, then it is metaphysically necessary that p is true at w, if w exists.)

(E) captures the claim that it is essential to any world w that the propositions true at w are true at w. The idea is that it is not merely accidental that p is true at w. Rather, if p is true at w, then p being true at w is (in part) what makes w the world that it is. As such, if w exists, then it must be related to p in this way. It is useful to compare the motivation for (E) with the motivation of a parallel idea in the case of propositions and the relation of aboutness, particularly Williamson's (2002, 241) and Speak's (2012, 529) considerations for the claim that if p is a singular proposition about o – that is, if p is directly about o – then p ontologically depends on o. Williamson writes:

> Even so, how could something be the proposition that that dog is barking in circumstances in which that dog does not exist? For to be the proposition that that dog is barking is to have a certain relation to that dog, which requires there to be such an item as that dog to which to have the relation (Williamson 2002, 241).

Likewise, the argument goes, with possible worlds and those propositions true at them: how could something be the possible world that it is, i.e. the possible world where at least p is true at it, in the circumstances in which p is not true at it? If $w \triangleright p$, then *a fortiori*, necessarily $w \triangleright p$, if w exists.[10]

Given (E) and (M), we argue from serious propositional contingentism to (MF). Of course, in presenting such an argument, we should be precise about the underlying logical principles used in the argument, since several combinations of axioms and inference rules for quantified modal logic are deeply problematic for the contingentist.[11] The argument for (MF) from serious propositional contingentism relies on little in the way of quantified logic. It is unnecessary here to outline a full proof system, or formal semantics. Much of the argument goes through with tautologous reasoning, and applications of *modus ponens*. However, the argument does require us to make non-trivial inferences involving quantification in modal contexts. Two aspects of the logic utilised need

[10]The considerations just discussed motivate a stronger thesis than (E), namely $\forall w \forall p(w \triangleright p \rightarrow \Box w \triangleright p)$. However, this latter thesis is problematic for the serious propositional contingentist, and thus the idea must be captured with a weaker claim.

[11]The classic example of this being the trio consisting of the rule of necessitation, i.e. if $\vdash \phi$, then $\vdash \Box\phi$, the axiom identity $\vdash x = x$, and classical quantification, i.e. $\vdash \phi(x) \rightarrow \exists x \phi(x)$, as well as, if $\vdash \phi(x)$, then $\vdash \forall x \phi(x)$. Given any relation of proof-theoretic consequence $\vdash$, if the above hold for $\vdash$, then necessitism follows as a theorem, i.e. $\vdash \Box \forall x \Box \exists y(y = x)$, see Nelson (2009).

to be clarified. First, the non-modal logic of quantification (NMQL). I appeal only to the following principles of a quantified free logic.

(∀1) $\forall^{\sigma} v^{\sigma} \rightarrow (\mathrm{E}^{\sigma} t^{\sigma} \rightarrow \phi[t^{\sigma}/v^{\sigma}])$
(∀$^{\rightarrow}$) $\forall^{\sigma} v^{\sigma}(\phi \rightarrow \psi) \rightarrow (\forall^{\sigma} v^{\sigma} \phi \rightarrow \forall^{\sigma} v^{\sigma} \psi)$
(UE) $\forall^{\sigma} v^{\sigma} \mathrm{E}^{\sigma} v^{\sigma}$
(UG) If ϕ, then $\forall v^{\sigma} \phi$

$\ulcorner \phi[t^{\sigma}/v^{\sigma}] \urcorner$ is the result of uniformly replacing v^{σ} with t^{σ} such that t^{σ} is not bound. Note that (UG) is justified here, since $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$ contains only variables and so any well-formed formula with free v^{σ} is understood as stating a truth about an appropriate arbitrary entity. Why principles of a free quantifier logic? The thought is simple. If a formula is an axiom of a free quantifier logic, or a rule valid in a free quantifier logic, then that formula and rule is a theorem or valid, respectively, in a classical quantifier logic. However, the converse does not hold. Some contingentists adopt a free quantifier logic to formulate their view, others do not, but regardless of this, insofar as the arguments presented appeal only to the above, they should be accepted as valid by any contingentist.[12]

Second, the modal logic utilised. Again, the modal logic utilised here is minimal. Here, I utilise the T-Axiom scheme, i.e. $\Box\phi \rightarrow \phi$, and much of the argument runs off the back of non-modal rules of inference with modal formulae. Of particular importance is that the argument does not presuppose the validity of the standard rule of necessitation.[13] That being said, it is worth noting that some degree of reasoning with formulae quantifying into modal contexts is required. In particular, the argument requires it to be a valid inference from (i) to (ii), where v^{σ_1} and v^{σ_2} are distinct variables, and ψ and ξ are formulae with exactly the relevant variable free, and ϕ a formula with at most two of the relevant variables free.

$$\forall v^{\sigma_1} \forall v^{\sigma_2} \Box\big(\phi(v^{\sigma_1}, v^{\sigma_2}) \rightarrow \psi(v^{\sigma_2})\big) \wedge \forall v^{\sigma_1} \forall v^{\sigma_2} \Box\big(\xi(v^{\sigma_1}) \rightarrow \phi(v^{\sigma_1}, v^{\sigma_2})\big) \quad \text{(i)}$$

$$\forall v^{\sigma_1} \forall v^{\sigma_2} \Box\big(\xi(v^{\sigma_1}) \rightarrow \psi(v^{\sigma_2})\big) \quad \text{(ii)}$$

For convenience, I will refer to this inference as '(i)–(ii)'. (i)–(ii) is plausible and endorsing it is consistent with deny the rule of necessitation.

