

Presentism and modal realism

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Abstract

David Lewis sells modal realism as a package that includes an eternalist view of time. There is, of course, nothing that ties together the thesis that modality should be analyzed in terms of “concrete” possibilities with the view that non-present things exist. In this paper I develop a theory I call *modal realist presentism* that is a combination of modal realism and presentism, and argue that it has compelling answers to some of the main objections to presentism, including the arguments from (i) singular propositions, (ii) cross-temporal relations, and (iii) truthmaking. Toward the end, I compare modal realist presentism favorably to some similar theories, including Bigelow’s modal theory of time, Williamson’s theory of the ex-concrete, and Dainton’s theory of many-worlds presentism.

1 Introduction

Modal realism (as conceived by David Lewis) treats modal operators such as ‘Necessarily’ and ‘Possibly’ as quantifiers over worlds, where the worlds quantified over are supposed to be no different in ontological kind from the actual world. Eternalism (often) treats temporal operators such as ‘It was the case that’ in a like manner, as quantifiers over times, where the times quantified over are supposed to be no different in ontological kind from the present (or any time we might call ‘the present’, if there be no distinguished present). But despite this and other analogies between tense and modality, the doctrines do not stand or fall together. One can rationally believe in the realist’s reduction of modality while at the same time believing in presentism. According to such a picture, the pluriverse consists of worlds, each of which lives within a single moment (assuming the necessity of presentism). It is clear, however, that while modal realism provides a reduction of modality, it can provide no such reduction of tense. Nonetheless, I will argue that what modal realism can provide is a theory of presentism with a number of compelling advantages. After presenting what I call *modal realist presentism*, I argue that it meets a number of central objections to the view, including the arguments from (i) singular propositions, (ii) relations, and (iii) truthmaking.

Even if the reader grants me my argument, that argument does not in itself constitute a compelling case for modal realist presentism, which is wedded to a contentious modal

theory. Instead, it illustrates a benefit to be reaped from a modal doctrine as robust as realism, a benefit that Lewis himself (or anyone else as far as I am aware) never considers. I also think it constitutes a compelling reason for any modal realist with presentist inclinations to prefer modal realist presentism over other presentisms. Unlike most theories that employ possible worlds that are able to remain neutral concerning the ontology of worlds (such as a theory of counterfactual conditionals), modal realist presentism *requires* the existence of, for lack of a better word, concrete mere possibilia—e.g., ersatz substitutes will not do. In this respect, the theory significantly differs from some similar proposals I discuss toward the end.

Before moving on, it is worth briefly remarking on what Lewis himself says of presentism. He calls the problem of temporary intrinsics the problem of how a thing can exist from one time to another while undergoing intrinsic change. If I was standing-shaped at one time and am now sitting-shaped, and assuming that both of these properties are intrinsic and non-relational, then it seems (at least to Lewis) that I must somehow have both of these incompatible properties. Lewis hastily rejects presentism as a possible solution:

[Presentism is a] solution that rejects endurance; because it rejects persistence altogether [...] In saying that there are no other times, as opposed to false representations thereof, it goes against what we all believe. No man, unless it be at the moment of his execution, believes that he has no future; still less does anyone believe that he has no past. (Lewis, 1986, p. 204)

However, Lewis says that “something persists iff, somehow or other, it exists at various times” (Lewis, 1986, p. 202) and certainly the presentist can agree to that—at least if by existing now and having existed, say, yesterday, I thereby count as existing at various times. What a presentist cannot agree to is the claim that I exist at various times in virtue of existing in some other sense, e.g. timelessly, at various times which do not, recall, include false representations thereof. Similarly, while the presentist denies that there *are now or timelessly* other times, they do agree that there *were* and *will be* other times, and so surely presentism does not go against “what we all believe”. The vast majority believe that they have a future insofar as they believe that they *will* exist, and not insofar as they believe that they timelessly exist in a future that is already there.¹

¹Lewis later describes the presentist’s position more charitably, in terms of primitive tense operators, but continues to reject it as providing a legitimate way of persisting. He says:

When the presentist obligingly agrees that it exists in the past and in the future, he is not saying that it or any part of it is located elsewhere in time; he is attaching his modifiers to alleged falsehoods to make truths. Thus he denies what *others* mean when they say that things persist and undergo intrinsic change. Of course the presentist has no problem of intrinsic change, but he escapes it at far too high a cost. (Lewis, 2002, p. 2, my emphasis)

Who are the *others* that Lewis has in mind? I suppose the eternalist—but then that is just how it should be! Of course, each denies what the other means in saying that a thing persists. The important difference is that the presentist, rather than eternalist, is presumably not denying what *most* mean in saying that a thing persists. Relatedly, it is interesting to note that, on Lewis’s definition of endurantism according to which a thing persists in virtue of being wholly present at more than one time, presentism for Lewis does not qualify as a version of endurantism. But surely the presentist can see herself as an endurantist by believing that, at any time at which a thing existed, exists, or will exist, it existed, exists, or will exist wholly at that time. For a convincing defense of presentism against the problem of temporary intrinsics, see (Zimmerman, 2006).

2 Modal realist presentism

A central tenet of modal realism (as endorsed by David Lewis) is the Principle of Plenitude:

Plenitude: absolutely *every* way that a world could possibly be is a way that some world *is* (Lewis, 1986, p. 2).²

One way the world could be is the way it was in 400 BC (i.e., some particular instant therein). It follows, according to Plenitude, that there is such a world. In that world there is an individual who is indiscernible, both intrinsically and extrinsically, from the way our Socrates was, and who is therefore wise, snub-nosed and will soon die a tragic death by ingestion of hemlock.

On a block universe picture, this would be true in virtue of the actual world and its 400-BC-stage. Suppose, however, that the pluriverse consists only of worlds at which present things exist—i.e., suppose presentism is necessarily true. By Plenitude, there is nonetheless a world that is just the way the actual world was in 400 BC, containing a person indiscernible from the way our Socrates was.³ In general, for any world w and any time t of w , there is a world $f(w, t)$ that is just the way w was, is, or will be at t (depending on whether t is past, present or future at w). By the identity of indiscernible worlds, $f(w, t)$ is unique. Let us call such a world *t-indiscernible* from w . Similarly, let us call an individual x a *t-clone* of s when x is just the way s was, is, or will be at t (depending, again, on whether t is past, present or future at the world of s). (Let us assume that s existed, exists or will exist at t .) Let us call a *t-clone* of a w -inhabitant a *past-clone* of that thing when, at w , t is past, a *future-clone* when t is future, and simply a *clone* when it is either a past- or future-clone. If t is present, it follows that the *t-clone* of an object is that very object itself.

