Another Model of the Open Future

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ABSTRACT

In his work on the open future, Patrick Todd outlines three models of how to deal with future contingents. These models must answer two questions: one metaphysical, about what facts there are in the world; one semantic, about how to deal with sentences involving 'will.' Model 1 has a privileged timeline. Model 2 has an actual future timeline but leaves it indeterminate which timeline that is. Model 3 has no future timeline. All three give will-sentences a modal treatement, as a box over available futures. I will argue that Todd's second model has problems and should be improved. The first is that it denies what Todd labels as the basic metaphysical intuition behind open-futurism. The second is that indeterminacy about the facts that characterize the actual timeline breaks through into indeterminate identity. I propose a fix to model 2 eliminating its actual future and resolving an issue that arises in applying the neutral semantics Todd endorses to indeterminate sentences. This improved model, I suggest, may even compare favorably to Todd's preferred model 3.

Keywords: Time, Temporal Ontology, Open Future, All-Falsism, Facts, Determinacy, Indeterminacy

INTRODUCTION

In *The Open Future: Why Future Contingents Are All False*, Patrick Todd takes a crack at the problem raised by Aristotle in *De Interpretatione* about the nature of future contingencies. Aristotle asks us to take the perspective of an admiral whose fleet may face the enemy tomorrow. Our admiral is deliberating about the possibilities for the next day, some of which involves a sea battle and others of which do not. Our admiral's predicament raises (at least) two questions. One is a question of metaphysics: what is the world like, and in particular does it include facts of the sort that would settle whether there will be a sea battle tomorrow, or perhaps even entities such as 'tomorrow,' the sea battle, and its participants? Another is a question of semantics: given one's preferred answer to the metaphysics question, how should we assess the truth value and inferential impact of sentences such as "there will be a sea battle tomorrow" and "there will be no sea battle tomorrow"?

One approach is to accept deterministic accounts of the causal laws or laws of nature so that together with the present facts they entail whether there is a sea battle tomorrow.[1] Todd sets this aside. Given a failure of determinism, Todd outlines three "models" for approaching the metaphysical and semantic questions Aristotle raises. The first, the Ockhamist model, includes a sufficiently rich set of present future-directed facts to settle a unique course for the future. The second, the indeterminacy model, includes present facts sufficient to settle a unique course for the future but leaves them indeterminate between the various futures consistent with the present-tense facts and the laws. The third model, the all-falsist model, lacks any contingent present facts about the future. He then defends the third of these models, which possesses the distinction of rendering all future contingents false.

I will contend that Todd's second model should be replaced. The best way to answer the metaphysical and semantic questions involving future contingents that invokes indeterminacy answers them differently from Todd's second model. My task here will be three-fold: to explain Todd's models, to raise problems for the second model, and then to outline a better version of it. In concluding, I suggest some reasons to prefer this new model to Todd's preferred one.

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[1] Barnes and Cameron [2009] introduce a wrinkle here: if there is indeterminacy in the laws of nature or in the present state of the world, then the combination of laws and present state may not settle whether there is a sea battle tomorrow. We will revisit this point later, but for now will press on as if we are assuming determinacy in the laws and present facts.

TODD'S THREE MODELS

Todd's first model corresponds to the traditional Ockhamist position. In this model, there are a plurality of continuations of the world's history consistent with the laws and the present facts. All three models share this feature. But in the Ockhamist model, there is a 'distinguished' history, a thin red line, to use a common metaphor.[2] This answers the metaphysical question. There is, now, a complete set of facts about what the future contains. These facts will not be countermanded at any future time.

Todd's second model draws from the tradition of approaching the problems of future contingents with the idea that they are indeterminate. Jan Łukasiewicz [1920] introduced the first proposal in the vicinity of this model when he invented modern trivalent logic. Todd's version of the model owes more to Barnes and Cameron [2009]. Like the first model, it includes the existence of present facts that pick out from among the many futures consistent with the laws of nature and tenseless description of the present a single unique future. But it is not determinate which of those possible futures the facts pick out.

Todd's third model differs from the other two by denying that there are facts about the future beyond what the tenseless description of the present together with the laws of nature entail.[3] As a result, both the Ockhamist privileged history and the second model's indeterminacy are unnecessary.

All three models, Todd argues, can adopt the same answer to the semantic question. This 'neutral' semantics treats 'will' as a box operator over available histories. Thus, will-ϕ is true just in case ϕ is true on all available histories. In the case of the Occamist model, this is just the one. In the case of the third model, this is any continuation of the timeline consistent with the past and the laws. The case of model 2 is complicated (although in theory it works like the Occamist model but with indeterminacy added); see the discussion in section n for further details.