[12]See Adams (1981) for a classic exposition of this way of formulating modal logic in line with contingentism and Nelson (2009) for discussion of this strategy.
[13]See Prior (1967, 48–49), Adams (1981, 27–28) and Menzel (1991, 340) for motivation for a contingentist rejection of the rule of necessitation.

However, endorsing (i)–(ii) raises some subtle issues which need addressing.[14] (i) –(ii) governs tautologous reasoning with quantified formulae, bound by quantifiers outside of the scope of the modal operator. As such, endorsing the inference makes it plausible that classical tautologies are necessary, i.e. claims like $\forall p\Box(p \vee \neg p)$. Now, the *truth* of a claim like $\forall p\Box(p \vee \neg p)$ is, of course, consistent with rejecting the standard rule of necessitation. Although typically claims like $\forall p\Box(p \vee \neg p)$ are taken to be logically true and derived by an application of the rule of necessitation to $p \vee \neg p$ and then an application of (UG), a rejection the rule of necessitation alone is not sufficient to rule out the *mere truth* of $\forall p\Box(p \vee \neg p)$ and claims like it. At first glance, this may seem problematic, given the argument discussed earlier from Fritz (2023a) which shows that $\forall p\Box(p \vee \neg p)$, whether logically true or merely true, entails propositional necessitism when coupled with two instances of the generalised being constraint. However, as I also noted in Section 1, the relevance of Fritz's conclusion to serious propositional contingentism can be avoided by either opting for a syncategorematic treatment of logical constants, or by restricting the number instances of (SA^+) the serious actualist must accept. I flag these issues here merely to be clear about the modal logic that is operative in the argument to follow and what are, and are not, consequences of it. The point to emphasise: the argument to follow gains traction against the serious propositional contingentist *even if* the rule of necessitation is restricted, a syncategorematic treatment of logical constants is adopted, and the number of legitimate instances of (SA^+) is restricted.[15]

With all this in mind, we can now present the argument for (MF), assuming (E), (M), and (SA^+), and the minimal logical resources outlined above.

[14]Thanks to an anonymous reviewer for pushing me on this point here.

[15]A distinct argument from that in Fritz (2023a) given against serious propositional contingentism is found in Dorr (2017, 57). Rather than beginning from the truth of $\forall p\Box(p \vee \neg p)$, Dorr notes that $\Box\forall p\Box(\Diamond p \vee \neg p)$ is a theorem in any higher-order modal logic containing the rule of necessitation, (UG), and the T-axiom. Given

$$\Box\forall p\Box(\neg p \rightarrow \exists q(q =^{\langle\langle\rangle,\langle\rangle\rangle} p)) \tag{iii}$$

$$\Box\forall p\Box(\Diamond p \rightarrow \exists q(q =^{\langle\langle\rangle,\langle\rangle\rangle} p)) \tag{iv}$$

as instances of (SA^+), it quite straightforwardly follows that $\Box\forall p\Box\exists q(q =^{\langle\langle\rangle,\langle\rangle\rangle} p)$. Again, such results can, in effect, be blocked by either rejecting the rule of necessitation, or opting for a syncategorematic treatment of logical constants. On the latter approach, (iii) is not a legitimate instance of (SA^+), blocking even the worry that $\forall p\Box(\Diamond p \vee \neg p)$ is as problematic for the serious actualist if merely true, but not logically true.

(1) $\Box\forall w\forall p\Box(w \rhd p \rightarrow \mathrm{E}^{\langle\rangle}p)$ (SA^{+}, T-Schema)
(2) $\forall w\forall p\Box(w \rhd p \rightarrow \mathrm{E}^{\langle\rangle}p)$ (T-Schema, 1)
(3) $\forall w\forall p(w \rhd p \rightarrow \Box(w \rhd p \rightarrow \mathrm{E}^{\langle\rangle}p))$ (NMQL, 2)
(4) $\forall w\forall p(w \rhd p \rightarrow \Box(\mathrm{E}^{\omega}w \rightarrow w \rhd p))$ (E)
(5) $\forall w\forall p(w \rhd p \rightarrow \Box(\mathrm{E}^{\omega}w \rightarrow \mathrm{E}^{\langle\rangle}p))$ (i–ii, 3, 4)
(6) $\forall w\forall p(w \rhd \neg p \rightarrow \Box(\mathrm{E}^{\omega}w \rightarrow \mathrm{E}^{\langle\rangle}\neg p))$ ($\forall$1, UG, UE, 5)
(7) $\forall w\forall p(\Box(\mathrm{E}^{\omega}w \rightarrow \mathrm{E}^{\langle\rangle}p) \leftrightarrow \Box(\mathrm{E}^{\omega}w \rightarrow \mathrm{E}^{\langle\rangle}\neg p))$ (Fact)
(8) $\forall p\forall w(w \rhd p \vee w \rhd \neg p)$ (M)
(9) $\forall p\forall w\Box(\mathrm{E}^{\omega}w \rightarrow \mathrm{E}^{\langle\rangle}p)$ (NMQL, 5–8)

Now, (MF), i.e. $\forall p\forall w\Box(\mathrm{E}^{\omega}w \rightarrow \mathrm{E}^{\langle\rangle}p)$, is not *alone* problematic for the serious propositional contingentist. However, given one further plausible assumption, (MF) can be shown to be jointly inconsistent with serious propositional contingentism and (W) – the thesis that propositions true at all worlds are necessary. Earlier, I introduced a primitive actuality predicate $\mathcal{A}$ of type $\langle\omega\rangle$. The argument for the joint inconsistency relies on only one further claim connecting $\mathcal{A}$ and $\rhd$:

$$\forall p\big(\forall w\Box(\mathcal{A}w \rightarrow p) \rightarrow \forall w(w \rhd p)\big) \qquad \text{(A-in)}$$

