

An Error in Temporal Error Theory.¹

Abstract

Within the philosophy of time there has been a growing interest in positions that deny the reality of time. Those positions, whether motivated by arguments from physics or metaphysics, have a shared conclusion: time is not real. What has not been made wholly clear, however, is exactly what it entails to deny the reality of time. Time is unreal, sure. But what does that mean?

There has (within the recent literature) been only one sustained attempt to spell out exactly what it would mean to endorse a (so-called) temporal error theory; a theory that denies the reality of time—Baron & Miller’s ‘What is temporal error theory?’. Despite the fact that their paper makes significant strides in spelling out what would be required of a temporal error theory, my claim in this paper is that their position must be rejected and replaced. As well as looking to reject Baron and Miller’s position, I also look to provide that replacement.

1. Introduction

Recently, a number of arguments have been brought forward to motivate and defend positions that deny the reality of time (Barbour, 1994a, b, 1999; Barbour and Isham 1999; Baron and Miller 2014; Deutsch 1997; Rovelli 2004, 2007, 2009; Tallant 2008). These arguments have been developed from a range of concerns in physics and metaphysics. Following Baron and Miller (B&M) (2015: 2428), call such positions ‘temporal error theories’. Still following B&M, we should note that little has been said about quite what it takes for a view to be properly regarded as a temporal error theory. To date, only B&M have looked to provide us with a sustained attempt to spell out how to understand what it would be for a view to be temporally error theoretic. This is problematic. For any concept, *c*: if it is claimed that a world is not *c*-apt because the concept *c* does not apply to the world, then we should be given a clear account of what exactly this requires. As B&M (2015: 2428) note prior to offering their analysis, it is not clear in the case of time that such an account has been given. This motivates them to offer their account of what a temporal error theory requires. It also motivates the current paper; an attempt to reject their account and replace it with something else.

I begin with a brief overview of error theories generally and some of the different kinds of error theory that we might be searching for in the philosophy of time, before turning my attention to the specifics of B&M’s view. I develop three arguments against their position and detail my preferred account. I show that it can deal with various paradigmatic cases of the unreality of time and how it recaptures one of B&M’s (2015: 2429-31) core concerns: how to explain the widespread resistance to a temporal error theory. Thus, even if you don’t find my arguments against B&M’s account persuasive, my account of temporal error theory is still ‘in the running’.

To begin, let us back up: what is it to hold an error theory about some domain of discourse, *D*? Though any account will be somewhat controversial, B&M’s (2015) will serve us here.

“A discourse is error theoretic just in case that discourse is truth-apt and core statements asserted by the discourse are false.” (2015: 2428)

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In the temporal case, that suggests a particular account of temporal error theory:

Temporal error theory: “temporal discourse is truth-apt and literally false” (2015: 2428)

I think that it’s fair to say that, *generally*, the motivation for an error theory in a particular domain of discourse will stem from the fact that said domain of discourse at least appears to quantify over entities that do not exist, or else that the entities that do exist aren’t arranged in such a way as to preserve our intuitive judgements.

In perhaps the most famous case, the moral case, a moral error theory will *likely* be motivated by the thought that at the core of our moral discourse are claims that aim to quantify over moral properties, but that said moral properties do not exist.² In the temporal case, it makes sense to suppose (*prima facie*) that matters will be similar: core elements of our temporal discourse aim to quantify of temporal entities (properties, relations, times, or what have you), but those entities do not exist.³ Nonetheless, this is not the account developed by B&M.

Before proceeding to the specifics B&M’s account, we require a clarification. In the temporal case (and perhaps others), an error theory could come in one of (at least) three flavors: folk error theory, physical error theory and metaphysical error theory. This follows from the fact that ‘the folk’, metaphysicians and physicists may, plausibly, deploy different concepts of time (cf. B&M (2015: 2428)). A physical error theory would claim that there is a concept of time defined by its usage in physics, but that it turns out that nothing in the world satisfies that concept; a metaphysical error theory would claim that there is a concept of time defined by its usage in metaphysics, but that it turns out that nothing in the world satisfies that concept; a folk error theory would claim that there is a concept of time defined by its usage by ‘the folk’, but that there is nothing in the world that satisfies that concept. Gaining clarity on how these error theories would connect to one another is a difficult task. Thankfully, it is also not one that we need to engage in here.

Like B&M (2015: 2429) I will focus on folk-error theory. As they have it:

While it would be interesting to discover that an error theory about physical or metaphysical time is true it is not obvious that this would have the same ramifications for our ordinary ways of understanding ourselves and our role in the world, and it is primarily these ramifications in which we are interested. (2015: 2429)

Folk-temporal error theory (‘error theory’ hereafter, as we narrow our focus) has proven remarkably unpopular. B&M, in the course of looking to determine what temporal error theory is, look to diagnose the cause of this unpopularity. They identify two causes. First, they claim (2015: 2430), we conceive of ourselves as agents and this requires that we: (i) persist through time, (ii) are causally efficacious; (iii) are capable of instituting change in the world. Second (2015: 2430-1), our temporal phenomenology convinces us of the reality of time (where by ‘temporal phenomenology’ they mean to include a range of experiences; of succession, of memory, and, perhaps, even of passage).