Given these definitions, I now propose the following truth conditions for tensed statements and call the resulting view *modal realist presentism*, or *MRP* for short:

- (i) ‘ s was/is/will be ϕ ’ is (presently) true iff some past-/present-/future-clone of s is ϕ ;

²Lewis provides this as an intuitive gloss of the intended principle but thinks it trivial on plausible sharpenings of ‘way’. The non-trivial version he gives is a principle of recombination stating that ‘patching together parts of different possible worlds yields another possible world [shape and size permitting]... [r]oughly speaking, the principle is that anything can coexist with anything else, at least if they occupy distinct spatiotemporal positions’ (Lewis, 1986, pp. 87–88). When I speak of ‘modal realism’, I mean more or less Lewis’s version (which includes qualitative counterpart theory, worldbound individuals, spatiotemporally isolated worlds, and so on).

³There may be many such worlds; whether there are depends on whether there are distinct indiscernible worlds. Lewis remained neutral on this issue (see (Lewis, 1986, p. 224)), but for an argument for the identity of indiscernible worlds, see (Divers, 1994). To make things simpler I will assume the identity of indiscernible worlds, as this allows us to speak of *the* world that is indiscernible from the way ours was a particular instant and, consequently, of *the* individual that is exactly the way our Socrates was (at some instant) in 400 BC. However, the assumption is not necessary. To simulate uniqueness, we could instead take equivalence classes of worlds, define well-orderings on them (assuming the Axiom of Choice) and take the least to serve as the unique representative.

(ii) ‘ s was/is/will be ϕ at t ’ is (presently) true iff the t -clone of s is ϕ .⁴

According to MRP, then, ‘Socrates was wise’ is true iff some past-clone of Socrates is wise. Since there is such a past-clone, as guaranteed by Plenitude, he is wise, and so the left side of the biconditional comes out true. Indeed, for any object that existed and was ϕ , one of its past-clones has ϕ , and similarly for future-tensed attributions. It follows that MRP (assuming its ontological claims true) is extensionally adequate.⁵

Notice that (the truth conditions of) a past-tensed claim involving a presently existing individual will involve past-clones of that individual rather than the individual herself, and similarly for future-tensed claims. The clones act, in this sense, as an individual’s stages do according to perdurantism. (Recall that the present-clone of an individual is the individual itself.) Note, however, that even if I have the property of being a rambunctious child in virtue of standing in a certain relation to certain of my clones, the person with the tensed property is still *me*, and not my clones.

There is a worry concerning the existential quantifier in (i). The right side of the biconditional says that there exists a past- (future-) clone of s which means that there exists *at present*... at present *where*? It seems that our quantifiers need to be world-restricted, since we cannot speak as if our present time is the present time of other worlds, even if the only time that exists at each world is the present. Or so it seems. No problem; if this is a worry—though it is not clear to me that it is—the following reformulation of (i) seems to get around it:

(i*) ‘ s was (will be) ϕ ’ is (presently) true iff, *possibly*, some past-clone (future-clone) of s is ϕ .

Now that the truth conditions for tensed claims have been given, let us see how well MRP fares against three central objections to presentism.⁶

⁴To avoid failures of reference, it is assumed that ‘ s ’ is a variable ranging over singular terms t such that ‘ t existed, exists, or will exist’ is true. ‘ ϕ ’ is a variable ranging over predicates such that (i) and (ii) come out grammatical. For simplicity, I have not relativized truth to a world in clauses (i) and (ii).

⁵There is a problem I’m ignoring, an analog of which also arises for Lewis’s original formulation of counterpart theory and the translation of modal discourse into that theory (see (Lewis, 1968)). On that translation, a sentence of the form ‘ s possibly doesn’t exist’ is true iff there is a w -counterpart of s that doesn’t exist at w , which is unsatisfiable. Likewise, according to MRP, ‘Socrates failed to exist’ is true iff some past-clone of Socrates fails to exist (at the world it inhabits). Since it is tangential to our present purposes, let me say only that my own view (which is controversial) is that there is no uniform translation from cleaned-up natural language into the primitive vocabulary of MRP (or counterpart theory) and that this is unproblematic. Thus the translation of ‘Socrates failed to exist’ should be ‘There is a t -indiscernible time, for t past, at which Socrates does not exist’.

⁶John Abbruzzese (Abbruzzese, 2001) briefly proposes a multiverse theory that attempts to skirt the paradoxes of time travel by maintaining that when a traveler journeys back in time, she journeys to an alternative universe with that time as present: it is assumed that “for every time t , there exists a universe, ω , such that the present time in ω is t ” (Abbruzzese, 2001, p. 36). This suggests a variant of MRP based on a *multiverse*. Of course, such a theory does not give us a reduction of modality.

3 Objections to presentism

The following triad comprises some of the most serious objections to presentism.⁷

1. *The argument from singular propositions.* A singular proposition expressed by a sentence of the form ‘*s* was ϕ ’ is a proposition that contains as a constituent, or directly refers to, *s*. There are singular propositions about the past (e.g. ‘Socrates was wise’). Therefore presentism is false.⁸
2. *The argument from relations.* If a relation holds between some things, the relata, then each relatum exists. Relations hold between non-present things and present things; in particular, present events are caused by past events. Therefore presentism is false.⁹
3. *The argument from truthmaking.* Every truth has a truthmaker, i.e. an object on whose existence the truth depends. There are truths about the past, e.g. that Socrates was wise, that seem to have non-present objects as truthmakers. Therefore presentism is false.¹⁰

I will now argue that MRP has relatively straightforward answers to each of these arguments.

3.1 The argument from singular propositions

Since Socrates doesn’t exist, there can be no singular proposition about Socrates that has him as a constituent. But suitable past-clones of Socrates exist and these are the constituents of singular propositions about Socrates. For instance, call the 400-BC-clone of Socrates ‘Sock’ and consider the sentence ‘Socrates was wise (at some instant in 400 BC)’. Then the singular proposition expressed by that sentence involves Sock as a constituent.

Here is a possible objection: according to MRP, the proposition expressed by ‘Socrates was wise’ does not have as a constituent what it intuitively should, viz. Socrates. Here is my response. According to the presentist Socrates doesn’t exist, so to insist that the proposition have something that doesn’t exist as a constituent is not going to make much sense to the presentist. The only candidate constituents are either abstract or concrete. Since Socrates doesn’t exist, I cannot see anything *actually* concrete that could serve as constituent. So the only concrete candidates left for the modal realist are mere possibilities such as a past-clone of Socrates. Now why would a concrete entity serve as a better candidate than an abstract one? One reason is that it allows the presentist to maintain uniform truth conditions for tensed and untensed property attributions. If ‘Socrates’ referred to

⁷One notable exclusion is the argument from special relativity since MRP does not provide any special resources for answering this objection.