Is (A-in) plausible? To begin, we should accept that if, necessarily, p is true on the supposition that w is actual, then p is true at w, i.e. where p is arbitrary:

$$\forall w(\Box(\mathcal{A}w \rightarrow p) \rightarrow w \rhd p) \qquad \text{(A-in}^{-}\text{)}$$

Indeed, the left-hand side of the conditional here, i.e. $\Box(\mathcal{A}w \rightarrow p)$, is often taken as a definition of $w \rhd p$, see Prior (1957, 48–49), Plantinga (1976, 45–46, 1985, 342), Bergmann (1996, 358) and Bricker (2006, 53). However, regardless of whether we take $\Box(\mathcal{A}w \rightarrow p)$ as a definition of $w \rhd p$, it should at the very least be thought sufficient for $w \rhd p$, as is claimed in (A-in^{-}). (A-in^{-}) entails (A-in), by applications of (UG) and ($\forall^{\rightarrow}$).

Here's the argument for the inconsistency of serious propositional contingentism and (W). (MF), (W), (A-in), and relatively uncontroversial instances of (SA^{+}) entail propositional necessitism.

(1) $\Box\forall w\Box(\mathcal{A}w \rightarrow \mathrm{E}^{\omega}w)$ (SA^{+})
(2) $\forall w\Box(\mathcal{A}w \rightarrow \mathrm{E}^{\omega}w)$ (T-Axiom, 1)
(3) $\forall p\forall w\Box(\mathrm{E}^{\omega}w \rightarrow \mathrm{E}^{\langle\rangle}p)$ (MF)
(4) $\forall p\forall w\Box(\mathcal{A}w \rightarrow \mathrm{E}^{\langle\rangle}p)$ (i–ii, 2–3)
(5) $\forall p(\forall w(\Box(\mathcal{A}w \rightarrow p) \rightarrow w \rhd p))$ (A-in)
(6) $\mathrm{E}^{\langle\rangle}\mathrm{E}^{\langle\rangle}p \rightarrow (\forall w\Box(\mathcal{A}w \rightarrow \mathrm{E}^{\langle\rangle}p) \rightarrow \forall w(w \rhd \mathrm{E}^{\langle\rangle}p))$ ($\forall$1, MP, 5)

(7) $\forall p(\forall w(w \triangleright p) \rightarrow \Box p)$ (W)

(8) $\mathrm{E}^{\langle\rangle}\mathrm{E}^{\langle\rangle}p \rightarrow (\forall w(w \triangleright \mathrm{E}^{\langle\rangle}p) \rightarrow \Box\mathrm{E}^{\langle\rangle}p)$ ($\forall$1, MP, 7)

(9) $\mathrm{E}^{\langle\rangle}\mathrm{E}^{\langle\rangle}p \rightarrow (\forall w\Box(\mathcal{A}w \rightarrow \mathrm{E}^{\langle\rangle}p) \rightarrow \Box\mathrm{E}^{\langle\rangle}p)$ (NMQL, 6, 8)

(10) $\forall p\mathrm{E}^{\langle\rangle}\mathrm{E}^{\langle\rangle}p$ (Fact)[16]

(11) $\forall p\forall w\Box(\mathcal{A}w \rightarrow \mathrm{E}^{\langle\rangle}p) \rightarrow \forall p\Box\mathrm{E}^{\langle\rangle}p$ (UG, $\forall^{\rightarrow}$, 9–10)

(12) $\forall p\Box\mathrm{E}^{\langle\rangle}p$ (MP, 4, 11)

Thus, assuming (A-in) and (MF), serious propositional contingentism and (W) are jointly incoherent. Since (MF) follows from serious propositional contingentism, assuming some minimal claims about possible worlds, this shows that such a view and (W) are jointly incoherent assuming the same minimal claims, including (A-in).

It's worth underscoring two consequences of this argument. First, the consequences for contingentist possible worlds. (W) is, as I stressed earlier, a minimal claim about the connection between world-talk and modal-talk. As such, the argument here does not merely rule out strong claims which tie together world-talk and modal-talk. In fact, the argument presented here shows that even only accepting that the totality of possible worlds imposes a useful structure on metaphysical modality is off the table for the serious propositional contingentist. For the serious propositional contingentist, thinking that propositions true at all worlds are necessary propositions leads to inconsistency, assuming minimal assumptions about propositions and worlds. Since I take it that the serious propositional contingentist has very good reasons to accept the minimal assumptions that went into the above argument, they must abandon the prospects of understanding necessity as truth at all possible worlds, rejecting what is, for many, almost the default view in the metaphysics of modality.

Second, the consequences for serious propositional contingentism more broadly. At the outset of this paper, I discussed Fritz's (2023a) recent argument against serious propositional contingentism. I also noted that Fritz's initial argument can be blocked by opting for a syncategorematic treatment of the logical constants. Indeed, similar such considerations block Dorr's (2017) argument against the serious propositional contingentist. Such an approach to the logical constants is not without cost, and Fritz develops other arguments against serious propositional contingentism consistent with a syncategorematic view

[16]Unabbreviated, $\forall p\mathrm{E}^{\langle\rangle}\mathrm{E}^{\langle\rangle}p := \forall p\exists q(q = \exists q'(q' = p))$. In natural language: for any proposition p, there exists a proposition that p exists. Given the wide-scope universal quantification, it is trivial that $\forall p\mathrm{E}^{\langle\rangle}\mathrm{E}^{\langle\rangle}p$.