² Though they *needn’t* be motivated in this way. If one thought that the moral facts/properties weren’t arranged in the right way to preserve the truth of our moral discourse, then that would suffice for the truth of a moral error theory.

³ To be clear, whatever the motivations for a putative temporal error theory in fact turn out to be, I’m not going to pursue any specific arguments *for* a temporal error theory, here. My concern—as was B&M’s—is with what it takes to hold a temporal error theory.

2. What is their account?

B&M are focused on the claim that agency and our experience of time are crucial to time's being real. Having already identified Temporal Error Theory (TET) as it's described above, they move to examine a folk error theory and suggest that, to understand folk error theory, we identify a functional role played by time—the 'time_F role'. In doing so, they move past TET into something rather different. We'll return to this in a moment.

If there is some element of the actual world that plays that functional role, there is then the further question of whether what realises that functional role does so rigidly; whether the reality of time at a world depends upon it having the same role-realiser that we find at the actual world, or whether that role may be realised in other ways at other worlds. B&M take no stand, giving two different criteria: one rigid, one non-rigid. The first allows that whatever fulfils the time_F role, does so rigidly.

Rigid time_F: Necessarily, time_F is whatever it is, R, that is tracked by our actual temporal phenomenology such that R possesses certain minimal features, F, which include features that are necessary for the existence of causation, persistence and change. (2015: 2435)

If, however, we do not take the actual role realiser to be required at every world at which time is real, then we can opt for the less modally stringent:

Non-rigid time_F: For any world w , w is whatever it is, R, that is tracked by temporal phenomenology in w , if there is any, so long as R has certain minimal features, F, that include features that are necessary for the existence of causation, persistence and change, or if there is no temporal phenomenology in w , time_F is whatever it is that has certain minimal features, F, that include features that are necessary for the existence of causation, persistence and change. (2015: 2435)

If we endorse rigid-time_F, then the folk temporal error theory will be true at a world w just in case either nothing *actually* plays the time role, or whatever plays the time-role at the actual world does not play that role at w (2015: 2435). In contrast, if we endorse Non-rigid time_F, then a world, w , will be one that is temporal error-theoretic just in case nothing plays the time-role_F in w (2015: 2436).

We can illustrate both. Start with Rigid-time_F. Suppose our experience of time were purely illusory. In that case, temporal error theory would be true of the actual world. Suppose, instead, that the actual world is A-theoretic, such that our experience of time is due to the passage of the A-properties, past, present and future, and that it is this same passage of A-properties that gives rise to the features of the world required for agency (persistence, causation, the capacity to change the world, etc.). Now consider a world, w , that is not A-theoretic. Given rigid-time_F, w is a world at which time is not real. In contrast, Non-rigid time_F allows that time may still be real at w , just so long as there is some feature of reality that is such that it underpins temporal phenomenology and the existence of causation, persistence and change.

Last, note that both accounts include the claim that playing the time role requires the inclusion of certain features that are necessary for the existence of causation, persistence and change. What are these features? As B&M explain (2015: 2432), it's hard to be certain. However, they say that that our temporal phenomenology must track that which plays the time_F role, and that, 'we can say with some confidence that whatever plays the time_F role must (at least) be capable of supporting timeful phenomena' (2015:

2432), where phenomena may be regarded as ‘timeful’ just in case they can only occur in the presence of time.

They then go on (2015: 2432-3):

In order to adequately support the timeful phenomena just mentioned, $time_F$ should be capable of doing (at least) four further things. It should be capable of: (i) rendering sensible an indexical notion of ‘now’; (ii) supporting a difference between the past and future; (iii) underscoring the manner in which the world displays a past/future asymmetry and (iv) scaffolding the asymmetry of counterfactual dependence.

To explain, they seek to show how agency would require at least these four features. Rendering sensible an indexical notion of the now is crucial because: ‘[i]n order to deliberate, one needs to now de se facts about where one is located in relation to events’ (2015: 2433). A difference between the past and future, as well as the demand for a past-future asymmetry, is required because: ‘[w]hen choosing, we act towards (what we take to be) the future, and not toward the past’ (2015: 2432-3). The asymmetry of counterfactual dependence must be underscored because: ‘agency requires that we be able to make sense of what would happen in the future, were we to make certain choices; but not so for what would happen in the past, which calls on the very asymmetry at issue’ (2015: 2432-3).

We can summarise:

X plays the time role iff: [A] our temporal phenomenology successfully tracks x and, [B] x supports agency, causation, change and persistence, by (at least): (i) rendering sensible an indexical notion of ‘now’; (ii) supporting a difference between the past and the future; (iii) underscoring the manner in which the world displays a past/future asymmetry and (iv) scaffolding the asymmetry of counterfactual dependence.

We ought to reject this account. In section 3 I offer up three concerns. The first two centre on the fact that we are missing crucial details from B&M (details that they don’t provide; I don’t explore whether they could provide them). I also develop one of B&M’s suggested counterexamples and show that their position falls foul of it. In section 4 I introduce my preferred account, showing that it deals with each of the problems raised in section 3. Later in section 4, I discuss a range of potential concerns.

Before that, though, the preceding discussion might suggest that my original characterisation of B&M’s project is not quite fair. To see this, let us step back to the moral case. Let’s imagine (for the sake of argument) that everyone agrees that moral error theory is true if there are no moral properties. We made a choice just there. We focused on whether there are moral properties. We did not ask, ‘what does it take for there to be moral properties?’.

