Temporal Quantifier Relativism

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In this paper, I introduce a quantifier-pluralist theory of time, *temporal quantifier relativism*. Temporal quantifier relativism includes a restricted quantifier for every instantaneous moment of time. Though it flies in the face of orthodoxy, it compares favourably to rival theories of time. To demonstrate this, I first develop the basic syntax and semantics of temporal quantifier relativism. I then compare the theory to its rivals on three issues: the passage of time, the analysis of change, and temporal ontology.

Keywords: quantifier pluralism; passage of time; temporary intrinsics; ontology; eternalism

Introduction

New theories beget newer theories. This is especially true of *quantifier pluralism*, the view that the best language to use for metaphysics employs more than one quantifier. Quantifier pluralism is new in part because it violates a central dogma of the past several decades of metaphysical methodology. That dogma, what I will call *strict Quineanism*, holds that there is a single mode of existence and that that mode is adequately captured by the existential quantifier of classical first-order logic. Adherents of the strict Quinean dogma dominate the recent history of analytic metaphysics, including such figures as Peter van Inwagen, David Lewis, and Theodore Sider. As a result of this dominance, many of the metaphysical disputes most familiar to philosophers today have advanced with an impoverished appreciation of the options available. But quantifier pluralism's growing reputation has afforded us the opportunity to correct for these oversights.

This paper is a part of that larger process. In what follows, I will develop a quantifier-pluralist theory of time. Loosely speaking, this theory is one that employs a

quantifier for each moment of time. This theory, *temporal quantifier relativism*, has significant advantages over its competitors. But it also has its fair share of disadvantages. In developing and discussing temporal quantifier relativism, I do not take myself to be arguing that philosophers must accept it as the correct theory of time. I do, however, hope to show that it is a theory deserving of serious consideration, serious consideration at a level comparable to traditionally dominant theories of time.

In section 1, I briefly characterize quantifier pluralism and the Quinean dogmatism that it violates. Then, in section 2, I develop temporal quantifier relativism, working through both formal and philosophical issues. Next, I discuss how the theory compares to others on several issues within the philosophy of time, including the passage of time (subsection 3.1), temporal ontology (subsection 3.2), and the analysis of change (subsection 3.3). Finally, in section 4, I offer some methodological suggestions for how to evaluate these comparisons.

Section 1: Quantifier Pluralism

Many philosophers aim to offer a description of reality that is as accurate as possible. A significant portion of that description seems to include quantificational descriptions about what there is, what it is like, and what its connections to other things are. For instance: there are electrons; electrons are negatively charged; no electron is identical to a unicorn; all unicorns have horns; there are no unicorns.

For some time, it's been widely accepted that these sorts of descriptions are best regimented in a way that employs the existential and universal quantifiers formalized in classical first-order logic – rather than, say, quantificational phrases of natural

language.[1] One motivation for that acceptance is that such quantifiers enable us to accurately describe reality with elegance and precision. Another, perhaps more important, motivation, is that it seems as if such a system of quantification is indispensable to theorizing about physics, mathematics, and other domains of knowledge.[2] Consequently, metaphysical disputes have been carried out in a way that revolves around the usage of classical first-order quantifiers. Since this methodology can be historically traced to Quine, call anyone who thinks that the best description of the world exclusively employs the existential and universal quantifiers of classical first-order logic a *strict Quinean*.

This adherence to a single pair of quantifiers might be a mistake. All sorts of things exist. Intuitively, though, the way in which you and I exist is radically different from the way in which the relation *is-less-massive-than* exists. According to a strict Quinean like Peter van Inwagen, this difference should be characterized as a difference in the properties that these things instantiate.[3] But why not take the difference at face value? We already think that existence is best characterized through formalized existential quantification. So, if the ways two things exist are also different, then this should be reflected in the quantifiers that we use to describe their existence. In other words, we should employ different quantifiers. Call anyone who thinks that the best language to describe the world is one that includes more than one pair of first-order singular quantifiers a *quantifier pluralist*.

Some philosophers (like Turner (2023): 3–4) understand quantifier pluralism through the more inclusive notion of a *quantifier family*, where a quantifier family is

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[1] For some representative discussion, see van Inwagen (1998); Sider (2001).

[2] Cf. Sider (2011): 223–224; Turner (Forthcoming)

[3] See van Inwagen (1998): 234–235

roughly defined by the domains over which the quantifiers range. In this sense, plural quantifiers (as in 'Some critics admire only one another') are in the same quantifier family as the classical existential and universal quantifiers. Other philosophers (like McDaniel (2017): 40) would dispute this categorization, and would count the inclusion of plural quantifiers as a form of quantifier pluralism. Since the issue does not impact the main point that I want to make in this paper, I will set it aside and restrict my discussion to first-order singular quantification.