of the logical constants. However, these further arguments are less direct: the first targets the so-called *applicative being constraint* – the idea, loosely, that it is impossible for a property to be exemplified without that property itself being something (2023a, 359–360) – and second shows that the generalised being constraint entails that there is no property of propositions necessarily coextensive with being possible and that such a result curtails higher-order reasoning about modality (2023a, 361–363). Now, to be clear, I do not wish to argue that length against Fritz's arguments: both arguments present compelling challenges to serious propositional contingentism and it remains to be seen whether work can be done to circumvent the worries Fritz raises. Rather, what I wish to emphasise is that the argument presented here is independent of such worries. What the argument presented here has shown is that, even if the serious propositional contingentist opts for a syncategorematic treatment of the logical constants, and work is done to circumvent Fritz's results, more problems than have been countenanced to date remain: a minimal apparatus of possible worlds is enough to undermine serious propositional contingentism. That is, given the generality of the argument presented here, if one, for whatever reason, ought to believe that there are some entities, whatever they may be, which fit the minimal role assigned to possible worlds outlined above, then one ought to reject serious propositional contingentism. This puts a significant and non-obvious constraint on future systematic attempts to formulate serious propositional contingentism coherently.

4. Discussion: abstraction, truth and going weaker

At first glance, the argument for (MF) and the joint inconsistency of (MF), (W) and serious propositional contingentism relied on the very minimal principles (M), (E) and (A-in). Of particular interest is that we only assumed (M) and not any problematic modal strengthening of this principle.[17] There are, however, some less trivial assumptions at play in my argument. So, it's important I discuss these and further clarify their use in the above arguments. I will also discuss one objection to the argument of this paper – that the serious propositional contingentist should instead

[17]Stalnaker (2012, 27) argues that if worlds are maximally consistent propositions, the contingentist should reject $\forall w \Box \forall p(w \triangleright p \vee w \triangleright \neg p)$. That is, although all possible worlds may actually be maximal, their maximality is not an essential feature. Even if Stalnaker's arguments are cogent, the argument presented in this paper required only (M) which is not threatened by any such modal argument about possible worlds.

commit to a weaker claim than (W) – and why I don't think this is an adequate response.

4.1. Predicate abstraction

One substantial assumption in the arguments I have presented is my inclusion of $\triangleright$ and $\mathcal{A}$ as predicate expressions in the language $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$. In turn, I assume that certain expressions involving them furnish legitimate instances of (SA$^+$). Indeed, I went further and claimed that such instances of (SA$^+$), as required in the argument, are minimal and should be considered non-controversial, strongly suggesting that no well-motivated restriction on (SA$^+$) is sufficient to block the issue presented here. Is this true? Can the argument be resisted by denying that $\triangleright$ and $\mathcal{A}$ furnish acceptable instances of (SA$^+$)? For such an objection to be successful, it must be shown that the work done by either $\mathcal{A}$ or $\triangleright$ in any theory of worlds can be done instead by some non-predicate expression and that no analogous problems arise for a theory without one of $\triangleright$ or $\mathcal{A}$. I argue that this cannot be achieved.[18]

To begin, let's first focus on $\mathcal{A}$. The first issue is that this objection ultimately presupposes *ad hoc* stipulations about the proper role of predicate abstraction in higher-order modal logic. To best understand the problem here, we should first pause to briefly outline how predicate abstraction is typically assumed to behave in higher-order modal logic. The most natural principle governing predicate abstraction in $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$ is the following.[19]

(λ) For every well-formed formula $\phi v_1 \cdots v_n$ of $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$, where $v_1, \ldots, v_n$ are variables free in ϕ, there is the predicate $\lambda v_1, \ldots, \lambda v_n.\phi v_1 \cdots v_n$

Here, we read $\lambda v_1 \cdots \lambda v_n.\phi v_1 \cdots v_n$ as the predicate *being* $v_1 \cdots v_n$ *such that* $\phi v_1 \cdots v_n$. Notationally, we write $\lambda v_1 \cdots \lambda v_n.\phi v_1 \cdots v_n(a_1, \ldots, a_n)$ for

[18]A minor point worth observing is that the standard motivations serious actualists give for dismissing other problematic properties and relations, such as the property of being nothing, or the property of being either wise or not wise, do not apply in the case of actuality and world-relative truth. That is, one might wish to argue that serious actualist should be restricted to properties which are in a certain sense natural, or at least non-gerrymandered – properties which correspond to only simple predicate expressions. Or alternatively, as I discuss in Masterman (2024a, 4), one might independently agree with Russell that there is 'no point' in a property 'which could not conceivably be false' (Russell 1994). This latter claim might rule out some properties, e.g. property of being nothing. However, these considerations make no contact with the question of whether world-relative truth and actuality are real properties, or whether $\triangleright$ and $\mathcal{A}$ are indispensable predicate expressions.