And that might be important. Someone might think that there are moral properties iff (insert your preferred theory here), while someone else might contend that if *that* is all there is, then there are no moral properties.

One could then offer two quite different, but compatible, accounts of error theory:

- (a) Moral error theory is true, iff there are no moral properties
- (b) Moral error theory is true, iff there are no properties that do the following things (insert a

suitable description here).

(a) and (b) are doing two quite different jobs. (a) is telling us that if moral error theory is to be true, then it is because there are no moral properties. Fully specified, (b) is (or would be) telling us what it would be, to be a moral property, and denying anything does *that*.

There is an analogue with the temporal case. Temporal error theory is true iff

(a)* there are no temporal properties

or

(b)* there are no properties that do the following things

And here, for B&M, ‘following things’ would mean: are tracked by our temporal phenomenology, and support agency, causation, change and persistence.

And we might take B&M to be providing an account like b* in response to the question: what would it take for there to be temporal properties or relations?

I’m uncertain of their intentions, but I think that there is a troubling tension in their position if B&M are taken to be asking the latter question. Simply, it's not clear (at least on the face of it) why being tracked by our temporal phenomenology, and supporting agency, causation, change and persistence would be *necessary* in order for there to be temporal properties or relations. By way of example: it would seem plausible enough to suppose that if we denied that objects persisted (and thereby endorsed the position sketched by Tallant (2014) as ‘delta nihilism’), time may still be real and *time* would not be any different from the way that we thought of it. To be sure, nothing persists through time on such a model, but that’s not to say that time *itself* is at all peculiar or in any way other than we naturally suppose. So we are not (or so I will assume from here on) interested in the question of what it would be for there to be temporal properties, but in the question of whether there are such properties and whether they are arranged as we might expect.

3. Missing details and potential demons

Let me now turn to three concerns with B&M’s account.

3.1 ‘Successful tracking’

B&M require that whatever plays the time role is successfully tracked by our temporal phenomenology. How closely must our temporal phenomenology track x to be regarded as ‘successfully’ tracking x, if x is to play the time role? There are plenty of cases where our temporal phenomenology fails to track properly.

First, as Fraisse (1984) notes, in laboratory conditions subjects will judge stimuli separated by less than 100ms to be simultaneous with one another. If x is simultaneous with y, then it's not the case that x is either earlier than or later than y. Thus, our temporal phenomenology is such that we systematically misrepresent as simultaneous events that occur +/-100ms before or after one another. In point of fact, that's a lot of error. It's also a systematic error. A lot of events occur within 100ms of one another. Nonetheless, no-one has ever claimed--nor do I think that they *should* claim--on this basis that time is not real, or that this gives us grounds to adopt a temporal error theory.

Second, consider cases drawn from the perception literature, commonly described as featuring in the 'time gap argument'. We regularly 'see' objects that did exist, but that do so no longer--distant stars being an excellent case in point. Our temporal phenomenology is of such entities being present. But now-burned-out stars are not present. They are past. They exist no more. And it's easy to see that, although the case is most extreme when we consider now-burned-out stars, the point is independent of it. Our phenomenology is as-of non-present entities being present. This is a systematic and widespread error. Nonetheless, once again, no one has ever claimed—nor do I think that they should claim—on this basis that time is not real or that we should adopt a temporal error theory.

Now, it's open to B&M to specify some account of what constitutes success. But in the absence of that specification, and in the clear presence of a good deal of systematic error in our temporal phenomenology, their account can reasonably be regarded as omitting an important detail. I do not take this to be an insuperable problem. But I do think that some account needs to be forthcoming and I am at a slight loss as to see a way forward. What will we say? That for X to play the time role, our temporal phenomenology must track X in more than 50% of cases? Does a 49% error rate constitute success? That seems a remarkably unsuccessful rate to me; it's basically the same as mere chance. Would 63% be sufficient? What about 62.5%? Further, does the *overall* tracking rate matter, provided we track particular *types* of experience? Would it be ok if we were to *always* misjudge the simultaneity (or otherwise) of events separated by less than 100ms, as long as we get everything else right? I don't know and don't see a clear, principled route forward.

I concede that, to an extent, this challenge seems a little unfair. In *some* sense spelling out 'successful tracking' could be seen as everyone's job: realist and error theorist alike. The same point can be applied to the moral case. Per the introduction of error theories in section 1, we said that a view may be thought error theoretic just in case either the domain of discourse at least appears to quantify over entities that do not exist, or else that the entities that do exist aren't arranged in such a way as to preserve our intuitive judgements. The latter disjunct surely can't be read as requiring that *all* of our intuitive (moral or temporal) judgments are preserved. So, how many are required? Just one? Half? Who knows! And so, against that that backdrop, surely B&M can't be expected to provide a totally precise definition of "successful tracking". It's a vague notion, to be sure, but a notion that's regularly appealed to.

I don't want to over-state the concern. Nonetheless, I've identified above some pretty systematic and widespread errors in our temporal phenomenology. There's simply a lot of error. So, whilst I agree that *in perfectly general terms*, spelling out what it takes for successful tracking to occur is difficult, and plausibly everyone faces a similar problem, with so many errors in our phenomenology, it seems pressing that B&M say at least a *little more* about successful tracking, else it become unclear how to properly understand their view.