While I am sympathetic to the above line of reasoning in support of quantifier pluralism, I ultimately think that it addresses the issue at the wrong level. To determine whether we ought to reject strict Quineanism in favour of quantifier pluralism, we should look to particular metaphysical disputes and evaluate the extent to which quantifier pluralism leads us to better theories.[4]

Let me elaborate on that methodological point with a more specific example. Within the philosophy of time, there is a dispute regarding temporal ontology, or how time relates to what exists. According to a *presentist*, the only things that exist are present things. According to an *eternalist*, past and future things exist as well. Consider the ancient Romans. The presentist's temporal ontology excludes ancient Romans, while the eternalist's temporal ontology includes them. The dispute between the presentist and the eternalist is typically characterized by the fact that someone can either accept or reject claims like:[5]

$$\exists x(x \text{ is an ancient Roman})$$

[4] Cf. McDaniel (2017): 8–11

[5] See, for example, Sider (2011): 285–290, Sullivan (2012a): 150–153.

Further developments within the philosophy of time have been based on this mutual agreement about how to formalize the existence claims central to the dispute. For instance, presentists have attempted to find a way to describe the sense in which ancient Romans *did* exist while avoiding a commitment to the above statement. Some of those presentists have resorted to the employment of sentential tense operators like P ('It was the case that…') and G ('It will always be the case that…'), and have gone on to develop logics and semantics to characterize those operators.[6]

But this way of framing the dispute about temporal ontology assumes strict Quineanism. If we relax that assumption, we may be able to develop alternative, pluralist, theories of time. It may even turn out that these alternative theories are better able to respond to arguments that have been given for and against presentism and eternalism. If so, then that is a good reason to be a quantifier pluralist, at least so far as it relates to the philosophy of time.

That's a lot of speculation. To see if it is borne out, we need to put these alternatives theories on the table. Before doing so, though, I want to offer three final points of clarification about how I understand quantifier pluralism.

First, as I understand it, quantifier pluralism is a claim about *quantifiers*. Quantifier pluralism is typically connected to *ontological pluralism*, the claim that there is more than one mode of existence. While these two claims are mutually supporting, they are conceptually distinct and someone can accept one even if they do not accept the other. Someone who accepts ontological pluralism need not accept that the multiplicity of modes of existence is best articulated through the use of multiple quantifiers. The historical precedents to contemporary ontological pluralism certainly did not articulate

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[6] See, for example, Prior and Fine (1977); Zimmerman (2005).

their views that way. And, even though McDaniel (2017) does articulate it that way, he is open to the possibility that it may be articulated in terms of essences. Similarly, Turner (2023) suggests how a 'Tractarian' can articulate ontological pluralism through the use of names rather than quantifiers. In addition, someone who accepts quantifier pluralism need not accept that the multiplicity of quantifiers corresponds to a multiplicity of modes of existence. I defined quantifier pluralism in terms of the language best used to describe the world. Yet there is a substantive disagreement within metaphysics regarding the criteria relevant to judging what makes one language better than another. Many philosophers think that an expression in a language is good to use in virtue of its correspondence to the world. For example, some such philosophers may judge one expression (like 'green') to be better than another (like 'grue') because the former is 'more natural' or 'carves the world closer to its joints'. But other philosophers accept a more expansive range of criteria with which to judge these decisions, criteria which have less to do with the world and more to do with our own cognitive lives. To use some terminology that I have used elsewhere (Finocchiaro (2021)), call the former group *ideological externalists* and the latter group *ideological internalists*. Two philosophers may agree that the best language is one that includes multiple quantifiers but disagree as to why. One of them, the externalist, may think so because they think that there are multiple modes of existence and the quantifiers of our language ought to reflect that reality. The other, the internalist, may think so because they think that there is something about our own cognitive lives that makes it better (perhaps the internalist thinks that natural languages just so happen to contain multiple quantifiers, and for convenience's sake we should follow their precedent). Though I am more inclined toward the externalist's way of seeing things, I don't want to exclude any particular means for judging what makes one language better than another. Thus, for the purposes

of defining quantifier pluralism, I consider both philosophers to be legitimate quantifier pluralists.

Second, as I understand it, quantifier pluralism and quantifier *variance* are incompatible. According to Eli Hirsch, quantifier variance is the view that:

> ...the quantificational apparatus in our language and thought—such expressions as 'thing,' 'object,' 'something,' '(there) exists'—has a certain variability or plasticity. There is no necessity to use these expressions in one way rather than various other ways, for the world can be correctly described using a variety of concepts of 'the existence of something' (Hirsch (2002): 51).

For several years now, quantifier variance, not quantifier pluralism, has been situated by philosophers as the main foil to strict Quineanism. Surprisingly, then, philosophers have been unable to reach a consensus as to the proper relationship between the two views. Some (e.g. McDaniel (2017): 37) suggest that quantifier variance is a kind of pluralism. Others (e.g. Turner (2012): 423–424) consider that to be a mistake. Rather than scrutinize what is mostly a matter of terminology, I will just state how I see the difference. The quantifier pluralist and the quantifier variantist both reject the strict Quinean claim that the best language to describe the world is one that includes a single quantifier pair. But they disagree as to why. Quantifier pluralists reject it because they think that the best language in fact includes more than a single quantifier pair (though they may disagree with each other as to which language is best and why). But quantifier variantists reject it because they deny that there is a single best language; they think that there are multiple languages with different quantifiers and that these languages are equally suitable for describing the world. From the perspective of someone who uses one of those languages, there may be a relative sense in which they are making the 'best' choice of language. But the quantifier variantist denies that there is an inter-personal sense in which they are making a better choice. Understood this way, then,

quantifier pluralists accept a uniqueness thesis about the best language, whereas quantifier variantists deny that uniqueness thesis.[7]