[19]For a concise introduction to the role of lambda abstraction in higher-order languages, see Dorr, Hawthorne, and Yli-Vakkuri (2021, 20–23).

the expression which uniformly replaces $v_1, \ldots, v_n$ with terms $a_1, \ldots, a_n$ of the right types. The expression $\lambda v_1 \cdots \lambda v_n.\phi v_1 \cdots v_n(a_1, \ldots, a_n)$ is read as $a_1, \ldots, a_n$ satisfy $\lambda v_1 \cdots \lambda v_n.\phi v_1 \cdots v_n$.[20]

Now, as I briefly discussed in Section 1, it is well-known that the serious propositional contingentist most plausibly must deny (λ); or at least, assuming very reasonable principles governing predicate *application*, (λ) is deeply problematic for the contingentist.[21] Though I will not rehearse these arguments in detail, it is worth observing presently that denying that $\mathcal{A}$ be included in $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$ is plausibly only a coherent strategy if some *further* claims hold. First, that $\mathcal{A}$ can be defined in terms of some open-sentence $\phi^{\mathcal{A}}$ in $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$. After all, we do not want to dispense with the notion of actuality altogether, we only demand that a predicate like $\mathcal{A}$ not be countenanced. Second, that the relevant instance of (λ) with $\phi^{\mathcal{A}}$ is false. On the face of it, however, this is a deeply *ad hoc* response. In fact, this response is especially *ad hoc*, since $\phi^{\mathcal{A}}$ is taken to stand in for *any* formula which may be taken to define $\mathcal{A}$. It is obscure what evidence, short of an *ad hoc* stipulation, could be adduced for such a strong general claim. In contrast to the case for a syncategorematic treatment of logical constants discussed in Section 1, there is no stock of philosophical arguments for thinking that actuality is not best theorised about by treating it as a predicate.

Now, to be clear, my reply here is not simply that the serious propositional contingentist must reject the most natural and simple principle governing predicate abstraction. This is a well-known and separate issue for them. Instead, my reply here is that to coherently object in this way involves introducing *further*, particularly *ad hoc* distinctions about predicates. We can put the problem for the serious propositional contingentist here in this way. It is well known that the serious propositional contingentist must *somewhere* draw a line between expressions which form predicates and those which do not. The problem is that objecting to a

[20]I am being cavalier here with the lack of quotation. It is clear when an expression is being used or mentioned.

[21]Predicate *application* is taken to be governed by the following principle.

$$\lambda v_1 \cdots \lambda v_n \phi v_1 \cdots v_n(a_1, \ldots, a_n) \leftrightarrow \phi v_1 \cdots v_n[a_1/v_1, \ldots, a_n/v_n]$$

This is often known as *Extensional Beta Conversions*, see Dorr, Hawthorne, and Yli-Vakkuri (2021, 23) for a discussion of this principle. For a discussion of the underlying motivation behind taking the application conditions of complex predicates to be identical to the application conditions of their respective formulae, see Fine (1985), Rayo (2021) and Masterman (2024a). Strictly speaking, the contingentist must reject the *conjunction* of (λ) and (λ'), see Dorr (2017), Rayo (2021) and Masterman (2024a). Here, I have focussed on (λ) alone because (λ') seems undeniable. Regardless of this, were the serious propositional contingentist to challenge (λ'), what I later say about (λ) applies *mutatis mutandis*.

predicate like $\mathcal{A}$ requires the serious propositional contingentist to commit to a seemingly unprincipled, *ad hoc*, and *specific* such dividing line. To make matters worse, to date no serious propositional contingentist or serious actualist has articulated a principled such dividing line, and thus the stipulation that $\mathcal{A}$ does not even correspond to a predicate remains *ad hoc* – the reason cannot simply be that otherwise, the contingentist runs into the argument I outlined above.

There is an altogether different, second problem with this objection. This is that there are independent reasons for seriously doubting whether the serious propositional contingentist can even give an adequate definition of $\mathcal{A}$ in the first place. A guiding idea is that if $\mathcal{A}$ applies to some w, we should want it that all propositions true at w are true *simpliciter*. A natural approach, then, is to define the actuality of a certain possible world as the truth of all the propositions which are true at that possible world as follows.

$$\mathcal{A}w := \forall p(w \triangleright p \leftrightarrow p) \qquad (\mathcal{A})$$

As I stressed earlier, however, it must be shown that a defined expression like ($\mathcal{A}$) can do the work required of a notion of actuality. The notion of actuality plays a crucial role for any theory of possible worlds in that by stipulating that all worlds are possibly actual, we guarantee that the propositions true at a world at least characterise a way the world *could have been*. The problem, however, is that ($\mathcal{A}$) is problematically weak in a contingentist framework. We can show informally that by ($\mathcal{A}$) alone, we cannot rule out there being some possible world w such that $w \triangleright p$, $w \triangleright q$, yet $\neg\Diamond(p \wedge q)$.

Let p and q be two propositions such that $\neg\Diamond(p \wedge q)$. Further suppose that both p and q ontologically depend on some contingent individual i. Since $\neg\Diamond(p \wedge q)$, the principles and postulates of any adequate theory of worlds should rule out the existence of a world w such that $w \triangleright p$ and $w \triangleright q$ by the stipulation that every world is possibly actual, i.e. $\Diamond\mathcal{A}w$. However, for the contingentist, endorsing ($\mathcal{A}$) *fails* to rule out such a world. Suppose there is a world w such that i does not exist at w, $w \triangleright p$ and $w \triangleright q$ and:

(a) For any proposition t which would be true, were i not to exist, $w \triangleright t$.
(b) For any proposition f which would be false, were i not to exist, $\neg(w \triangleright f)$.

Since i is a contingent individual, it is possible that i does not exist. Moreover, were i not to exist, no proposition ontologically dependent on i would exist – including p and q. Given (a), it follows that, were i

not to exist, it would be true that $\forall p(p \to w \triangleright p)$. Given (b), it follows that, were i not to exist, it would be true that $\forall p(\neg p \to \neg(w \triangleright p))$. Thus, were i not to exist, it would be true that $\forall p(p \leftrightarrow w \triangleright p)$. Since i is contingent, $\Diamond\forall p(p \leftrightarrow w \triangleright p)$. Thus, by ($\mathcal{A}$), w is a possible world, i.e. possibly actual, even though $w \triangleright p$, $w \triangleright q$, and $\neg\Diamond(p \wedge q)$.