⁸On the argument from singular propositions, see e.g. (Chisholm, 1990), (Fitch, 1994), (Markosian, 2004), and (McKinnon and Bigelow, 2012).

⁹On the argument from relations, see e.g. (Bigelow, 1996), (Markosian, 2004), (Crisp, 2005), and (Torrengo, 2010).

¹⁰On the argument from truthmaking, see e.g. (Keller, 2004), (Crisp, 2007), (Tallant, 2009), (Baia, 2012), and (Baron, 2015).

something abstract, we need to be told some further story concerning how ‘Socrates was human’ is true since abstract things can’t be human. Consider the sentence ‘Socrates was wise’; it is true iff a past-clone of Socrates is wise *simpliciter*. One need not tell a long-winded story about precisely which abstract things are cut out to play the representation role, or precisely how those things do the representing, or why one abstract representation is better than certain alternatives. The modal realist who believes in presentism should therefore say that the referent of ‘Socrates’ is a past-clone of Socrates, and not some abstract representer. This is of course not a knock down argument against the ersatz, but is a point in favor of MRP.

Another option is to simply deny that ‘Socrates’ has any referent. But then we would have to give up on there being genuine singular propositions expressed by sentences such as ‘Socrates was wise’ (or hold that they are gappy). We might understand ‘Socrates was wise’ as expressing, for example, an existential generalization prefixed by a past-tense operator. Perhaps the sentence means (or at least has the same truth conditions as) ‘It was the case that something Socratizes and that thing is wise’. Either we say the same for every sentence, including present-tensed ones, or we maintain the view that the proposition expressed by ‘Socrates was wise’ changes from a singular proposition while Socrates is in existence to something else once he goes out of existence. Neither of these alternatives looks very appealing.

The objector might complain that I have failed to appreciate the dialectics. Intuitively the constituent of the singular proposition is Socrates, so if that is what it is, and that is what we have reason to believe it is, then presentism is false regardless of whether there is an indiscernible substitute of Socrates available to play the role that genuine Socrates does in singular propositions about Socrates. It is here where we end up with a clash of intuitions, for intuitively Socrates doesn’t exist, not just now, but *simpliciter*. The best the presentist can do is to provide an answer to a version of the argument from singular propositions that does not simply beg the question against the presentist, i.e., by providing a sense in which there are singular propositions about Socrates even if there really are none. Similarly, the best the eternalist can do to answer the counter-objection that, intuitively, Socrates doesn’t exist is to answer a version that does not beg the question against her, i.e., by providing a sense in which Socrates doesn’t exist even if he really does.

3.2 The argument from relations

According to MRP, my admiring Socrates amounts to my admiring a clone of Socrates. The clone exists, so the relata of the admiration relation exist. Likewise for other relations between non-present and present individuals.

Here is a possible objection. When one says that one admires Socrates, one does not *mean* or believe that one admires a past-clone of Socrates. Moreover, it seems rational or consistent for one to admire Socrates without admiring someone very similar to—even indiscernible from—Socrates (at some particular moment).

I respond as follows. First, most of the time one does admire someone for certain qualitative features that person bears. One does not typically admire someone for their *haecceitistic* properties. Does one typically admire Socrates for being Socrates? Usually, then, if one admires the Socrates of 400 BC, then one admires his 400-BC-clones, for they

have the qualitative properties worthy of admiration. Nonetheless, it seems consistent to suppose that one admire someone for one's haecceitistic properties, and hence that one could admire Socrates but not any of his clones. (Similarly, if someone were to produce an intrinsic duplicate of the love of my life, I would not feel the same way about the duplicate as I do the love of my life. Is admiration like love in this respect?) If we are being so liberal about admiration, then perhaps one can admire the Tooth Fairy, and if so, then admiration is not a genuine relation after all, but rather some intensional notion like *believes in*. For the argument from relations to get off the ground, then, it will need to make use of a genuine relation.¹¹

Causation is typically taken to provide the toughest case against presentism—for it is hardly controversial that present events occur, and that they were caused by past ones. So let us suppose that the presentist may rest his case by dealing with causation. For the presentist, past events no longer exist, so causation cannot be a relation between past events and present ones. Moreover, we do not want to say that an other-worldly event involving a past-clone of the cue ball was the cause of the present moving of the actual billiard balls. Clearly the past-clones did not cause any *actual* event to occur if causation is an intraworld relation. However, if the MRPist wishes to preserve the genuine relational feature of causal talk, she can.

For a straightforward example consider the following modification of Lewis's early theory of causation.¹² An event e_2 *causally depends* on event e_1 iff $O(e_1) > O(e_2)$ and $\neg O(e_1) > \neg O(e_2)$, where $>$ is the counterfactual conditional of (Lewis, 1973b), $O(e)$ expresses the proposition that e occurs, and \neg is truth-functional negation.¹³ Causation is taken to be the transitive closure of causal dependence.

Now suppose that e_1 at t_1 causes e_2 at t_2 , according to the eternalist. Then on the proposed modification, we want to say roughly the same thing as Lewis except in terms of clones of worlds. Let us say that e_2 *causally** depends on e_1 iff the closest $\neg O(e_1)$ -world w to our t_1 -clone is such that w 's t_2 -clone is a $\neg O(e_2)$ -world. (So the evaluation involves three, rather than two, worlds.) We then let *causation** be the transitive closure of causal* dependence. In other words, the idea is to treat worlds as sums of their clones and to treat counterfactuals in the Lewisian way. This allows the MRP-ist to provide obvious modifications to *any* counterfactual theory, including Lewis's account of causation as influence, and not just his early causal theory.

Our world has t_1 - and t_2 -clones; what lets us say the same about *other* worlds? That is, how can we make trans-world temporal comparisons? Let us say that two worlds have the same temporal structure if the natural arrangement of their clones has the same order type. On the usual assumption, any world whose arrangement of clones has the same order type as the real numbers will have the same temporal structure as our world (let us assume), and this allows us to make comparisons between times of our world and times

¹¹Ned Markosian provides another strategy for dealing with admiration that generalizes to similar intentional notions; see (Markosian, 2004). On a plausible assumption that Markosian doesn't make explicit, it follows on his analysis that one cannot admire someone without admiring anyone qualitatively indiscernible from that person.

¹²See (Lewis, 1973a). See (Lewis, 2000) for his most recent account of causation as influence.