Finally, quantifier pluralism is a thesis about the *primitive* quantifiers of a language. Quantifier pluralists typically think that the best language includes restricted quantifiers, in the sense that the domains of these quantifiers do not range over everything. For example, one quantifier pluralist may adopt a language that includes quantifiers that range over concrete objects like you and me and also includes quantifiers that range over abstract objects like *is-less-massive-than*. Now, suppose that I am already using the unrestricted quantifiers of first-order logic. I can 'restrict' my quantificational claims by saying something like the following:

$$\exists_c x Fx =^{df} \exists x(Cx \wedge Fx)$$

Where 'Cx' means 'x is a concrete object'. But this constructed quantifier is unlike the quantifiers relevant to quantifier pluralism. Genuinely pluralist quantifiers are primitive within the framework of the language, not defined in terms of some other quantifier. Some quantifier pluralists may also accept the 'generic' or 'unrestricted' quantifier from classical first-order logic uses. Whether or not this unrestricted quantifier is defined in terms of the restricted quantifiers is a matter of dispute.[8] But, regardless of how that dispute plays out, the restricted quantifiers should not be defined in terms of the unrestricted ones.

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[7] Cf. Javier-Castellanos (2019)

[8] See Merricks (2019); Builes (2019); Rettler (2020).

Section 2: Temporal Quantifier Relativism: The Basics

There are several quantifier-pluralist theories of time worth considering. But in what follows I will focus on the one that I find most plausible. The initial motivations that underlie the theory go like this. Contrary to what presentists say, reality is not restricted to the present. Ancient Romans, contemporary Americans, and human Martians from the year 2200 all exist. But we should recognize that the senses in which they exist are immutably different. Because existence is best captured by existential quantification, we should capture these differences by modifying the quantifiers of our language in a way that makes them temporally relativized. Call this theory *temporal quantifier relativism*, or TQR for short.

Informally, we can regard the classical quantifiers, $\exists$ and $\forall$, as like determinables with determinates corresponding to each instantaneous moment of time. The language we should use to describe the world would thus have a quantifier for each instantaneous moment of time. We can track these correspondences by subscripting each quantifier with the 'name' of that time. So, for example, the language may include quantifiers like: $\exists_{t1}$ or $\exists_{\text{the-first-moment-of-2020AD}}$.

How many quantifiers should be included in the language ultimately depends on the structure of time. Time might have a beginning, it might have an end, or it might eternally extend in either direction. Time might also be dense, in the sense that for any two instantaneous moments of time, there is a third distinct time that succeeds one and precedes the other. TQR should not presuppose any of these possibilities. Thus, strictly speaking, TQR is not a view that offers a specific class of quantifiers. Rather, TQR offers a disjunction of possibilities, each of which characterizes a genuinely possible structure of time. That being said, in order to simplify the discussion that follows I will

assume that the structure of time is continuous, like the real number line. The formal details of what follows can be modified to accommodate alternative structures of time.

As a formal system, the primitive vocabulary of TQR is the same as that of classical firstorder logic, except that the existential quantifier connective $\exists$ is omitted and for all $n \in \mathbb{R}$, we add a quantifier $\exists_n$. Universal quantification can be defined in terms of existential quantification: $\forall_n x(\varphi) =^{df} \neg\exists_n x\neg(\varphi)$.

The definitions of well-formed formulas (wffs) are also very similar to those of classical first-order logic. The only difference is that a classical wff quantifier clause like:

If φ is a wff and α is a variable, then $\exists\alpha(\varphi)$ is a wff

will be replaced by a clause more amenable to multiple quantifiers:

If φ is a wff, α is a variable, and Ω is a quantifier, then $\Omega\alpha(\varphi)$ is a wff

This new clause does not directly specify the quantifier in question, but in that way it is no different from classical clauses that do not specify the variable or wff in question.

This way of developing the syntax of TQR exposes another choice point about how the theory should be developed. Grammatically, all symbols (including variables and predicates) are shared across quantifiers. Following terminology from Turner (2012), this means that my system is *unsorted*. TQR could instead be developed into a sorted formal system where, for example, some predicates can only be combined with some but not all quantifiers. One reason I prefer the unsorted system is lexical simplicity: unsorted TQR includes a stock of predicates that is 'merely' countably infinite, whereas sorted TQR's stock is uncountably infinite (because there are predicates for each of the uncountably infinite stock of quantifiers). Another reason I

prefer the unsorted system is metaphysical: whereas the ways in which things exist differs across time, the properties they instantiate are the same. For example, the humanity that I instantiate is the same humanity that Cicero instantiates.