Crucially for our example, since p and q depend on i, p and q would not exist, were i not to exist – that is were i not to exist, p and q would not fall in the range of the quantifier in $\forall p(w \triangleright p \leftrightarrow p)$. The problem here is a species of a general one for contingentists: quantified expressions are considerably weaker in contingentist settings when compared to necessitist settings, see Masterman (2022, 12–13). As such, it is plausible to think that any definition of actuality which makes use of some quantification over propositions – as we should expect such a definition to – is going to suffer from similar flaws. We therefore have two good reasons to resist this response from the serious propositional contingentist: it is therefore not an option for the serious propositional contingentist to push back against the arguments presented in this paper by eschewing an actuality predicate.

Recall, however, that the objection to the arguments presented in this paper is that we can take at least one of *either* $\triangleright$ *or* $\mathcal{A}$ as defined. What, then, should we say about $\triangleright$? In the case of $\triangleright$, there are indeed complex formulae which could be taken as a definition of $\triangleright$ and which do not, unlike the case of $\mathcal{A}$, seem to fail to be at least materially adequate. One could define $\triangleright$ in terms of actuality and necessity. In $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$, this would amount to the following.

$$w \triangleright p := \Box(\mathcal{A}w \to p) \qquad (\triangleright)$$

However, such a definition, however much better it fares than definitions for $\mathcal{A}$, still falls afoul of the earlier, more general problem which I highlighted for the serious propositional contingentist. That is, defining $\triangleright$ in this way is only a coherent strategy, if there is no complex predicate associated with the definitional formula. However, this response again introduces a problematic, *ad hoc* distinction about predicate abstraction. With no independent reason for this distinction, this response is inadequate.

My responses to the prospects of defining $\mathcal{A}$ and $\triangleright$ have been much the same. At the very least, in both cases, the serious propositional contingentist incurs theoretical costs in doing so, i.e. the introduction of notably *ad hoc* distinctions. As such, it is worth underscoring that the serious propositional contingentist cannot afford to be at all cavalier about taking on such theoretically defective commitments. To coherently formulate their view, they already have to make significant sacrifices regarding simplicity, see Williamson (2013), and reject natural and compelling principles about how predicates work, as discussed above. In light of this, it is not a viable response to deny that world-relative truth and actuality can be talked about with predicative language.

4.2. World-relative truth

I noted that the arguments presented here do not presuppose any problematic principles about world-relative truth. Many contingentists have argued for a notion of world-relative truth – truth *at* a world – according to which it fails to be the case that the propositions true relative to a given world *w* are only those which exist relative to the possible world *w*.[22] For such contingentists, we should not think in terms of propositions being true in a world – those which would be true, were the world actual – but true at a world – those propositions which, from the perspective of the actual world, accurately characterise the possible world, or are implicitly represented to be the case by the possible world.

The question of which propositions are not true in a world, but true at a world and why – in other words, which propositions do not exist relative to a world but are true relative to that world and why – is a difficult one. In particular, the question of how related claims of ontological dependence should be best formulated in a higher-order modal theory are subtle. In part, the subtlety arises because how we answer such questions will depend on how we motivate propositional contingentism. Throughout this essay I have maintained neutrality on the question of how to motivate propositional contingentism and further discussion on the motivations for the view, or further discussion on how to best understand world-relative truth, are not needed at this juncture. This is because, regardless of the details about this or that specific approach to world-relative truth, there can only be a legitimate concern about the notion of world-relative truth used in my argument, if I assume that all propositions true relative to a world *exist* relative to that world; or, in other words, if I assume that all propositions true *at* world are true *in* a world. This assumption played no role in this paper.

[22]Early arguments for formulating modal theories in terms of truth at a world are found in Adams (1981) and Fine (1985). Further discussion and defence of the idea is found in Almog (1986, 220), Deutsch (1990), Menzel (1991, 1993), Cartwright (1997, 77), Turner (2005), Nelson (2009, 139–140), Einheuser (2012), Stalnaker (2012), Speaks (2012), Kment (2014, 102–103), Werner (2021, fn. 10), Masterman (2024a, 2024b, Section 3.2, 2024c, Section 4).

I have argued for two claims about world-relative truth. First, I argued that the contingentist cannot deny in a principled manner that world-relative truth at least corresponds to a predicate in the language $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$. This claim is orthogonal to the issues raised by the distinction between truth in, and truth at, a world. The dispute over whether truth *at* a world or truth *in* a world should be taken as the primary notion of world relative truth is not a dispute over the grammatical category of the apparent relation of world-relative truth, but rather concerns the conditions which must hold for such an apparent relation to hold between a possible world and a proposition. Arguing that the contingentist cannot define $\triangleright$ in terms of some formula or other, does not presuppose anything problematic about world-relative truth which the contingentist may already have reason to deny.