¹³Roughly, $A > B$ is true at a world w just in case all the A -worlds most similar to w are B -worlds.

of worlds with the same temporal structure.¹⁴

We do not need to call this transworld version of causation ‘causation’. All that matters is that the relation coincides with the eternalist’s honest to goodness causation, in the sense that all the same causal claims come out true. Any work that causation can do, causation* can do just as well, and that’s good enough for the presentist who thinks causation is a genuine relation amongst (possibly) existing relata, or who at least finds it convenient to speak this way.

Secretariat was faster than Seabiscuit and yet there is no time at which they both existed, as required by the truth conditions of MRP. Notice that the same is true for the eternalist—*anyone* who interprets a proposition of the form *Was(P)* as a quantification over past times is going to run into the same problem. It is clear what the eternalist will say in response to this problem: the relata of the “faster than” relation are Secretariat and Seabiscuit, and *Was(<Secretariat is faster than Seabiscuit>)* can be interpreted as true if ‘is’ is taken to be “atemporal” (in which case the past tense operator makes no contribution to the truth conditions of the embedded proposition). The analogous move for the modal realist presentist is to say that the relata are clones and ‘is’ is modally unrestricted.¹⁵

3.3 The argument from truthmaking

I say that some clones are truthmakers for ‘Socrates was wise’. The objector asks what some other-worldly individual has to do with Socrates’s having been wise.

There appears to be an analogy between the objection raised here against MRP and the Humphrey objection to modal realism (due to Kripke). On one reading of the objection, a thing’s merely possible counterparts are irrelevant in an analysis of the thing’s modal properties. For example, Humphrey’s other-worldly counterparts are irrelevant in analysis of Humphrey’s possibly having won the election.¹⁶ That is a fair objection *because* Humphrey exists so that his modal properties can be grounded in him and not his other-worldly counterparts, but to insist that something non-existent ought to do the representing or grounding in an analysis of tensed statements is (barring Meinongianism) question-begging or worse. Socrates does not exist according to the presentist, so it makes little sense to demand that an analysis of tensed claims such as ‘Socrates was wise’ involve Socrates somehow.

In any world in which a 400-BC-clone of Socrates exists, it is true according to that world that Socrates *is* wise, and so it is true according to the actual world that Socrates *was* wise. Since we are always guaranteed of such a clone, there is a sense in which the existence of such a clone necessitates the truth of <Socrates was wise>. If that is all we demand of truthmaking, then the clone serves as a truthmaker for the proposition. Now one

¹⁴See (Lewis, 1986, 70–71) for Lewis’s take on trans-world temporal comparisons in making sense of divergence, Lewis’s substitute for intrinsic temporal branching.

¹⁵Divers (Divers, 2014) suggests that for one thing to be faster, taller, etc. than another, the two must be worldmates (i.e. stand in some spatiotemporal relation). This would be a problem for MRP’s answer to the argument from relations. However, I do not think Divers’s suggestion is plausible. All that is required to make trans-world comparisons of height between *x* and *y*, for example, is that there be a world containing duplicates of *x* and *y* that has the same or similar spatiotemporal structure as our world (and in which *x* and *y* occupy sufficiently similar spatiotemporal regions as they actually occupy at the relevant time).

¹⁶See (De, 2018) on the Humphrey objection.

might demand a more substantive dependence than mere necessitation to hold between a truthmaker and whatever it makes true, but if doing so requires taking that relation as primitive, it has no place in a reductive picture like Lewis's. For what assures us that such a relation is non-modal?¹⁷

It is clear that 'Socrates was wise' is true *because* 'Socrates is wise' was made true by Socrates. It is less clear that it is true because it is possible that something, i.e. a clone of Socrates, is presently a certain way. However, it is also less clear that it is true because it is *actually* the case that something is presently a certain way. If we were to go on the intuition of ordinary folk alone, surely presentism garners greater conviction than what might be called standard truthmaker theory, the view that every truth presently or timelessly has a truthmaker. For what is plausible is that a proposition of the form *Was(P)* is such that *P* had a truthmaker, and not that *Was(P)* has one. Why think that there should be anything more to truthmaking than that? If one is an eternalist then one *can* say more, but one need not. Of course, the fact that one can say more and the other can't might be turned into an argument against the other, but it does not seem to me to be a very convincing one. Truthmaker theory for a presentist ought to be restricted to present tensed truths, along with the restricted tensed claims concerning tensed truths; e.g. for any proposition of the form *Was(P)* (or expressible by a sentence of the form 'It was the case that *A*', in case propositions have no form), if it is true, then it is because *P* had a truthmaker. However, if the presentist wants to satisfy the intuition that tensed truths have (and not only had or will have) truthmakers, then I think clones provide suitable role-fillers for the eternalist's real McCoy.¹⁸

The relation of *t*-indiscernibility which holds between worlds is a genuine relation, but the notion of *being a t-clone of Socrates* is not; or if it is, it is a relation between an individual and a set of properties that picks out the way Socrates was at *t*. An individual *s* is therefore a *t*-clone of Socrates just in case *s* exemplifies the "Socrates-at-*t* properties". This raises the following worry.¹⁹ What makes something a *t*-clone of Socrates is that it inhabits a world that is *t*-indiscernible from our own, and we can then ask what the truthmakers are for these facts, i.e. facts concerning *t*-indiscernibility. It is clear that an answer to this question will have to involve the having of some primitively tensed property. For instance, the truthmaker for the fact that $f(w, t)$ is *t*-indiscernible from *w* involves $f(w, t)$'s

¹⁷See (Lewis, 2001) and (Lewis, 2003) for Lewis's views on truthmaking. The strongest truthmaking principle that early Lewis was willing to accept is the following:

(TM=): For any proposition and pair of worlds, if the proposition is true at one world but not the other then there exists something at one world that doesn't exist at the other, or some things stand in some fundamental relation in one world but not in the other.

It might be thought that (TM=) is incompatible with MRP (or presentism more generally) for can't two indiscernible worlds differ in the tensed propositions they make true? For instance, while our world makes true that there were dinosaurs an indiscernible duplicate whose inhabitants came into existence only five minutes ago does not. However, since our world makes true that it is past-indiscernible from a world at which there are dinosaurs and the five-minute old duplicate does not, and since that relation is fundamental according to MRP, (TM=) is not falsified.

¹⁸Jonathan Tallant (Tallant, 2009) also holds that the intuitive truth of presentism gives us reason to reject standard formulations of truthmaker theory. See also (Baia, 2012) and (Baron, 2015) on tensing truthmaker theory.