For technical reasons, TQR cannot use the inference rules of classical logic.[9] TQR needs to effectively isolate the domains over which its infinite stock of quantifiers range. To accomplish this, we can adopt a move from the development of free logics. Free logics, generally speaking, allow for terms that fail to denote objects (e.g. 'the present king of France'). To block invalid inferences, free logics introduce weaker rules of inference that test whether the term in question denotes. So, for example, the classical rule of universal instantiation:

$$\text{For any term t: } \forall x\varphi \vdash \varphi[t/x]$$

is replaced with:

$$\text{For any term t: } \forall x\varphi, \exists y(y = t) \vdash \varphi[t/x]$$

Similarly, for TQR, the term must denote something that falls within the domain of the relevant quantifier. To secure that, we first formally define a quantifier pair as:

$$< \Omega, Y > \text{ is a } \textit{quantifier pair} =^{df} \text{(i) } \Omega \text{ is an existential quantifier, (ii) Y is a universal quantifier, and (iii) } \Omega x(\varphi) \equiv \neg Y x \neg(\varphi)$$

With that definition, we can provide the following free logic-inspired modification of universal instantiation:

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[9] I am alluding to the so-called 'There Can Only Be One' argument. See Turner (2012): 430–431.

For any term t and quantifier pair < Ω, Y >: Yxφ, Ωy(y = t) ⊢ φ[t/x]

Informally speaking, these modifications just block inferences from one moment of time to another.

The semantics for TQR will be substantially unlike what is typical for a first-order system. All quantifier-pluralist theories include quantifiers that range over restricted domains. For many currently developed pluralist theories, these restricted domains can be straightforwardly included in the semantic model.[10] For example, a theory that includes quantifiers for concrete objects and quantifiers for abstract objects can be modelled with two elements corresponding to the two distinct domains. Like other quantifier-pluralist theories, TQR has quantifiers that range over restricted domains. Unlike other quantifier-pluralist theories, though, TQR introduces an infinite stock of quantifiers for an infinite amount of moments. To avoid a model with an infinite number of elements, we need to adopt a different strategy.

Let's start by reviewing a similar strategy in quantified modal logic. The semantic model of a standard first-order system will include a single set – intuitively, the domain of things that exist. But a single-domain model seems untenable when extended to modality. What exists is supposed to vary from one world to another. At first glance, then, the model should include a distinct set for each possible world. Unfortunately, since there are infinitely many possible worlds, this would result in a model with infinitely many elements. The standard strategy, first introduced in Kripke (1963), is to define a semantic model that includes five elements, three of which are

[10] Cf. Turner (2012): 430, 431.

especially relevant to the issue at hand.[11] First, the model retains the original set of all things and the standard interpretation function that assigns values to names and predicate. The model then adds an additional non-empty set of objects – intuitively, the set of all possible worlds. Next, the model adds a binary relation over this non-empty set, which represents 'accessibility' relations between possible worlds. Finally, the model adds a function that maps each element of the new set to a subset of elements in the original set. Intuitively, this is a function that assigns to each possible world a set of all the things that exist at that world. Statements are then evaluated relative to these functionally-defined sub-domains of the original (now super-)domain, rather than domains that are defined independently of each other.

This kind of model is standardly used in the development of tense logics.[12] When applied to time, the super-domain intuitively represents all the things that exist in the actual world, the additional set represents moments of times rather than possible worlds, the 'accessibility' relation is more like a 'temporal ordering' relation, and the function from moments of time to subsets of the super-domain specifies for each moment of time the things that exist at that time. Statements are then evaluated relative to these moments of time.

I suggest that the semantic model of TQR should look the same.[13] That being said, substantially different versions of TQR can be developed based on what is included in the super-domain and how those elements are sorted. In principle, any

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[11] There are other strategies. Most notably, some philosophers abandon the original intuition that what exists varies from one world to another. See, for instance, Williamson (2013).

[12] See, for instance, Prior (1957); Müller (2011).

[13] The temporal ordering relation may be skipped if there is no 'arrow of time'; see 3.3 for when this issue becomes relevant.

temporal ontology can be accommodated. However, in what follows I will assume that the domain is populated by *enduring* objects that are 'wholly present' at each moment of time, rather than *perduring* objects that persist through time by having temporal parts. Consequently, identity will be treated as an unsorted relation that can hold both within a single domain and across domains.

TQR differs from other logical systems in how the truth value of a quantified sentence is determined. Informally, for any quantifier, we look at its corresponding sub-domain and treat the quantifier as if it were 'bare'. More formally, the valuation function of a quantified statement is still evaluated relative to a variable assignment (and that variable assignment can assign variables absolutely, rather than relative to times). But the valuation function's results are sensitive only to how variables are assigned to the objects within the relevant sub-domain.

This domain-relativity differs from the domain-relativity of statements in systems that use sentential operators (like standard modal logic and tense logic) because the quantified sentences of TQR do not vary in truth value across domains. $\forall_{t1}x[F(x)]$, if true at one time, is true at every time. In contrast, even if the statement $\Diamond[\forall x[F(x)]]$ is true at one world, it might not be true at others. Similarly, even if the statement $P[\forall x[F(x)]]$ is true at one moment of time, it might not be true at others. In other words, domain-relativity in systems based on sentential operators is regulated by the model (more specifically, the accessibility relations in the model) and domain-relativity in TQR is regulated by the variable assignment.