PROBLEMS FOR MODEL TWO

Model two faces several problems as is. The first is metaphysical. Model two is intended to be of an open future [Todd 2021, p. 23]. Yet, model two answers the metaphysical question in the affirmative: there are facts pinning down a unique, actual future. This flies in the face of the open futurists ur-intuition: that the present facts are simply insufficient to support a unique actual future [Todd 2021, p. 18]. The kind of metaphysical intuitions that motivate an open future cut against the way model two addresses the metaphysical question, and leaves the overall motivation for model two in question.

The second problem comes from its invocation of indeterminacy, which even Todd is not entirely satisfied with (p. 47). Model two's distinctive metaphysics call for the existence of facts, but indeterminacy as to what those facts are.[4] There is some question in the literature as to whether this makes sense.[5] But assuming it does. The believer in the open future is willing to go in for a certain amount of unsettledness. She thinks that there are not now true future contingents, although (some of) those same contents will at some point be true. Thus, she has some stomach for metaphysical indeterminacy. But modeling it in this way allows for more indeterminacy than perhaps anticipated. For there is an argument from model two's treatment of the future to the existence of indeterminate identity. And even those with some stomach for metaphysical indeterminacy about the future may not be keen on indeterminate identity in the present.

FROM MODEL TWO TO INDETERMINATE IDENTITY

Here is an argument that the way model two implements indeterminacy about what the future holds leads to indeterminate identity, a distinct and less plausible form of metaphysical indeterminacy.[6]

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[2] This terminology comes from Belnap and Green [1994]. Todd prefers to avoid it because of an ambiguity over whether the thin red line marks a determinate future. Following Hughes [2015], he refers to the Occamist model as one containing a privileged future, which neither of the other models contains.

[3] Todd is the main defender of this type of view, with his [2016] representing an earlier version.

[4] This account is primarily motivated by Barnes and Cameron [2009] as well as Barnes and Williams [2011].

[5] See, e.g., Williamson [1994], [2005].

[6] See Evans [1978], Parsons [2000], especially ch. 3, Greenough [2008], and Garrett [2014] for further discussion

(1) For the question 'will-Fa?', some fact exists that directly answers the question
(2) There are two such possible facts: <will-Fa> and <will-not-Fa>.
(3) If the fact that settles the question 'will-Fa?' is determinately identical to <will-Fa>, then 'will-Fa' is determinately true
(4) If the fact that settles the question 'will-Fa?' is determinately identical to <will-not-Fa>, then 'will-Fa' is determinately false
(5) 'will-Fa' is neither determinately true nor determinately false
(6) So the fact that settles the question 'will-Fa' is not determinately identical to anything
(7) So the fact that settles 'will-Fa?' is either identical to nothing or possess an indeterminate identity
(8) If the fact that settles 'will-Fa' exists, then it is not identical to nothing
(9) So the fact that settles 'will-Fa' has an indeterminate identity

In the above argument, premise (1) is a restatement of a core feature of model two.[7] Premise (2) is an analytical truth. Any question that directly answers whether P will answer it in the affirmative or in the negative ('directly' here is doing significant work by screening off all facts that entail rather than constitute an answer to the question). Premises (3) and (4) are also logical truths. Premise (5) states a core feature of model two. Premise (6) follows from (2), (3), (4), and (5). Premise (7) lists the surviving members of an exclusive and exhaustive disjunction once (6) has been taken into account. Premise (8) is a consequence of neo-Quinian metaontology.[8] It is probably the best place in the argument to offer resistance, but if model two locks a metaphysician out of a common metaontological framework, the argument has served its purpose. The final conclusion (9) follows from (7) and (8).

How bad is (9) for model two? My objective here is not to argue that (9) is irrecoverable. Some philosophers have a taste for indeterminate identity; others do not. With indeterminate identity comes the loss of the necessity of identity and distinctness, which are supported by powerful arguments,[9] and feature in the most natural extensions of classical first order logic to include modal operators. Defenders will bite these bullets. However, it is a cost.

MODEL TWO IMPROVED

How should model two be improved? The source of both problems is the inclusion of facts that pin down a unique actual future. If they go away, then the motivating open futurist intuition is satisfied. The model is no longer metaphysically unmotivated. Likewise, if they go away, then the worry about indeterminate identity goes away. Adding facts about the future to model two does not do any important work, and it creates additional problems that impose non-negligible costs.

So what does a model that embraces indeterminacy but removes facts about the future look like? Recall that our models have two questions to address: the metaphysical question and the semantic question. The metaphysical question asks what the world is like, and whether it supports non-determined facts about the future. The semantic question asks how to handle the sentences which express future contingents. If we answer the metaphysical question by saying that nothing in the past or present pins down a unique actual future, we are still left with the question of how to handle sentences like 'will-φ' whose truth value is not settled.