¹⁹Thanks to a referee of this journal for raising it.

being exactly the way w was at t . MRP does not give us a reduction of tense, so it should come as no surprise that primitively tensed properties get into the act. It is important to note, however, that the number of such properties is not multiplied beyond necessity since the only ones needed are those required in grounding facts of t -indiscernibility between worlds. We can say, then, that the truth that $f(w, t)$ is t -indiscernible from w is a brute fact and in that sense without a truthmaker in the same way that, on certain eternalist views, the fact such as x and y stand in a certain spatiotemporal relation R is a brute fact without a truthmaker.

This brings us to the following related worry. The truthmaker for ‘Katherine gave a lecture yesterday’ can only exist for as long as Katherine gave a lecture, so if the sentence always has a truthmaker, it varies from time to time. But this is no more surprising than the variation of truthmakers over time for existential statements in general. Right now ‘There are cats’ is made true by whatever cats there presently are, and it was made true by different cats that were, and it will be made true still by different cats that will be. Even an eternalist may grant this, given a standard semantic treatment of tensed statements, and such statements are no different in this regard because they too (according to many accounts) are treated as existential statements in disguise. Now there is the difference that yesterday, the truthmaker for the sentence was Katherine, and today the truthmaker for ‘Yesterday, Katherine gave a lecture’ is no longer Katherine but a clone instead. This is counterintuitive but not particularly worrisome. For nothing stops us from saying that Katherine is the truthmaker in virtue of standing in relation to a clone that gave a lecture yesterday, so that the truthmaker is invariant after all (as long as Katherine exists). This is similar to a potential problem perdurantism faces. The truthmakers for ‘Katherine gives a lecture’ and ‘Yesterday, Katherine gave a lecture’ are counterintuitively different since each is true in virtue of different stages. Again, the perdurantist can say that the truthmaker for both is Katherine in virtue of the fact that both stages stand in a certain genidentity relation to each other that make them part of the same unified whole that is Katherine.

(This objection is called the *shifting-truthmakers objection* by Matthew Davidson (Davidson, 2013). I cannot give it its full due. For all I have suggested, it is not surprising that truths, in particular existentially quantified ones, shift their truthmakers over time. But the shift in truthmakers for tensed claims entailed by MRP might be thought to be especially problematic, for we have shifts from natural candidate truthmakers in our world to other-worldly entities. At least the other-worldly entities are of exactly the same kind as the original truthmakers rather than, e.g. the whole world, as it is with Lucretianism, or abstract proxies, as it is with ersatzism! Other targets of this objection include the Lucretianism of (Bigelow, 1991), the “distributional properties presentism” of (Cameron, 2010), and the “ex-concrete” view of Williamson mentioned below. Note that there is a similar shift in truthmakers for modal propositions according to modal realism, so the shift for tensed propositions will not cause much concern for the modal realist presentist.)

4 Is MRP eternalism in disguise?

MRP has ontologically available individuals that play the same tense-theoretic role that past and future individuals play for the eternalist. Does this make MRP a sort of eternalism? I think not, but the claim needs defending.

Presentism is the thesis that (necessarily) only present things exist and that eternalism is the thesis that past, present and future things exist.²⁰ Now if ‘past/future things’ means ‘past-/future-clones’ then MRP counts as eternalist after all. But under similar interpretations of ‘past/future things’, virtually all presentist theories count as eternalist, so who cares? Any theory which posits counterparts of past and future things—whether they be abstract or not—counts as a version of eternalism under analogous interpretations of ‘past/future things’. Consider ersatzers which represent past, present and future things using abstract entities, such as certain sets of predicates. According to such a theory, an individual is represented as having the property expressed by ϕ just in case ϕ is an element of the ersatz moment. Now interpret ‘non-present things’ as ‘ersatz moment having as member the predicate ‘existed’/‘will exist’’. Under this interpretation, ersatz theories of presentism are eternalist since they admit the existence of non-present things. However, anyone who grants a meaningful distinction between presentism and eternalism in the first place will not think there is any interesting sense under which ersatz theories of presentism count as eternalist, and I do not see that it should be any different for MRP just because clones are, unlike ersatz representers, concrete rather than abstract.

Another important difference between eternalism and MRP is that, according to eternalism, reference to past and future individuals involves reference to individuals that either were, are, or will be, spatiotemporally related to us. Past- and future-clones are not, and never were or will be, spatiotemporally related to us, so they do not count as past and future entities for the typical eternalist—they are *possibilia*. This raises the important question of how precisely the divide between presentism and eternalism should be drawn. Here is one—and what I take to be legitimate—way of drawing the divide that puts MRP clearly on the presentist side. Let eternalism be the thesis that past, present and future things are spatiotemporally related to each other. (For the eternalist, I have in mind a block universe defender.) According to presentism there is no spatiotemporal relation between me and Socrates because past things don’t exist. And even if past and future things are taken to be past- and future-clones of things, these things are not spatiotemporally related to me. That is why ‘Socrates exists’ is false according to MRP. Moreover, it is never the case that the referent of ‘Socrates’ (in a typical context) is something that is spatiotemporally related to anything that presently (and actually) exists. Even if it were vacuously true according to the presentist that past, present or future things are spatiotemporally

²⁰I have been ignoring the arguments aiming to show that there is no non-trivial distinction to be made between presentism and eternalism, or that if the distinction is legitimate, it is not the one we thought it was. See, respectively, (Meyer, 2005) and (Savitt, 2006) and the references cited therein. If presentism is either logically true or obviously false as some have argued, then its negation is either logically false or obviously true. Is one better off than the other? That depends on which disjunct you choose. Being logically true is better than being logically false, but being obviously true is better than being obviously false. I have been assuming that there is a primitive and intelligible sense of ‘exists’ that yields a non-trivial formulation of the distinction, but below I formulate what I think is a non-trivial formulation of the distinction.

related since there are no past and future things, it is still false according to presentism that Socrates is spatiotemporally related to present things. So we could reformulate the distinction to say that, according to eternalism, ‘*s* is spatiotemporally related to everything actual’ is true for any term *s* such that ‘*s* existed, exists, or will exist’ is true. As any occurrence of ‘Socrates’ in a sentence (relative to a context) has some other-worldly clone as referent, ‘Socrates is spatiotemporally related to everything actual’ is false, and MRP does not count as eternalist. (I am leaving the interpretation of ‘actual’ intuitive, but we could replace ‘everything actual’ with a name that picks out some actual individual to avoid any potential worries.)²¹