The second claim about world-relative truth in my arguments is the principle (A-in) which I argued uncontroversially followed from the idea that:

$$\Box(\mathcal{A}w \rightarrow p) \rightarrow w \triangleright p \qquad (\mathrm{A}-\mathrm{in}^{-})$$

Does (A-in^{-}) entail anything problematic about world-relative truth? We shouldn't think so. To best understand why, note that in interpreting a claim like (7) in $\mathcal{L}^{\Diamond}_{\mathrm{HOL}}$, there are two ways of understanding what the propositional variable in the antecedent means:

(T) Necessarily, if *w* is actual, then *p* is *true*
(T^{-}) Necessarily, if *w* is actual, then *p*

(T) is natural. In higher-order logics, if we want to write, say, the thesis that there exists a truth, we write $\exists pp$. If we understand (A-in^{-}) in this way, then (A-in^{-}) states that if, necessarily, if *w* is actual, then *p* is true, then *p* is true at *w*. In other words, (A-in^{-}) states that if *p* is true *in w*, then *p* is true *at w*. This principle is accepted by most, if not all, contingentists who draw a sharp distinction between truth in, and truth at, a world, see Turner (2005, 198). Moreover, this principle is well-motivated. After all, loosely put, a proposition is true at a world just in case it characterises that world correctly, regardless of whether it exists at the world in question. If a proposition is true in the world, and thus *would* be true *simpliciter*, were that world actual, it *a fortiori* characterises that world correctly. We can phrase this point in this way. (A-in^{-}) states a perfectly legitimate *sufficiency* condition for truth at a world and it is only the *converse necessary* condition which is potentially problematic. On the other hand, if we interpret (A-in$^-$) as (T$^-$), then there is even less of a worry about presupposing principles potentially problematic for the contingentist. Whilst a case could be made for it being problematic for the contingentist to tie world-relative truth to truth *simpliciter* at the world, (T$^-$) is entirely consistent with denying such a connection.

4.3. Going weaker than (W)

My argument shows that, given some minimal assumptions, the serious propositional contingentist cannot accept (W) – the claim that propositions true at all worlds are necessary. It should be noted that my argument does *not* rule out weaker connections between possible worlds and necessity.[23] In particular, my argument does not rule out the following idea.

(W$^-$) $\forall p(\Box\forall w(w \triangleright p) \rightarrow \Box p)$
(To be read: For any proposition *p*, if *p* is necessarily true at all worlds, then *p* is necessary.)

(W) of course implies (W$^-$), assuming generally that $\Box p \rightarrow p$, as we should. But, (W$^-$) fails to imply (W). Moreover, (W$^-$), (MF) and serious propositional contingentism are in fact jointly consistent: (W$^-$) is only ruled out if we assume a stronger dependence holds between worlds and propositions than (MF):

(MF$^+$) $\forall p\Box\forall w\Box(\mathrm{E}^{\omega}w \rightarrow \mathrm{E}^{\langle\rangle}p)$
(To be read: For any proposition *p*, it is necessarily the case that, for any world *w*, necessarily, if *w* exists, then *p* exists.)

However, (MF$^+$) is too strong. Whilst I showed that the serious propositional contingentist should accept (MF), the same cannot be said of (MF$^+$). So, without (MF$^+$), the argument I give above fails to generalise to (W$^-$).

Could the contingentist endorse (W$^-$) and eschew a commitment to (W)? There is certainly some initial plausibility to this suggestion. If one accepts that propositions vary modally, it is natural to think that possible worlds likewise vary modally. Thus, a proposition being true at every possible world might be thought insufficient for genuine necessary truth.

[23] Thank you to an anonymous reviewer for raising this worry.

Instead, we might require that *necessary* truth at all possible worlds is sufficient for necessary truth. But it should be stressed that the mere fact that (W^-) alone is well-motivated and immune to the kind of argument in Section 3 is alone uninteresting. What is important is whether a systematic theory of modality given in terms of possible worlds which contains a principle like (W^-), and not (W), gets us what we should want for a systematic theory of modality. Does (W^-) constrain necessity and, by extension possibility, sufficiently to allow for an adequate theory of modality given systematically in terms of possible worlds?

We can get a handle on how we should answer *this* question by pausing to ask what the serious propositional contingentist should say about possibility, if they accept *only* (W^-). First, the serious propositional contingentist *cannot* endorse the idea that any possibility $\Diamond p$ implies the existence of a possible world at which p is true. That is, they cannot accept:

(P) $\forall p(\Diamond p \rightarrow \exists w(w \rhd p))$

(P) very plausibly entails (W), which, given my argument, the contingentist must reject.[24] Instead, the contingentist must at least accept the following constraint on possibility, since this straightforwardly follows from (W^-).

(P^-) $\forall p(\Diamond p \rightarrow \Diamond \exists w \neg (w \rhd \neg p))$
(To be read: For any proposition p, if it is possible that p, then there possibly exists a possible world w such that it is not the case that $\neg p$ is true at w.)

The question, then, of whether the contingentist can endorse only (W^-) to adequately avoid my argument can now be approached by asking whether a theory of modality which systematically constrains *possibility* by (P^-), but not by anything as strong as (P), is adequate.

[24] (P) *plausibly* entails (W), since (P) entails (W), given two plausible assumptions. The first assumption, (D): possibility and necessity are dual notions, i.e. $\forall p(\Diamond p \leftrightarrow \neg\Box\neg p)$. The second, (ME): a non-problematic strengthening of (M) in which disjunction is exclusive, i.e. $\forall p \forall w((w \rhd p \vee w \rhd \neg p) \wedge \neg(w \rhd p \wedge w \rhd \neg p))$.