Todd's neutral semantics call for a modal treatment of 'will,' so that 'will-φ' matches the truth value of 'in all available futures, φ.' He allows that instances of will-φ may receive an indeterminate truth value on model 2 (p. 34), but does not give us the exact conditions under which this may occur. He does, however, commit the model to the principle of will-exluded middle, namely to the tautological status of 'will-φ v will-¬φ.' (p. 35). For that commitment, he argues thus: there is

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[7] Note that premise (1), like model 2 itself, is neutral on the ontology of facts. They could be true propositions, obtaining states of affairs, complexes of objects and properties, etc. See Mulligan and Correia [2021] for a menu of options.
[8] See van Inwagen [2009] and the first chapter of his [2023] for elaboration and defense.
[9] See Barcan Marcus [1961], Kripke [1971], and Williamson [2013] for some well-known examples. Schechter [2011] attempts to defang many of the arguments that identity is a strict relation, but does so by changing classical logic. Many partisans of model 2 wish to claim that they can preserve classical logic, so Schechter's theory is not available to them.

only one actual future. It is either a ɸ-future or a ¬ɸ-future. In which case, either 'will-ɸ' is true or 'will-¬ɸ' is true, even if it is indeterminate which is.

This argument is not convincing. The neutral semantics for will that Todd commits himself to treat will as a box modal over all available futures. But what counts as available? In model two, we have two candidates. Candidate (1): a future is available iff it is the unique actual future (Todd endorses this in passing). Candidate (2): a future is available iff it is not determinately not the unique actual future.

If (1) is the right story about availability in model 2, then it is not right to allow for indeterminate truth values in the object language.[10] None of the individual futures countenanced by model 2 is indeterminate. What is indeterminate is which of them is the unique actual future. Considered alone, they are just classical timelines. The only indeterminacy this semantics allows is at the meta level. It is indeterminate which timeline to use to evaluate our formulae, but each formula is either true or false. What they are not is determinately true or determinately false.

If (2) is the right story about availability in model 2, then we no longer have a good argument for will-excluded middle. Given multiple available futures that disagree on ɸ, the natural thing to say (following standard supervaluationists like Thomasson [1970]) is that 'will-ɸ' is true when all available futures are ɸ-futures, false when all available futures are not ɸ-futures, and indeterminate when some available futures are ɸ-futures and other available futures are not ɸ-futures. Furthermore, it now becomes important that the main connective in will-excluded middle is not a tense operator, but a disjunction. There are some reasons to prefer Łukasiewicz's [1920] semantics for trivalent logic when our purpose is to treat future contingents.[11] In that case, model 2 will not validate will-excluded middle. Indeed, when we think about formulae such as 'will-ɸ v 'will-ψ' (e.g. formulae where the sentences under the scopes of the tense-operators are not contradictory), it will be readily apparent why we do not want a general semantics for 'or' that takes two indeterminate formulae to truth.

Consequently, the things Todd says about applying his neutral semantics to model 2 cannot all be true. Either there is only one available future, and consequently every formula is either true or false (but not determinately true or determinately false), or model 2 does not validate will-excluded middle. I think the second route is better. Denial of will-excluded middle is an important logical marker of open future views and open future friendly semantics should behave accordingly.

This gives us a roadmap to improving model 2. We answer the metaphysical question in the negative: there are no facts pinning down a unique actual future. This takes it out of alignment with model 1 and into alignment with model 3 on its metaphysics. We answer the semantic question along the lines sketched above: 'will-ɸ' is true iff all possible futures are ɸ-futures; 'will-ɸ' receives a third truth value (informally: indeterminate or not yet settled[12]) in cases where some possible futures are ɸ-futures and some possible futures are not ɸ-futures; 'will-ɸ' is false if none of the possible futures are ɸ-futures. This avoids undermining the intuition behind open futurism and escapes from invoking indeterminate identity. It nevertheless pays tribute to the tradition of seeing future contingents as indeterminate or unsettled. But this indeterminacy comes entirely in answering the semantic question.

The semantic question is where it stands apart from Todd's preferred model 3. In particular, the models now disagree primarily about how to assign truth values to future contingents. Todd's model regards them as false, the new model regards them as indeterminate. A full-blown comparison of the two models will have to wait for another day, but I will note one point in favor of the new model two. Model 3 treats sentences under a 'will' operator that are false in all possible futures and those that are false in some possible futures exactly the same. They are false, and that is all the semantics can say. On the other hand, the new model treats these kinds of sentences differently. The ones that will be false stay false, but the ones that might be true have the third truth value. Marking this metaphysical difference seems like a useful thing for the semantics to do, if they are meant to make precise the correct inferences involving will-sentences. One of Todd's favorite analogies may be

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[10] Note that Barnes and Cameron [2009], the inspiration for model 2, make a point that the kind of indeterminacy they are interested in is (at least consistent with being) bivalent (p. 292-98).