I am not suggesting that this is the best way to draw the distinction, but I do think it has its advantages in the present context. The main one is that there is no problem concerning the interpretation of ‘exist’—is it supposed to be tensed or tenseless?—since drawing the distinction this way does not involve any reference to existence. One may ask whether “are spatiotemporally related” is tensed or not, but both ways of answering the question yield a genuine distinction between presentism and eternalism, so nothing important hinges on how the question is answered. (Whether tensed or tenseless, past things are, for the eternalist, spatiotemporally related to present things.) This is important because if ‘past things’ just means ‘past clones’, then MRP is committed to the existence of past things (and likewise for future things). The difference is that these past things, while playing a role in tensed discourse equivalent to past things in the eternalist’s ontology, are not the same kind of things to which the eternalist is committed. And playing the same role with respect to some discourse does not thereby make for identity.²²

I said the 400-BC-clone of Socrates is qualitatively indiscernible from the way Socrates was in 400 BC. But so is the eternalist’s 400-BC-stage of Socrates. Hence the two, were they both to exist, would be indiscernible from each other. What then is the difference between the 400-BC-clone and the 400-BC-stage? Quite a bit, we should hope, otherwise MRP starts to look like eternalism. For while they are indiscernible, they are distinguishable by some very important properties, including some fairly natural ones, such as the property of being spatiotemporally related to us.

In the final three sections, I want to compare MRP to three similar theories, namely, John Bigelow’s modal theory of time, Timothy Williamson’s theory of the ex-concrete, and Barry Dainton’s theory of many-worlds presentism.

²¹Harold Noonan provides nearly the same characterization of the presentism-eternalism divide which he takes to be substantive, but he phrases it in terms of a spatial, rather than *spatiotemporal*, relation between the present and non-present. Specifically, what he calls *anti-Lewisian presentism* (i.e., the version that does not imply a certain actualism) is the view that “everything concrete that is actual is spatially related to me” (Noonan, 2013, p. 223, fn. 8). I suspect that his reason for doing so is that he leaves it open as to whether Socrates, for example, is temporally—and hence spatiotemporally—related to present things. I have been assuming that because Socrates doesn’t exist, he strictly speaking doesn’t even stand in a temporal relation to us. If this seems false or otherwise odd, one may be happier to adopt Noonan’s formulation instead.

²²Suppose one holds that entities like Socrates exist outside of spacetime. Then they are not spatiotemporally related to anything, and so the view counts as a presentism on my way of cutting the distinction. If the ex-concreta of Williamson (see below) lie outside of spacetime, then the view counts as a presentism. While I find this unpleasant, since the view seems clearly eternalist to me as I remark on below, note that on the ex-concretist view, Socrates may not be spatiotemporally related to us, but he *was*. This is not true concerning clones, however, and thus it suggests a way of adjusting my formulation of the presentism-eternalism distinction such that the ex-concretist view falls on the eternalist side.

5 Other possible worlds presentisms

5.1 The modal theory of time

Bigelow gives an interesting analysis of the passage of time in terms of A-theoretic properties (i.e. the properties being past, being present and being future) designed to avoid McTaggart's classic objection (McTaggart, 1908) to the A-theory. The idea goes roughly as follows. Let us grant McTaggart that (i) the properties of being past, being present and being future are incompatible, and (ii) every event in some sense has them all, and (iii) it is viciously circular to circumvent the problem by saying that an event has only one and will have or has had the others. Bigelow's way of making (i) and (ii) true while avoiding circularity is to say that something is e.g. present here, and past and future in *other* worlds. He says:

The passage of time involves the truth of such claims as that what is now past was once present. If it was present, then clearly it is possible for it to be present, and that means (in other words) that there is a possible world in which it is present [...] The claim that what is present was future, and will be past, is to be [sic] analyzed, according to the modal theory, as entailing that: What is actually present could have been future and could have been past (Bigelow, 1991, pp. 5–10)

There are two final pieces to the puzzle. The first is to take the A-theoretic properties as intrinsic, or at least the property of being present. Clearly one way of avoiding circularity is to relativize the A-theoretic properties, but to do so risks making the A-theory look like the indexical B-theory. However, it is difficult to see in what sense these temporal properties could be intrinsic. How can we look at just an object itself to figure out which of the three properties it has? To put it another way, it seems possible that two intrinsic duplicates need not share their temporal properties. Could there not be an intrinsic copy of me created at this instant that does not have the temporal property that I possess of being past? If it is just the property of being present that needs to be intrinsic, then if everything is of necessity present, it is not clear what to say concerning presentness's intrinsicity. For not all necessary properties are intuitively intrinsic, and often accounts of intrinsicity (such as Lewis's) need to be restricted to the contingent.²³

The second is to restrict the notion of possibility. It is clear that any possible event whatsoever could have been past, present or future—that is what it means to be a possible event—and yet not every possible event was past, is present or will be future. The notion of possibility must therefore be restricted. Importing ideas from temporal logic, Bigelow defines a notion of relative possibility, or accessibility, as follows. When the following conditions are met, we say that *u* is *in v's past*, and that *v* is *in u's future*, and that *v* is *accessible from u*:

- (i) everything which is past or present in *u* is past in *v*;

²³See (Langton and Lewis, 2001), (Lewis, 1986, pp. 61–62), and (Lewis, 2001) for Lewis's various attempts at analyzing intrinsicity. Bigelow is not alone in holding the A-theoretic properties to be intrinsic; cf. Parsons (2002).

- (ii) everything which is present or future in v is future in u ;
- (iii) everything which is future in u and not future in v is present or past in v .²⁴

(Normally, in linear tense logic, we distinguish two accessibility relations, one corresponding to the backwards-looking past tense operator and the other to the forwards-looking future tense operator. Of course, one is definable as the inverse of the other, so this is not strictly necessary, but it will nonetheless be necessary to talk about two kinds of accessibility corresponding to the two directions of time.)