Section 3: Comparing TQR and Its Rivals

Now, I will discuss how TQR compares to other theories of time. I cannot hope to compare TQR to every theory in the philosophy of time, though, so I will mostly limit my discussion to some of the more prominent ones. I also cannot hope to compare these

theories on every single issue. So, in what follows, I will limit my discussion to some of the issues that seem to me most interesting in connection to TQR.

My discussion has a noteworthy absence, however. In what follows, I will not say anything about how TQR coheres with the special theory of relativity. While I do think that every theory in the philosophy of time must eventually be evaluated in connection to our best scientific theories of time, I'd prefer to delay such an evaluation for two reasons. First, I am not a trained physicist; it is beyond my expertise to decisively settle the matter. Second, and more importantly, the border between philosophical theories of time and the special theory of relativity is hotly disputed territory. Many philosophers, for example, have argued that presentism is inconsistent with the claim that, according to special relativity, there is no observer-independent notion of simultaneity.[14] Others philosophers have objected to this argument or have questioned whether it says anything interesting about other philosophical theories of time.[15] The issue is complicated, to say the least. I therefore leave it for another day.

Section 3.1: The passage of time and the privileged present

In what sense does time 'pass' from one moment to another? On this issue, philosophers are deeply divided. They can be divided into two camps, though the precise boundaries of these camps are contested. Someone is an *A-theorist* if they think (i) there is a metaphysically privileged time (the time that is present), and (ii) which moment is so privileged objectively changes.[16] A presentist, for example, thinks that the present is

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[14] See Sider (2001): 42–52 for a standard presentation of this argument.

[15] See, for instance, Builes and Impagnatiello (forthcoming). Rea (1998): 226–236 discusses how, even if the argument succeeds against presentism, it has little impact on other theories in the philosophy of time.

[16] For more on the A-theorist camp, see: Zimmerman (2005); Sullivan (2016).

privileged insofar as it exists; as time passes, one moment comes into existence and another goes out of existence. Someone is a *B-theorist* if they deny one or both of these two claims about the privileged present.[17] B-theorists often say that space and time are analogous. 'The present' is like 'the here' insofar as there is nothing metaphysically distinguishing these locations beyond the indexical fact that it happens to be where or when someone is.

It's not obvious which camp contains TQR. According to TQR, there is a quantifier for every moment of time. Incidentally, then, the present moment is distinguished from every other moment of time in a way that goes beyond merely indexical facts. But the present moment of time is not distinguished *qua* being the present moment. Furthermore, the metaphysical distinction posited by TQR is egalitarian: no moment of time is privileged over any other. Thus, I consider TQR to be a B-theory of time.

TQR's status as a B-theory of time will be seen as an advantage to some and as a disadvantage to others. Some philosophers, for example, think that only an A-theory can make sense of our phenomenal experience of time.[18] Such philosophers would likely view TQR just as suspiciously as they view other B-theories of time. I suggest that they consider a different quantifier-pluralist theory, *presentist existential pluralism*. This theory is like a growing-block A-theory of time with two quantifiers, one for past existence and one for present existence.[19] Other philosophers would see TQR's status as a B-theory of time as an advantage insofar as they think that the metaphysical privilege an A-theory ascribes to the present is inconsistent with scientific orthodoxy about the

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[17] For more on the B-theorist camp, see: Mellor (1998); Sider (2001).

[18] For a more systematic discussion of 'the' argument from experience, see Skow (2011).

[19] For more, see McDaniel (2017): 78–109.

nature of time.[20] Personally, I think the collective force of these and related arguments about the passage of time pushes in favour of a B-theory of time. But that is a point much too large to resolve here. At the very least, with respect to the passage of time, TQR is no less plausible than other B-theories of time.

Section 3.2: Temporal Ontology

As I indicated earlier, the dispute between presentism and eternalism is a dispute about what sorts of things exist. Most philosophers would agree that presentism offers an 'ordinary' or 'conservative' ontology: what exists according to presentism is more-or-less what we pre-theoretically think exists. In contrast, the most prominent eternalist theory, four-dimensionalism, offers a 'revisionary' ontology. What, precisely, is contained within this ontology differs depending on the specific version of four-dimensionalism under consideration. But, generally speaking, four-dimensionalism posits *instantaneous temporal parts*. To give a fairly standard definition: x is an instantaneous temporal part of y at some instantaneous moment t when (i) x exists at, but only at, t; (ii) x is part of y at t; and (iii) x overlaps at t everything that is part of y at t (Sider (2001): 59). Instantaneous temporal parts collectively compose the objects that persist over time. For example, my Geddy Lee Signature Jazz bass guitar has existed since 2009, and for every moment between then and now there exists an instantaneous part that exists only at that moment and perfectly overlaps the persisting bass, like a momentary snapshot of my bass at that moment in time.

Four-dimensionalism's temporal ontology is typically seen as a disadvantage of the theory. There are at least two distinct reasons to consider it a disadvantage.