3.2 Circular time?

A world at which circular time exists is one at which time is real (and is non-error-theoretic), but this is not the verdict returned by B&M. Roughly, to say that time is circular, rather than linear, is to say that it has a circular topology. It appears open as to whether the actual world exhibits a linear temporal structure, or whether the topology is circular, such that every time-like separated event is both earlier and later than every other time-like separated event (in what we might call a 'Big-Bounce' model (see, eg., Gielen and Turok (2016)). Suppose, as seems epistemically possible, that the topology *is* circular. Add to this that such a circular topology includes causal loops, such that it is true to say that events immediately preceding a collapse can be said to be the cause of the collapse, and that the collapse can be said to be the cause of the expansion, etc. How does this fare against B&M's criteria?

The temporal structure that existed would be that which is tracked by our temporal phenomenology. However, it's not clear that a circular temporal topology satisfies each of the other requirements. For instance, if time is circular, then agents cannot sensibly take the future to be different from the past. As Dowden puts it: '[i]f any part of time were circular, then the future—at least this part of it—is also the past, and every event in that part occurs before itself.' More, since any action performed is just as much directed towards the past as it is the future, it is not at all clear that this model underscores a past/future asymmetry. Last, it is not at *clear* that a circular model of time provides us with any scaffolding for the asymmetry of counterfactual dependence. Witness the following. It seems just as correct to say that: were it not the case that Billy threw the ball, then it would be the case that the window broke, as it would be to say that, were it not the case that the window broke, then it would not be the case that Billy threw the ball. After all, there is a global symmetry at the world described, and we *may* also have global causal loops. Given B&M's requirements, that would appear to make circular time not a model of time, at all, and such a world temporally error theoretic. But that seems (intuitively) wrong; the folk do recognise circular temporal models as being models that preserve the reality of time.

For instance, circular conceptions of time seem to have been held at a significant number of points in history (see, eg., Whitrow (1989: 42-3, 46-7, 65)). More recently, and pressingly, there are a number of discussions of circular time, ranging from analyses of Nobel-prize winning literature⁴ ('The very structure of *Sun Stone* reproduces this pessimistic vision of circular time'), film reviews⁵ ('*Arrival*' is brilliantly thought-provoking, exploring the circular nature of time,...'), general discussions of whether particular religious views are properly judged as committing their proponents to circular time⁶, and works of literature themselves that appear to treat time as circular.⁷ My point is simply that contemporary writers seem able to recognise a circular temporal structure and describe it as *time*. They do not feel any need to claim that such models deny the reality of time; they describe these circular models *as* models of time. This suggests that non-philosophers and non-scientists (something like *the folk*) do recognise circular temporal models as being models of time, rather than models that deny the reality of time, and not as temporally error-theoretic scenarios. These at least seem to be cases where there are temporal properties, and these are arranged in the kinds of ways we might expect (for 'the folk' seem to manage to make sense of these scenarios as temporal).

I therefore think that we should regard the folk view of time as being one that is compatible with circular time, and I think that it would be good to hear more from B&M about this case. A scenario in which there is circular time appears to be one in which the folk regard time is real and ought not to be said to hold an error theory. Nonetheless, at least on cursory inspection, that's not a result B&M's position achieves. It may be possible for B&M to overcome this concern, but then we must be told how.

3.3 Demons & time

My final objection to B&M's view is developed from a case they introduce. B&M consider the supposition that x may play the time role iff x is tracked by our temporal phenomenology. They say:

Suppose we live in a world in which there is time_F , but our temporal phenomenology is generated entirely by an evil demon. Our cognitive states ground our phenomenology, and that phenomenology tracks something, but the thing that it tracks is an evil demon, or perhaps some

⁴ https://www.nobelprize.org/nobel_prizes/themes/literature/cullhed/

⁵ <https://wtop.com/entertainment/2016/11/review-arrival-is-masterful-science-fiction-until-vexing-twist/>

⁶ <https://www.algemeiner.com/2017/05/07/new-york-times-erroneously-claims-jewish-time-is-circular/>

⁷ See, for instance, 'Night Broadcast' by Ion Hobana in which a signal from the past is detected by a gadget that is geared up to detect *future* transmissions. 'By going far enough into the future one comes upon what we call the past'.

phenomenon created by that demon. In this case, though our phenomenology tracks something, the thing it tracks is not time_F . (B&M, 2015: 2432)

B&M use this case to motivate a move beyond phenomenology. As they then put it:

Thus, roughly, a set of objects, properties and relations, F , jointly plays the time_F role just in case F is tracked by our temporal phenomenology *and* F has certain minimal features, including features that are necessary for the existence of change, causation and persistence, where what it is to support timeful phenomena is, in part, to support indexicality, directionality, asymmetric counterfactuals and so on. This second condition rules out that an evil demon counts as being time_F *even if the demon is what is tracked by our temporal phenomenology, because (at a minimum) evil demons are not necessary for the existence of timeful phenomena.* (2015: 2433-2434—my italics)

However, reflection on another case suggests this isn't right.