The strategy is interesting but it has serious drawbacks. The first is that, unlike MRP, it does not secure a unique ordering of things, and hence it is not guaranteed to secure *the* ordering of things. By way of example, let us adopt Bigelow's representation of a world as a sequence of letters representing objects, where boldface indicates pastness, capitalization indicates presentness, and italicization indicates futurity. If \mathbf{aBc} is a world, then \mathbf{baC} is a world satisfying conditions (i) to (iii), and hence an accessible world. However, suppose a is *of necessity* the cause of b , e.g., (assuming origin essentialism) a is the event of Jane's parents conceiving Jane, and b is the event of Jane's existing. (Or if one does not wish to reify events, we can let a stand for Jane's mother and b for Jane.) Then on this account it is possible that b temporally precede a , *per impossibile*.²⁵

The main issue I have with the modal theory is that, since it is not a realist theory like Lewis's, merely possible worlds must be abstract representers (as there will not be enough concreta to give us all the possibilities), in which case why even call these representers *worlds* at all? Why not just call them *times*? Indeed, accessibility is defined in terms of A-theoretic properties in just the way a standard ersatz A-theory might define them.²⁶ In the end, I do not see any feature that makes the theory distinctively *modal*.²⁷

On the other hand, it is quite evident that MRP is distinctively modal and, moreover, that it skirts McTaggart's objection in the same way that the modal theory was designed to avoid it. For according to MRP, I am past, present and future in the sense that there are worlds according to which I exist that are past-, present- and future-indiscernible from ours. With that said, I still think the best way to avoid McTaggart is to take the tense operators as primitive and to define the properties pastness, presentness and futurity in terms of them:

²⁴Bigelow demands a further condition hold between u and v , viz. that they have exactly the same "temporal objects", where such an object is one that has at least one A-theoretic property. But if we are presentists, then only the present objects will count as temporal objects, and consequently it will not come out as true that Socrates (or some event involving him) was past. For this reason I have excluded this further condition from my presentation of the modal theory.

²⁵Bigelow sees this as a feature of the theory since it does not rule out backwards causation, branching, and so on. But the problem is that there are no natural, non-circular conditions we could further add to (i)–(iii) to secure the correct ordering of things. If we posit degrees of A-theoretic properties as Bigelow mentions (for other reasons) but thinks unnecessary, the problem could be avoided.

²⁶Those familiar with temporal logic will notice that conditions (i) to (iii) correspond to a definition of the accessibility relation of a so-called canonical model used in completeness proofs. Such a model is ersatzist in the sense that worlds are taken to be sets of sentences of the tensed language, and a sentence is true at a world just in case it is a member of it.

²⁷This problem would not arise if we could do away with accessibility, but we cannot since anything whatsoever could have been future (in some world) and could have been past (in some world), but not anything whatsoever was future (here) and will be past (here).

- s is past iff it was the case that s exists (iff there is a past-clone of s);
- s is present iff it is the case that s exists;
- s is future iff it will be the case that s exists (iff there is a future-clone of s).

Defining the usual A-theoretic properties in terms of primitive tense operators rather than explicating the having of the A-theoretic properties in terms of tense avoids McTaggart's objection of vicious circularity.

There is a theory similar to the modal theory that is defended by Josh Parsons (Parsons, 2002), who calls it *the counterfactual theory of tense*. According to the counterfactual theory:

- s will be ϕ iff there is some future time t_f such that were it t_f , s would be ϕ ;
- s is-now ϕ iff there is some present time t_n such that were it t_n , s would be ϕ ;
- s was ϕ iff there is some past time t_p such that were it t_p , s would be ϕ .

One of the main differences between the modal and counterfactual theories is that the latter is incompatible with presentism (provided there are past or future-tensed truths), for if there are no past times, for example, then ' s was ϕ ' is false for any choice of s and ϕ . Parsons does, however, consider a version of the theory that is neutral with respect to non-present times:

Even my own proposal could be understood in this light: the counterfactual theory might suggest a way to assign truth-values to past- and future-tensed without requiring that there must actually be any past and future events. Julius Caesar does not have to exist for 'Were it 50 BC, Caesar would be bald' to be truth-apt, and that counterfactual is all that we are asserting, according to the counterfactual theory, when we say 'Julius Caesar was bald in 500 BC'. (Parsons, 2002, p. 12)

But if the view is no longer committed to the existence of worlds or times, exactly what advantage does it have over simply taking the tense operators as primitive? We are hardly given an analysis of the past tense by saying that ' s was ϕ at t ' is true, for $t < \text{now}$, iff 'Were it t , s would be ϕ '. For one, the latter sentence has a variety of readings that the former does not. For instance, one can say that 'If it were the Mesozoic era, we'd all have to watch out for dinosaurs' even though it is false that, back then, we all had to watch out for dinosaurs. This in itself provides no refutation of the theory, since an analysandum and its analysans need not have all the same readings, but the only way to fix on the desired reading of the counterfactual is to say that a world at which 50 BC is present is one that is exactly the way our world *was* at that time, and to say that is to explain the truth of such counterfactuals, in the end, in terms of primitive tense operators, and not the other way around. To reemphasize, the counterfactual 'Were it 50 BC, Caesar would be bald' cannot serve as an *analysis* of 'Caesar was bald' if there are neither worlds nor times that serve as witness to the truth that Caesar is bald, for an exact correspondence between such counterfactuals and tensed statements can only be assured by providing truth conditions for the counterfactuals in terms of tense operators.

We can make it compatible with presentism, however, if assume modal realism, and then say that a world is a future time if it is t -indiscernible from ours for some $t > \text{now}$, and similarly for the past. Then the clause for the past tense becomes:

- s was ϕ iff there is a world w t -indiscernible from ours for some $t < \text{now}$ such that were w actual, s would be ϕ .

But it should be clear that the resulting theory is merely a counterfactual variation on modal realist presentism, and one that adopts an unnecessary counterfactual reading of tense that was designed in the first place to avoid a commitment to realism about worlds.

5.2 Ex-concretist presentism

According to Williamson, objects that did but no longer exist, such as Socrates, go from being concrete to “ex-concrete”, a category distinct from the abstract.

When Trajan died, he did not become an abstract object, although he ceased to be concrete. He did not become the value of some abstraction operator. He became something neither abstract nor concrete, but something that had once been concrete. Trajan is an ex-concrete object. (Williamson, 2002, p. 246)

An ex-concrete object such as Socrates exists and can thus (i) serve as the constituent of a singular proposition (e.g. that Socrates was wise), (ii) ground true relational attributions such as ‘Past event e caused present event e' ’, and (iv) serve as truthmaker for tensed propositions such as that Socrates was wise. Let us further claim, as the presentist holds, that past and future *events* do not exist or occur in any sense whatsoever.²⁸ Thus it appears that ex-concretist presentism shares many of the benefits that MRP does.

I think the most serious objection to the view is that it doesn’t look at all like presentism. Socrates *now* exists according to the view, regardless of whether or not he is ex-concrete, and that is something any presentist should deny. (Note that this existence claim is false according to MRP, since no present-clone of Socrates exists.) According to the view, everything exists always, and that sounds just like eternalism. Of course it is also true that everything that exists exists at present, since nothing ever goes into or out of existence, and this sounds like presentism, but, again, presentists don’t believe in the present existence of Socrates. One can dress the view up in presentist clothes by reformulating presentism as the thesis that only present and non-abstract things are concrete, but such a rewording does not thereby make for presentism.