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[20] Cf. Sider (2001); Turner (2020)

First, as I noted, it is revisionary.[21] We don't ordinarily think that objects are 'spread out' over time and composed of instantaneous time slices. The fact that four-dimensonalism contradicts ordinary belief is seen by many as a cost. There are at least two justifications for why such a contradiction should be seen as a cost. First, some philosophers (e.g. Lewis (1986): 134–135) have argued that we should be theoretically conservative. We should be theoretically conservative because we are cognitively limited beings and we should therefore be modest about our ability to acquire the truth on our own, rather than by relying on our collective epistemic achievements. Other philosophers (e.g. Korman (2015): 111–115) think that our ordinary beliefs about what exists are responsive to what actually exists insofar as our experiences accurately track what actually exists. For example, we ordinarily believe that persisting objects like my bass exist because we have experiences as of persisting basses, we do not ordinarily believe that instantaneous temporal parts of basses exist because we do not have experiences as of such parts, and, generally speaking, our experiences are reliable. On either justification, four-dimensionalism's inconsistency with ordinary beliefs is a disadvantage, though not an insurmountable one.[22]

Second, four-dimensionalism's temporal ontology is ontologically profligate. Many philosophers value ontological parsimony in that they think the fact that one theory, T1, is more ontologically parsimonious than another, T2, is a reason to prefer T1

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[21] Cf. Sider (2001): 218

[22] In fact, despite Lewis's endorsement of theoretical conservativism, he himself endorses four-dimensionalism!

over T2.[23] Because presentism does not posit temporal parts, it seems to be comparatively more ontologically parsimonious than four-dimensionalism.[24]

Some philosophers admit that presentism is comparatively ontologically parsimonious, but deny that it is comparatively more simple overall. As I briefly mentioned in Section 1, many philosophers think that presentism is forced to use tense operators like P ('It was the case that…') and G ('It will always be the case that…'). Because presentism cannot reductively define these tense operators, they are an additional complication to the theory's ideology. Four-dimensionalism does not need such tense operators.[25] So, four-dimensionalism is comparatively more *ideologically* parsimonious.

Now, how does TQR compare to four-dimensionalism and presentism on these issues of temporal ontology? Wonderfully!

TQR, as I've developed it, is compatible with an ordinary ontology. It posits the existence of ordinary objects like you, me, and my bass. It does not posit the existence of anything exotic like temporal parts. It does posit the existence of past entities (like ancient Romans) and future entities (like Martian colonists). In other words, TQR has an eternalist ontology. But eternalism is not revisionary. Admittedly, many people do report having the central presentist intuition, according to which only the present is 'real' and only presently existing things exist at all. But, on closer inspection, that sort of ontology is not reflected in our ordinary lives. We regularly (attempt to) reference

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[23] See, *inter alia*, Horgan and Potrč (2008); Lewis (1986).

[24] See Bourne (2006): 68–69; Miller (2009); Tallant (2013). Sider (2001): 75–76 discusses a version of four-dimensionalism, inspired by Bertrand Russell, according to which persisting objects are excluded. Such a view may be on a par with presentism with respect to ontological parsimony, but it suffers from other disadvantages.

[25] Sider (2011); Sullivan (2016). Cf. Zimmerman (2005)

past things and future things. Who's your favourite historical philosopher? It's not at all revisionary to say that it's David Hume, even if he's been dead for hundreds of years.

TQR may be considered revisionary in virtue of its multiple quantifiers. Certainly, as I've noted, it stands in the face of metaphysical orthodoxy. But I deny that quantifier pluralism goes against the ordinary beliefs of people who have yet to be corrupted by professional metaphysicians. As others have noted (Turner (2010): 5, McDaniel (2017): 11), non-experts often report the intuition that the sense in which we say a person exists is not the same sense in which we say a relation exists. Furthermore, there is a rich phenomenological tradition according to which these differences are given to us in experience.[26] I thus conclude that the fact that TQR employs many quantifiers is not revisionary.

TQR is not ontologically profligate. In virtue of having an eternalist ontology, it does have more entities than presentism. Consequently, the overall number of entities is higher. But the kinds of entities are not. According to TQR, the humans that existed in the past are of the same ontological kind as the humans that exist now. So, while TQR is comparatively less *quantiatively* parsimonious, it is no less *qualitatively* parsimonious.[27]

A similar point holds with respect to ideological parsimony. TQR posits an infinite number of quantifiers. So, if we measure ideological parsimony in terms of bits of ideology, TQR is ideologically profligate. But, plausibly, what matters in metaphysics is not so much the number of individual expressions that a theory employs,

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[26] See McDaniel (2017): 6–7.