[11] Rubio [2019] makes this argument.

[12] Prior's [1953] objection to reading Łukasiewicz this way is addressed in the more detailed semantic framework of Rubio [2019].

illuminating. Todd often adverts to fictions to analogize the open future, since like an open future a fiction simply does not settle a number of questions. A semantic difference between things a fiction rules out and things it leaves open seems useful. So it may be with the future.[13]

CONCLUSION

Todd provides us three models where the laws of nature and present facts do not entail a unique actual future. One model posits the determinate existence of those facts anyway. One posits the existence of those facts, but indeterminacy as to what they are. One has no such posit. I have argued that the second model faces problems. While aiming to be an open future model, it goes against the metaphysical intuition motivating open futurism, and while allowing some indeterminacy, it opens up indeterminate identity. Finally, I have proposed an adjusted second model that remains within the tradition of handling future contingents with indeterminacy, but avoids the problems I have identified. I propose it as an improvement, and perhaps even a contender for the best model of open future.

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[13] On a final note, since these two models are the same ontologically, a natural way to separate them is by comparing their ideology. This is a tricky task, but pinning down the logical apparata required to state them will be important, as per Rubio [2022].

Works Cited

Barcan Marcus, R. [1961] "Modality and Intensional Languages," *Synthese* 13 (4):303-322.

Barnes, E. & Cameron, R. [2009] "The Open Future: Bivalence, Determinism, and Ontology," *Philosophical Studies* 146:291-309.

Barnes, E. & Williams, J.R.G [2011] "A Theory of Metaphysical Indeterminacy," *Oxford Studies in Metaphysics* 6. K. Bennett and D. Zimmerman, eds. Oxford: OUP, 103-148.

Belnap, N. & M. Green [1994] "Indeterminism and the Thin Red Line," *Philosophical Perspectives 8: Logic and Language*. Atascadero, Ridgeview, 365-388.

Evans, G. [1978] "Can There be Vague Objects?" *Analysis* 38 (4):208.

Garrett, B. [2014] "Some Comments on Evans's Proof," *Vague Objects and Vague Identity" New Essays on Ontic Vagueness*. K. Akiba & A. Abasnezhad, eds. Dordrecht: Springer, 275-282.

Greenough, P. [2008] "Indeterminate Truth," *Midwest Studies in Philosophy* 32:213-241.

Hughes, C. [2015] "Denying Privilege," *Analytic Philosophy* 56 (3):210-228.

Kripke, S. [1971] "Necessity and Identity," *Identity and Individuation*. M. Munitz, ed. New York: NYU Press, 135-164.

Łukasiewicz, J. [1920] "On Three-Valued Logic," *Polish Logic 1920-39*. S. McCall, ed. Tr. H. Hiz, Oxford: Clarendon.

Mulligan, K. & F. Correia [2021], "Facts," *The Stanford Encyclopedia of Philosophy Winter 2021 Edition*. E. Zalta, ed. <https://plato.stanford.edu/cgi-bin/encyclopedia/archinfo.cgi?entry=facts>. Accessed 17 April 2023.

Parsons, T. [2000] *Indeterminacy: Metaphysics and Semantics*. Oxford: Clarendon.

Prior, A. N. [1953] "Three-Valued Logic and Future Contingents," *The Philosophical Quarterly* 3 (13):317-326.

Schechter, J. [2011] "Weakly Classical Theories of Identity," *Review of Symbolic Logic* 4 (4):607-644.

Rubio, D. [2019] "Essays in Formal Metaphysics." Ph.D Dissertation, Rutgers University-New Brunswick. Chapter 4.

Rubio, D. [2022] "Ideological Innocence," *Synthese* 200 (5):1-22.

Todd, P. [2016] "Future Contingents are All False! On Behalf of the Russellian Open Future," *Mind* 125 (499): 775-798.

Todd, P. [2021] *The Open Future: Why Future Contingents Are All False*. Oxford: OUP.

van Inwagen, P. [2009]. "Being, Existence, and Ontological Commitment," *Metametaphysics: New Essays on the Foundation of Ontology*. D. Chalmers, D. Manley, & R. Wasserman eds. Oxford: OUP, 472-506.

van Inwagen, P. [2023]. *Being: A Study in Ontology*. Oxford: OUP.

Williamson, T. [1994] *Vagueness*. Oxford: OUP.

Williamson, T. [2005] "Vagueness in Reality," *The Oxford Handbook of Metaphysics*, M. Loux & D. Zimmerman, eds. Oxford: OUP, 690-715.

Williamson, T. [2013] *Modal Logic as Metaphysics*. Oxford: OUP.