Consider a B-theoretic, eternalist world, at which many events exist and at which each event stands in fixed and permanent 'earlier than' and 'later than' (so-called B-) relations to every other event. Were we to inhabit this world, then it seems reasonable to say that this B-theoretic relational structure would underpin indexicality, directionality, asymmetric counterfactuals, and also be that which is tracked by our temporal phenomenology. This structure looks as if it will play the time role.

Back to the demons. Suppose that the only inhabitants of this world are in thrall to a demon; it is the demon that is tracked by their temporal phenomenology. One way to conceptualise this is that *at* every moment, the demon generates in all of the inhabitants of the world all of their life experiences and presents these in such a fashion that it appears to the inhabitants that they are moving through time in just the same way that it seems to us that we are moving through time. Thus, at each moment every inhabitant of the world in question appears (to themselves) to have a complete life-time of experiences and it appears (falsely) to each inhabitant that these experiences are spread out over time. This is all, however, the work of the demon; the demon misleads them both about the events that will constitute their life, as well as the temporal separation between these events. Nonetheless, the demon is actually doing a good job of preserving the illusion of the reality of time. In these illusions, night seems to follow day. It appears that there is counterfactual asymmetry. It appears that time has a direction. Indeed, were folks released they'd have no problem at all in navigating the temporal world around them. This demon, though changing out the actual events that constitute the history of the world, otherwise creates a world that appears to the inhabitants of the illusion much as it would were they not in the grips of the demon's schemes.

Notice that in this scenario there exists a B-theoretic structure. This structure includes features that are necessary for the existence of change, causation and persistence, where what it is to support timeful phenomena is, in part, to support indexicality, directionality, asymmetric counterfactuals. But, because of the demon, temporal phenomenology does not track this structure. Temporal phenomenology is generated entirely by the demon. By B&M's lights, time is not real at this world; what we have is an error theory.

But this seems wrong. As above, it seems perfectly reasonable to think that this kind of temporal structure suffices for the reality of time. There is causation at this world. There is a B-theoretic direction, from earlier to later. There are temporally asymmetric counterfactuals. There are true (temporal) indexical

propositions (e.g. ‘everyone is now being deceived by a demon’). Moreover, were the demon to disappear, or were the demon to have a change of heart and stop generating this temporal phenomenology, then temporal phenomenology *would track* the B-theoretic structure. There seems to be a strong case for thinking that time *is* real at such a world. Something plays the time role (the B-theoretic structure plays the time role) despite not underpinning temporal phenomenology.

There might remain a worry. As above, a position can intuitively be regarded temporally error-theoretic if either, there are no temporal properties, or *if those properties are arranged very differently from the way that we supposed*. In short: temporal error theory is intuitively true if there are no temporal properties, or if time is *very* different than we supposed. In the demon case, it’s clear there are temporal properties. So, *is* time as we suppose?

I think so. It’s clear enough, from the perspective *we* occupy, that the external world in this scenario would preserve counterfactual dependence, asymmetry, and so on and so forth. So, whilst there might be certain intuitive judgements made by the inhabitants of the world that don’t turn out quite right (someone in the grip of the illusion might wrongly think that *yesterday* they ate a peach; they didn’t, they were being deceived by a demon), I see no compelling reason to think this scenario is temporally error-theoretic as opposed to a case where folks are deceived. That being so, it seems that we have reason to repair or replace B&M’s account.⁸ Since I cannot see how to repair it, I opt for replacement.

4. Revised temporal error theory.

It’s typical to see a domain of discourse treated as error theoretic just in case that discourse is truth-apt and core statements asserted by the discourse are false.

That generates a particular account of temporal error theory:

Temporal error theory (TET): temporal discourse is truth-apt and literally false.

I suggest we stick to temporal error theory as it is stated in TET.

Detail must be added. In particular, what counts as ‘temporal discourse’? For reasons that will become apparent, I adopt the position that: the truth, at a world, of non-trivial present-tensed propositions is necessary and sufficient for the reality of time.

4.1 TET’s consequences

First, this solves the problems raised for B&M. The extent to which our temporal phenomenology tracks a temporal structure is irrelevant: time is real at world iff there are present-tensed true propositions. It doesn’t matter what those propositions *are*. Circular time presents no difficulty: time is real at a world that has a circular temporal topology; there are present-tensed truths at such a world. Since a B-theoretic world has the resources to make true present-tensed propositions, a B-theoretic world will be one at which time is real—demon or no demon. TET is off to a promising start.

Second, this delivers the (pleasing) result that all of the main positions in the philosophy of time (eternalism, growing block, presentism, etc.) are non-error-theoretic. All of them preserve (or at least seek

⁸ Nothing of note turns on my choice of the B-theory. Any viable theory would do. The point is simply that a good candidate theory for our actual world (e.g. the B-theory) turns out to not play the time role—and so time would not be real—if there is an evil demon at that world who engages in the right kind of deceit. That result is a bad one.

to preserve; whether they succeed is a matter of at least some debate) the truth of present-tensed claims. That's a good start.

4.2 TET's consequences: Effingham and Melia

However, it may seem that TET faces counterexamples. Here I borrow part of a set-up from Effingham and Melia (2007: 144).

Given a world containing a manifold of times and containing an object t that bears the charge relation to time t , another possible world is generated by cutting away all times but t . In such a world, though t remains, it plays none of the roles that are characteristic of being a time.