[27] For more on the differences between quantitative parsimony and qualitative parsimony, as well as reasons to prefer one or the other, see: Lewis (1973); Nolan (1997). In Finocchiaro (Forthcoming), I raise a puzzle about how we regard these differences. Thankfully, that puzzle does not impact what I want to say here in this paper.

but rather the number of kinds of expressions that it employs. There is no consensus as to how to individuate ideological kinds. But there are some reasons to think that all first-order objectual quantifiers – including the quantifiers posited by TQR and other quantifier pluralist theories – are all of the same ideological kind. Some philosophers have argued that modal operators ($\Box$, $\Diamond$) and logical connectives ($\neg$, $\wedge$, $\vee$) form their own ideological kinds in virtue of the fact that they are interdefinable with one another. Quantifier pairs are obviously interdefinable. But, more importantly, the infinite number of quantifiers posited by TQR are interdefinable. Informally, to say that x exists_{t1} is to say that x generically exists and it is not the case that x exists_{t2}, and it is not the case that x exists_{t3}, and so on. Of course, these definitions rely on the generic quantifier. But that is no cost to the qualitative parsimony of TQR, since the generic quantifier is also a member of the same ideological kind. So, if interdefinability is a mark of sameness of kind, then we have reason to think that TQR's ideology is as qualitatively parsimonious as its rivals. In fact, we have reason to think that TQR's ideology is even more parsimonious, unless its rivals are able to eschew quantification altogether.[28]

Overall, then, TQR has a very attractive temporal ontology. Its ontology is ordinary and economical. Furthermore, the ideological resources it employs are not relevantly more complex than those employed by four-dimensionalism or presentism.

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28 See Turner (2016) for an attempt to make sense of a quantifier-free fundamental metaphysics. For more careful discussions of ideological parsimony and ideological kinds, see Cowling (2013); Finocchiaro (2019). For an alternative approach, see Rubio (2022). Interestingly, on Rubio's approach, presentism is expressively weaker than four-dimensionalism and is therefore not less ideologically parsimonious.

Section 3.3: The problem of temporary intrinsics

It's not possible to be 75kgs and also 85kgs. But it is possible to be 75kgs at one time and 85kgs at another. On the surface, these seem like banal truths. But mass seems to be an intrinsic property. Thus, if something is 75kgs at one time, then it is 75kgs *simpliciter*. Accepting one of these banal truths seems to lead to denying the other.

This is the problem of temporary intrinsics, most prominently given by David Lewis. It's undeniable that the two banal truths are in fact compatible. As Lewis says, "It is *not* a solution just to say how very commonplace and indubitable it is that we have different shapes at different times. To say that is only to insist – rightly – that it must be possible somehow" (Lewis (1986): 204). A metaphysical theory must explain how an object has different properties at different times and what it means for an object to have different properties at different times.

A metaphysical analysis of change tries to answer these challenges. At a minimum, a metaphysical theory has to adequately complete the following:

$$\text{a changed from Q to } \neg Q =^{df} \ldots$$

One solution reinterprets what we ordinarily take to be intrinsic properties as disguised relations. For David to be 75kgs is for the *75kgs-at* relation to hold between David and some moment of time. This relationist solution quantifies over moments of time and relies on a predicate to order them, $<$, where $t_1 < t_2$ means that t_1 temporally precedes t_2. With these resources, change can be analysed as:

$$\text{a changed from Q to } \neg Q =^{df} \exists t_1 \exists t_2 [Q(a,t_1) \wedge \neg Q(a,t_2) \wedge (t_1 < t_2)]$$

This relationist solution is consistent with endurantism and strict Quineanism. But it creates problems. Most immediately, it entails that nothing ever changes its intrinsic properties. Such a conclusion flies in the face of our ordinary beliefs. It certainly seems

like whether or not David is 75kgs is an intrinsic fact about David and only a matter of what David is like. But this denial of intrinsic change impacts other philosophical issues as well. Consider morally significant properties like personhood and responsibility. Plausibly, what matters is not whether David is a person in relation to t_1 or morally responsible in relation to t_2. What matters is whether David is a person *simpliciter*, whether or not he is morally responsible *simpliciter*. The relationist solution is inconsistent with such claims.

A second solution utilizes the resources of four-dimensionalism. According to four-dimensionalism, the world contains instantaneous temporal parts that compose ordinary objects like David and my bass. These temporal parts are, according to the second solution, the real bearers of intrinsic properties. Ordinary, temporally extended, objects have seemingly incompatible properties in virtue of having temporal parts that instantiate these properties:

$$\text{a changed from Q to } \neg Q =^{df} \exists x \exists y \exists t_1 \exists t_2 [Q(x) \wedge \neg Q(y) \wedge \text{TemporalPart}(x, a, t_1) \wedge \text{TemporalPart}(y, a, t_2) \wedge (x \neq y) \wedge (t_1 < t_2)]$$

David is 75kgs in virtue of having a temporal part at t_1 that is 75kgs and is also 85kgs in virtue of having a temporal part at t_2 that is 85kgs. This situation is no more mysterious than when David is wearing glasses (on his face) and is also not wearing glasses (on his beard).

That being said, this second solution also creates problems. According to the second solution, ordinary objects only derivatively instantiate temporary intrinsics. Thus, David only has mass in a derivative sense. That's strange, but not unacceptable; perhaps, in this moment of time, I only have mass in the derivative sense that my body parts have mass, or the parts of my body parts have mass, or so on. What does seem

unacceptable is the analogous claim for morality. Some morally significant properties are temporary. But they do not seem to be the kind of properties that can be distributed across instantaneous temporal parts. My left arm cannot be morally responsible for anything because it cannot do the things that are required to be the kind of thing that can be morally responsible for something. Similarly, my instantaneous temporal part cannot be morally responsible for anything because it, too, cannot do the things that are required to be the kind of thing that can be morally responsible for something. My instantaneous temporal part simply isn't around long enough to do anything. So, if change is a matter of an earlier temporal part not instantiating the property in question and a later temporal part instantiating it, then I cannot become morally responsible for anything. A four-dimensionalist could say that we have temporally extended temporal parts that are morally responsible – for example, the temporal part of me that persisted for all of yesterday is responsible for that mean thing I said to my mother last night. But, even if my yesterday temporal part is responsible, my today temporal part is not. So in what sense can I say that I, the sum of these temporal parts, am responsible?