(1) $\forall p(\forall w \neg(w \rhd p) \rightarrow \Box\neg p)$ (P, D)

(2) $\forall p(\forall w \neg(w \rhd p) \leftrightarrow \forall w(w \rhd \neg p))$ (ME, $\forall^{\rightarrow}$)

(3) $\forall p(\forall w(w \rhd \neg p) \rightarrow \Box\neg p)$ (1–2)

(4) $\forall p(\forall w(w \rhd p) \rightarrow \Box p)$ ($\forall$1, UG, UE)

I think we have good reasons for thinking that a theory of modality in terms of possible worlds which is constrained by only claims as strong as (P^-) is inadequate.[25] (P^-) is too weak a constraint on possibility. In endorsing a possible worlds theory of modality, we want to endorse constraints which properly vindicate the *core features* of possible worlds and vindicate the *theoretical role* such entities are supposed to play. Quite trivially, for some entities to qualify as possible worlds, they must be maximal and possible. Of course, there is a certain freedom granted to those who wish to utilise possible worlds insofar as there are competing ways of spelling out *how* worlds are maximal and consistent.[26] However, any purported way of defining maximality or possibility must *vindicate* these features of worlds – they must plausibly be ways of spelling out such notions. Likewise, any theory of modality given in terms of possible worlds must vindicate the theoretical role possible worlds play in such theories. And, abstractly put, a possible worlds account of modality posits that possibility and necessity are systematically in step with how truth values of claims are distributed across some class of special entities, i.e. worlds. That is, very generally, a possible worlds theory of modality commits to the idea that, for every possibility, there *exists something* importantly related to the content of that possibility.

(P^-) is too weak to vindicate this theoretical role that possible worlds should play in *two* ways. Firstly, accepting (P^-) alone is consistent with there being possibilities for which there are no relevant corresponding worlds, i.e. the following is consistent with (P^-).

(15) $\exists p(\Diamond p \wedge \neg\exists w(w \triangleright p))$
(To be read: For some possible proposition p, there doesn't exist a world at which p is true.)

(P^-) only weakly requires that, for every possibility $\Diamond p$, there is possibly a world w such that the negation of p fails to be true at w. As such, accepting (P^-) alone leaves possibility unconstrained to the extent that possibilities can float free from facts about which possible worlds there are – it fails to rule out (15). In fact, (P^-) is consistent with there being possibilities

[25] A worry I put little weight on is the worry that (P^-) rules out the prospects of a *reductive* account of modality – possibility is tied to the *possible* existence of a world. However, I think, as Stalnaker notes in Stalnaker (2012, 30), that a reductive account of a fundamental notion like possibility and necessity ought not be desirable.

[26] See Einheuser (2012, 4–6), Mitchell-Yellin and Nelson (2016, 1542–1545) for two discussions of competing ways of understanding the maximality of possible worlds, particularly how actualists should understand maximality.

for which there *necessarily* are no relevant corresponding worlds, i.e. (P^-) is consistent with the following being true.

(16) $\exists p(\Diamond p \wedge \neg\Diamond\exists w(w \triangleright p))$
(To be read: For some possible proposition p, there *necessarily* isn't a world at which p is true)

Again, (P^-) only minimally requires that, for every possibility $\Diamond p$, there is possibly a world w such that $\neg p$ fails to be true at w. This alone is consistent with there necessarily not being any possible worlds at which p is true – it fails to rule out (16).

Now, it is worth noting that (P^-) is inconsistent with (16) if we assume a much stronger claim about maximality than what is captured in (M). That is, (P^-) and (16) are inconsistent assuming:

(M^+) $\forall p\Box\forall w(w \triangleright p \vee w \triangleright \neg p)$
(To be read: For any proposition p, necessarily, for any world w, either p or $\neg p$ is true at w.)

(P^-) and (M^+) are jointly inconsistent with (16), since (16) entails (17) which, assuming (M^+), is equivalent to (18) – and (18) is plainly inconsistent with (P^-).

(17) $\exists p(\Diamond p \wedge \Box\forall w\neg(w \triangleright p))$
(18) $\exists p(\Diamond p \wedge \Box\forall w(w \triangleright \neg p))$

However, the fact that (P^-) *and* (M^+) are jointly inconsistent with (16) should be of little interest to the serious propositional contingentist. (M^+) itself is a deeply problematic claim for the serious propositional contingentist: (M^+) and (SA^+) straightforwardly jointly entail propositional necessitism – since $\forall p\Box\forall w(w \triangleright p \rightarrow E^{\langle\rangle}p)$ is an instance of (SA^+), (M^+) entails $\forall p\Box E^{\langle\rangle}p$. Without ($M^+$), the contingentist is unable to rule out (16) and a theory of possible worlds consistent with (16) fails to vindicate the distinctive role possible worlds ought to play in our modal theorising.

Thus, whilst a constraint like (W^-) is immune to the kind of argument I raised in Section 3, I have argued that such a constraint *alone* fails to vindicate the role that possible worlds ought to play in systematic theories of modality. To be clear, I have given no general argument that there is no potential constraint weaker than (W) which could vindicate this theoretical role. Establishing that claim is beyond the scope of this paper. Rather, I have focussed on showing why at least one natural alternative should not be considered adequate and it is now an open question whether some alternative to (W) is both non-problematic and sufficient for the contingentist. What I have aimed to show is that, at the very least, the most plausible, weaker alternative to (W), i.e. (W^-), doesn't offer a satisfactory response to the argument presented in Section 3. Indeed, this underscores that it is a non-trivial enterprise to define such an adequate, but non-problematic constraint on necessity which could be used to revise a possible worlds account of modality consistent with serious propositional contingentism.

5. Conclusion

I have argued that serious propositional contingentism entails that worlds are modally fragile – all worlds ontologically depend on all propositions, Moreover, under plausible assumptions, this consequence is inconsistent with (W) – the claim that propositions true at all worlds are necessary. This paper has shown that for relatively simple reasons, the serious propositional contingentist cannot understand necessity as truth at all possible worlds – a compelling, theoretically useful, and almost default understanding of necessity. Moreover, the argument given is independent of any potential controversial assumptions about world-relative truth or the proper treatment of logical constants in a higher-order setting, and independent of any problematic assumptions about the abundance of properties and relations, adding to the growing stock of worries about contingentism: there are *serious* problems for serious propositional contingentism.

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