Object t bears no temporal relations to other times; there is no temporal dimension at such a world so no temporal dimension for t to be a part of; there is no change at such a world so there is no dimension of change. Under such extreme conditions, t no longer does anything to deserve the name 'a moment of time'. Yet, by construction, t still bears F to t . Since nothing deserves to be called a time at this world, t in particular is not a time at this world. Since t still bears the charge relation to t , we have thus reached a world containing something which bears the charge relation to something which is not a time.

So, let us test, TET: is t a world at which there are present tensed truths, but at which time is unreal?

Well, to decide that first we must differentiate between two similar scenarios. It is possible (or so I'll assume) for time to be real, but for reality to last for just one instant; it's also possible for time to be unreal. To indulge in a little metaphor: "God created the world and saw to it that it lasted but an instant." "God created the world but created it such there was no time". Those possibilities seem different and absent a reason to think otherwise I submit we treat them such.

What that difference comes to will be difficult to spell out, but the one instant world will have to contain some *temporal structure*. This structure could take different forms. For instance, some A-theorists are minded to treat presence as a property.⁹ Perhaps the difference between a one-instant world and a no-instant world comes to the fact that the property of presence is instantiated the one-instant world (though not at the no-instant world). Or, if we deny that there is such a property perhaps we could maintain that, at the one-instant world, every entity stands in a temporal relation to every other (a B-theoretic simultaneity relation—albeit a conventional relation of simultaneity—or perhaps we could specify that every object resides upon the same Cauchy surface), and differentiate a one-instant world from a no-instant world by arguing that at the no instant world there is no such structure.

To return to the E&M case, what is unclear is whether t retains any temporal structure. For everything E&M say, t seems neutral between a no-instant world and a one-instant world. What matters, I submit, will be whether the structure 'left behind' after the subtraction described by Effingham and Melia is a structure that suffices to make it true, of t , that ' t is present'. If it does, then there is enough temporal structure at t for t to be a one instant world. If it does not, then there is not. But the potential threat from their case came from the fact that we had a seemingly timeless world, t , at which there are temporal truths. I've suggested that it's an open question as to whether there is temporal structure at t that would suffice for there to be temporal truths, and that if there is enough temporal structure at t for there to be temporal truths, then t is a one instant world and time is real.

⁹ For instance, as Markosian (2014) has it: "The opponents of The B Theory accept the view (often referred to as "The A Theory") that there are genuine properties such as *being two days past*, *being present*, etc.; that facts about these A properties are not in any way reducible to facts about B relations."

Perhaps we can press the question one more time: temporal error theory is true if there are no temporal properties, *or* if time is *very* different than we supposed. A one-instant world is very different from our own, timeful world. So, does that mean that temporal error theory is true of a one instant world, and that TET therefore generates the wrong conclusion?

I think not. The central plank of my response is that a one-instant world retains the kind of temporal structure that we think exists at the actual world. Granted, we might think at the actual world that there are many times, and that at one-instant world, there is only one, but that's a difference in number rather than an interesting difference in kind. To see the relevance of this point, let's compare with the moral case. Consider a possible world that contains just one event: Jones setting fire to a cat. Let us grant that, at this world, there also exists a moral fact—Jones setting fire of the cat *is wrong*. We should conclude that moral realism is true of such a world. Of course, there are no *other* events, so there is only *one* moral fact. But the moral property that exists is instantiated in the right kind of way. (In contrast, we might be tempted to say that moral error theory would be true of a world if the moral property that existed was such that the setting fire to the cat *is good*.) To be sure, there is only one moral fact at this world and so the world is, morally, very different from our own. But so be it. The property of *wrongness* attaches to the world as we would expect. Moral error theory does not apply here.

I think the same basic point applies to the temporal case. Granted, a one instant world is very different to our own—just as different as a one-event/one moral fact world is. Nonetheless, and I take this to be the key point—what temporal structure *there is* is arranged at this world in such a way as to match our expectations of how that world should be. There is one moment. For its duration, it is present. That's pretty much all that we can expect of it. (Were that moment always *past*, for instance, then matters might be otherwise.) That being so, this is a world where temporal error theory does not apply. Thus, I see no reason to think that an E&M style case threatens TET.

4.3 TET's consequences: why the present tensed truths?

Let us return to the details of TET. Why pick the present-tensed truths? Well, as we've just seen, a one instant world looks to be one at which time is real, but it is not clear to me that any temporal truths other than present tensed truths are true at such a world. Were we to focus our attention on any other temporal truths, it's hard to see how we can secure the result that a one instant world is one at which time is real.

In response, an objector might claim that the present tensed truths are sufficient for the reality of time, but not necessary for the reality of time. Just so long as we have some other temporal truths, then it follows that time is real.

To this concern, I reply as follows. Given a standard Priorean (2003) gloss, the present tense operator 'it's now the case that...' is redundant. When we utter sentences like 'it is raining' we do nothing to effect the truth value or meaning of the sentence by adding 'now' to the sentence.

Suppose that's correct. Now consider any temporal expression—indeed, any expression at all if we take 'the redundancy of the now' seriously. It follows from that any sentence should be read as equivalent to that self-same sentence embedded within the scope of a present tense operator: p is equivalent to Np . If that's right, the truth of *any* temporal proposition is equivalent to (and entails) a present-tensed proposition. So, as long as we have any true temporal proposition, then a present-tensed proposition is true. And, in that case, it's hard to see how to maintain that the truth of a present tensed proposition

could fail to be necessary for the reality of time if we're opting for something like TET. Thus, if 'now' is a redundant operator, then my interpretation of TET will be viable.