The view is presentist in the sense that it gives up commitment to past events, but in doing so it also gives up one of the main advantages of ex-concretist presentism, viz. that it has something to say about the argument from relations. Moreover, if events are things that exist and can be quantified over, why do they come and go out of existence, such as the event of Socrates’s trial, but other things do not, such as Socrates himself? Perhaps events do not exist but rather *occur*. But then the fact that the view fails to posit the existence of past and future events does not thereby make it a presentism, for events

²⁸This view is given its fullest defense by Francesco Orilia in (Orilia, 2016), where it is called *moderate presentism*. Williamson himself does not develop a theory of presentism from his view of the non-concrete.

are not even the sorts of things that could exist, and presentism is a thesis about what sorts of things exist, not what sorts of events occur.²⁹

Second, ex-concrete objects are a mysterious ontological category. We know what concrete objects are (at least on certain understandings of concreteness), and so we thereby know what a clone is, and perhaps we know what abstract objects are. But I confess that, despite venerable attempts to elucidate the notion, I have a hard time making sense of what a non-concrete object is supposed to be. I know what properties some of them are supposed to have, just like I know what properties the Russell set is supposed to have, but that does mean that I can understand what it would mean for such an entity to exist and to have those properties. Perhaps this is due to ignorance, failure of imagination, or the dogma that the categories of concreteness and abstractness are exclusive and exhaustive (ignoring sums of abstracta and concreta, which ex-concreta are not), but if so, I think the burden of proof is on the ex-concretist to unshroud the mystery for the rest of us.

5.3 Many-worlds presentism

Dainton presents a theory of presentism that is similar to MRP in many respects, but also different in important ways. The theory is presented as follows:

reality as a whole includes many momentary presents that are not temporally related to each other, and so do not succeed each other in any way. Since each of these presents is a very brief self-contained world in its own right, I call this doctrine “Many-Worlds Presentism”. [...] [Moreover, reality] encompasses all the worlds that there will ever be, and so cannot grow. This kind of many-worlds view is thus not dynamic (in the manner of the growing-shrinking block). (Dainton, 2010, p. 84)

It is important to note that each of the presents is “very brief”, perhaps even momentary as he goes on to suggest:

The easiest way to appreciate how this might be so is as follows. Start by imagining that we do have a past, and a future, and that all coexist within a four-dimensional block-universe. Now imagine this block carved into many brief slices, each corresponding to the condition of the world at a particular time, and transport these slices into timeless [reality]. (Dainton, 2010, p. 85)

As I’ve presented MRP, there is no requirement that the worlds be static in the way Dainton suggests for many-worlds presentism. Indeed, on the picture of reality Dainton sketches, there simply is no reason to think that our world has a past or future, and hence no reason to think that any past- or future-tensed propositions are even true. The unification of the worlds into a block is what makes these tensed propositions true—it is what gives each world a history. If each world is temporally isolated and momentary, in what sense does it have a history or future?

²⁹At least, as it is traditionally understood. The ex-concretist presentist is free to deny this, of course, but they will have to convince others why presentism is best understood as a thesis about the occurrence of events, so that a view that grants the existence of past things can still, contra intuition, qualify as a presentism.

But even ignoring this worry, since we may simply take Dainton's remarks metaphorically, there is a larger worry concerning how these temporally isolated presents are to be reconnected and ordered through a "best match" method.

We know (or believe) that, in our world, for the most part change is gradual and orderly: we don't find whole cities vanishing or suddenly appearing, furniture stays where it is put, cats don't change into frogs. Consequently, any ordering of the slices that fails to capture this continuity will not be an accurate representation of our history. Indeed, it is perfectly plausible to suppose that if we start from our present, and find those slices that resemble it most closely, and place them in the order that minimizes overall differences between immediate neighbours, we would find ourselves with a unique ordering of slices, an ordering that would correspond with what we believe about our past and (although this is less certain) anticipate about our future. If we extend this "best match" method, and try to order all the slices, we might well be able to reconstruct the block we started with in its entirety. (Dainton, 2010, p. 85)

What is particularly questionable is the claim that the best match method would give us a *unique* ordering, let alone one with a linear past. Assuming that our world is indeterministic, and given the possibility that reality contains more worlds than just those that correspond to moments of ours, we should expect that the best match method will yield an infinity of orderings that contain our present. (This could be true even if there are *precisely* those worlds corresponding to moments of ours.) And without anything to secure a unique ordering, the theory fails to get off the ground.

6 Final remarks

Theodore Sider claims that "[p]resentists must...be anti-reductionists about tense; they must deny that tokens of 'there once existed dinosaurs' have truth conditions involving quantification over past dinosaurs" (Sider, 2001, p. 15). In particular, they must maintain that operators like 'it was the case that' are irreducibly tensed and hence not reducible to quantification over times. This is true for most other brands of presentism, but not for MRP. The MRP-ist can maintain that 'There once existed dinosaurs' has truth conditions involving quantification over past dinosaurs, in the sense that 'past dinosaurs' means 'past-clones of dinosaurs', and that operators like 'It was the case that' are treated as quantifiers over possibly non-present times, in the sense that 'times' means 'world clones'. This relation between tense operators and quantifiers does not give us a reduction of tense since primitive tense concepts are employed in the notion of *t*-indiscernibility.³⁰

According to traditional perdurantists, a continuant is a four-dimensional worm comprising *possibly non-present* temporal parts any two of which are worldmates. According

³⁰The only way to get a presentist reduction of tense, it seems to me, is to take times to be ersatz constructions, such as propositions, to say that the present time is the true one, and to construct the B-series from presentness and other acceptable resources, such as the "best match" method of (Dainton, 2010). I am dubious, however, that such a reduction could succeed on the plausible assumption that our world is indeterministic.

to MRP, there are no perduring individuals in this sense. But the MPR-ist needn't give up four-dimensionalist talk if she identifies the temporal parts of an enduring individual with that individual's clones. For example, the stages of Socrates will be each and every one of his clones. One interesting feature about stages and worms for the modal presentist is that they are *dynamic* in whatever sense the present is. If the present is in continuous flux then which individuals count as past-clones will similarly be in continuous flux. (If x is a t -clone of Socrates that later undergoes any qualitative change, intrinsic or extrinsic, it will no longer count as a t -clone of Socrates, for it will then instantiate properties different from those instantiated by Socrates at t .) But it doesn't matter which individual at a given moment is the t -clone of another, for by Plenitude we are guaranteed that at least one such individual exists. Consequently, the expression 'the t -clone of s ' is non-rigid over times-as-worlds when worlds are dynamic entities, and it is rigid when not. The dynamism of the fundamental ontology creeps into the derivative four-dimensional one.

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