4.4 TET's consequences: can we explain the lure?

One issue that B&M raise is the need to give an explanation for the fact that arguments against the reality of time receive such a bad reception. In their terms:

Though both McTaggart (1908) and Gödel (1949) have argued for an error theory about time, their arguments have typically failed to convince. That there is something in our world that is a good enough deserver to satisfy the concept of time typically seems more certain to us than any philosopher's argument to the contrary. There are relatively few things we could discover about our world that would lead us to conclude that there is no time, rather than to conclude that time is somewhat different to how we had supposed. Call this phenomenon relative ineliminability. (B&M, 2015: 2429-30)

B&M go on to explain that we ordinarily think it likely that there exist various phenomena that require the reality of time: specifically, causation, persistence and change. Further, we also think it likely that there are particular phenomena—'agential phenomena'—that *also* seem to require the reality of time, where that should be taken to include planning for the future, holding agents responsible for their past actions, etc. So, in giving a functional account of the reality of time in the way that they do, B&M's position entails that if time is unreal, then that this is so is precisely because the requisite structure (whatever that may be) to support causation, agency, phenomenology of passage, etc., isn't present. Of course, if those features aren't present in a timeless world, then it's hard to accept that our world is timeless, for we are (claim B&M) committed to the existence of these phenomena.

I concede that the relative ineliminability of time is an oddity and that it requires an explanation. Happily, TET delivers an explanation. Consider, very generally, that error theories are hard to swallow. Moral error theory has us deny that there are moral truths. Error theory about composite objects (mereological nihilism) has us deny that there are composite objects. An error theory about the mental (eliminative materialism) has us deny that there are such things as thoughts. But, as I've described it, temporal error theory would be as bad as all of those error theories combined. After all, each of the following sentences are plausibly present tensed: 'you should not kill him', 'my computer is on the desk', 'I think I should go home'. If TET were true of the actual world, none of those sentences would be true. All of those sentences would be truth apt, but, because they are present tensed, they would also be false. That's incredibly hard to accept.

Indeed, the same will be true about a whole host of other judgements, a sub-set of which enable us to recover B&M's own explanation for why theories that deny the reality of time have proven objectionable. Consider the following sentences: 'I'm breaking up the jigsaw puzzle', 'I'm going out with Hilary again', 'I'm breaking in these new shoes'. These sentences are present-tensed. They make claims that are causal (the breaking of the puzzle and the breaking in of the new shoes), require persistence (else how could I go out with Hilary again?) and change (again, the puzzle and the shoes). But, since those sentences are present tensed, any theory satisfying TET would be obliged to treat those sentences as truth-apt, but false.

Now, if we *were* agents, then these sentences would be true. If they are not true, then we are not, in fact, agents. If a theory satisfying TET is true, then we are not agents. Since we *are* committed to the idea of ourselves as agents (B&M, 2015: 2430), so this goes some way to explaining the relative ineliminability of the reality of time. Denying the reality of time means denying that there are present-tensed truths. And

that means denying that there are such phenomena as causation, agency and the phenomenology of passage. And that's just too much to swallow.

4.5 TET is unsatisfying and prone to counterexamples

Temporal error theory, as I present it, is fully captured by TET. But whilst that may be a good starting point, it doesn't really tell us anything about what it would take to falsify temporal discourse. We don't know what is required to make temporal discourse true or false. At least, so goes the concern. Further, this omission makes possible two different kinds of counterexample: counterexamples that threaten both the necessity and sufficiency of TET.

The threat to necessity: suppose that we adopt a token-reflexive account of the truth-conditions for present-tensed claims.¹⁰ Accordingly, a token of "it is now 10pm" is true iff that token is located at 10pm. For any world in which there are no present-tensed sentence tokens, there will be no true present-tensed statements. So, consider an eternalist world that is just like ours and, via recombination, 'strip it' of all linguistic tokens of this kind. Such a world is not a world in which time is real. That seems like the wrong result. This tokenless world contains just the same temporal structure as the original. All that has changed is whether there are any sentences of the 'right' kind. The reality of time doesn't depend on that.

The threat to sufficiency: in Barbour's (1999) theory, all that exists is a single 3-dimensional configuration--a time-capsule---that contains very many consistent records indicating a temporal history, but a history that doesn't actually exist. There is no reason why there couldn't be present-tensed propositions in this time-capsule (perhaps in a book), but, we may worry, there is no reason to take this world as one in which time is real. According to Barbour, there *is* no temporal structure.

What both cases share is that, because of TET, the temporal truths are doing all of the work. What has not been said is how these truths are to 'connect up' to the world. For, or so goes the thought, if a world is to be regarded as timeless, what matters isn't just what's true at such a world, what matters is what those truths are representing (or failing to represent). Thus, what matters in the threat to necessity isn't whether there are tensed truths. What matters is whether those truths are representing temporal structure. The problem is that TET doesn't say that, and so TET fails to recognise that the world described is one in which time is real.

Similarly, in the threat to sufficiency, what matters isn't whether we can cook up a true sentence, what matters is what would be represented by such a sentence. And, in this case, it's clear that no temporal sentence should be true at such a world, because it lacks all temporal structure. There is no temporal structure to be represented by a putative truth; thus we should regard such a world as timeless.

I think these two threats (to necessity and sufficiency) require different treatments. Dealing with the threat to necessity requires me to clarify what I mean by 'temporal discourse'. Dealing with the threat to sufficiency requires me to take a slightly different route. I'll deal with each case in turn.

I say that time is unreal just in case temporal discourse is truth apt and false. Two things then need clarifying. When I say that 'temporal discourse is truth apt and false' I am being imprecise. More carefully, TET is the claim that: Temporal discourse is truth apt and false, or, if there is no temporal discourse at a world, then had there been such discourse, then it would have been false. I take it, of course, that the same is true of most anti-realist views. For instance, I do not think that we ought to object to moral anti-

¹⁰ Cf. Dyke (2002; 2003).

realism that the view is false because there are possible worlds that lack mind independent moral facts but that also lack agents who engage in moral discourse. Moral anti-realism is true in the absence of such facts. Any argument to the contrary seems to deliberately miss the point of the anti-realist's position. So, though TET is accurate enough for us to be going on with we can offer the more precise version if required.

The threat from sufficiency requires a different response. The concern is that unless we say something about what temporal truths require of the world, then it looks open that a tensed proposition might be true at a Barbour style world. That's just wrong.

I offer a two-step response. The first step is a clarification: I take for granted that what I mean by 'temporal truths' carries with it a commitment to a theory of truth that is robustly realist: for a proposition to be true requires that it is true in virtue of how the (mind-independent, verification transcendent) world is—however we are then to spell out this 'in virtue of' claim. In saying as much, I do not mean to commit myself to any particular theory of truth or any particular theory of what it is that underpins this 'in virtue of'. Nonetheless, I do presuppose that true propositions are true because of how the world is.

The second step, an explanation, follows from this clarification. Suppose, per the objection, that we had true present-tensed propositions at a Barbour world, in virtue of a Barbourian 3D capsule. Here will bite the bullet. If this 3D capsule is such as to make true present tensed propositions, then contra the received wisdom, I would regard time as real at the capsule world. Let me try to explain.

First, remember that we are holding fixed the claim that a proposition is true in virtue of how the world is (however that 'in virtue of' is to be spelled out). Second, we should remind ourselves that, even granting a realist theory of truth, it does not need to follow that the (seeming) linguistic structure of the representational device is mirrored by the world. That is, that it is true to say of some time that 'it is now', or that we say that 'x is later than y' does not mean that the world must contain a property of nowness or a later than relation. What makes true a claim that 'a is F' or that 'Rxy' can be other than a, F, R, x and y.¹¹ So, we needn't suppose that temporal truths are true in virtue of temporal structure in the world. Third, let me compare the temporal case with some more familiar cases. So, holding fixed a realist theory of truth, let us think about modality. Our question: should we be realists about possibility? Our test is possibility error theory, PET: modal discourse is truth-apt and literally false. In this case, 'modal discourse' amounts to putative truths such as 'it's possible for birds to fly' and 'I could eat a sandwich'. If claims such as these are true, I don't think that we can deny the reality of possibility. Next, consider the moral case. Our test is moral error theory, MET: moral discourse is truth-apt and literally false. In this case, 'moral discourse' amounts to putative truths like 'it is wrong to steal', and 'it is good to give to charity'. If claims such as these are true, I do not think that we can deny the reality of morality.

So, if present tensed claims are true, and if we endorse a realism about truth, then time is real. The question then becomes whether or not anything in the Barbour-world is such that temporal propositions are true at such a world. I do not propose to settle that issue, here, but I do think that how we settle the matter determines whether we should think of a Barbour world as one at which time is real or unreal.¹²

¹¹ For a mundane example: nominalists deny that there are properties, but will typically say that it's true that, for instance, my cup is blue.

¹² B&M cannot preserve this result. There is no temporal asymmetry at a Barbour world and so, by their lights, time is not real. However, if what exists at a Barbour world suffices to make it true that, for some x, <x is present> is true, then, for the reasons given, I think their view fails.

Finally, an objector might claim that we *still* don't really know what temporal error theory is. We've not been told what it would take, given a robust account of truth, for a present tensed truth to be true. So, even in a Barbour-world, we don't *really* know whether that's temporally error-theoretic.

To this objector I suggest that this is a case in which this is actually the desired result. It can be a legitimate matter of disagreement whether the world's being thus and so, *is* sufficient to make some moral claim true (i.e. whether people having mental states of certain kinds is a truthmaker for moral claims); likewise in the modal case. But that shouldn't get in the way of us spelling out a general account of moral and modal error theory. TET is neutral on such issues, just as MET is.

One *can* legitimately disagree about whether the world's being as Barbour describes it, would be sufficient to make true, present-tensed sentences/propositions and one *can* ask whether there is enough structure at a Barbour-world for time to be considered real. TET is merely a test—and a good one—to help us along the way.

5. Conclusion

Arguments that move from our best physics to the claim that time isn't real, are ubiquitous. What such arguments do not make at all clear is what, exactly, such claims amount to. We *now* have a grip on what a theory must do in order to deny the reality of time.

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