A third solution, based on presentism, claims that the only properties an object has are those it has presently. While many see this presentist solution as the obviously correct one, it has its fair share of problems. If David only has the properties he presently has, how do we describe him as previously having been 75kgs? Presentists typically do so by employing tense operators to formulate claims about times other than the present, permitting the following analysis of change:

$$\text{a changed from Q to } \neg Q =^{df} P[[Q(a) \wedge F[\neg Q(a)]]$$[29]

Linguistically, tense operators allow us to describe the past without committing to its existence. But, metaphysically, what do such claims amount to? If a claim like 'David was 75kgs' is true, there must be something that makes it true. But David is now 85kgs. The presentist may say that David instantiates the property of *having-been-75kgs*, and the fact that David presently instantiates that property grounds the truth that David was 75kgs. But such a property is quite mysterious. Compare David to a molecule-for-molecule duplicate of David that exists in a possible world that exists for a single moment of time. Duplicate David does not instantiate *having-been-75kgs*. This difference cannot be explained through some extrinsic factor, for any such factor would be beyond the present moment and therefore out of existence. But then the fact that Original David instantiates this property and Duplicate David does not is a brute, inexplicable, fact.[30]

A fourth solution utilizes the multiple quantifiers of TQR to analyse change. Here's a first pass of its analysis of change:

$$\text{a changed from Q to } \neg Q =^{df} \exists_{t1}x\exists_{t2}y[[Q(x) \wedge (x = a)] \wedge \neg Q(y) \wedge (y = a)]$$

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[29] As is, the analysis provided doesn't obviously solve the problem of temporary intrinsics. What is needed is a more developed treatment of the tense operators. In particular, they must deny the validity of '$P(\exists xFx) \rightarrow \exists xFx$' and '$\exists xP(Fx) \rightarrow \exists xFx$'. Tense operators must be 'prophylactic'. For more, see Sullivan (2012b).

[30] I am summarizing a fairly large literature here. For more on the truth-maker objection to presentism and its connection to change, see Sider (2001): 35–42, Merricks (2007): 119–145.

This relativized solution avoids the problems mentioned above. The past is just as real as the present, and so there is no problem in finding the grounds of truths about the past. Ordinary objects (like David and my bass) are the real bearers of temporary properties, and so it avoids the problems for temporary moral intrinsics. Finally, properties are genuinely intrinsic rather than disguised relations to time.

But this analysis is not appropriately generalized. Recall that $\exists_{t1}$ is a quantifier for a specific moment of time. Thus, this analysis only works as an analysis of change between two specific moments of time. An adequate analysis must examine what is going on throughout the entire length of time. To express this generalization, the TQR solution needs to quantify over quantifiers. Following the convention of using Ω as the variable for existential quantifiers produces the following:

a changed from Q to $\neg Q =^{df} \exists\Omega_1\exists\Omega_2[\Omega_1 x \Omega_2 y[[Q(x) \wedge (x = a)] \wedge [\neg Q(y) \wedge (y = a)]]]$

As is, this analysis cannot differentiate between gaining a property and losing a property. For example, if in one domain of quantification David is 75kgs and in another he is 85kgs, the above analysis will say that it is true both that David changed from 75kgs to not-75kgs and that David changed from 85kgs to not-85kgs. This inability to differentiate between gaining mass and losing mass may be welcomed by some philosophers: if the apparent 'arrow of time' is not a fundamental feature of the world, then a metaphysical analysis of change should not differentiate between gaining a property and losing a property. Other philosophers, of course, may see it as a cost.

There are a few options for adding temporal direction to TQR. Most simply, we could follow the first and second solutions by reifying moments of times and using the < predicate to order them. On the assumption that a moment of time exists only within a

single quantificational domain, ordering relations between them can serve as proxies for orderings between quantificational statements. This gives us the following analysis:

$$\text{a changed from Q to } \neg Q =^{df} \exists\Omega_1\exists\Omega_2[\Omega_1 x\Omega_1 t_1\Omega_2 y\Omega_2 t_2[[Q(x) \wedge (x = a)] \wedge [\neg Q(y) \wedge (y = a)] \wedge [(t_1 < t_2)]]]$$

In fact, we can adjust the above analysis by replacing times with some other thing that is uniquely associated with the domains in question, like maximal states of affairs or propositions.

This style of analysis might feel redundant, though, insofar as TQR (like standard tense logic) already has temporal direction built into its semantic model in the form of accessibility relations. It would be nice if that information could be used in the analysis of change. The problem, however, is that the information doesn't interact with any of TQR's current logical machinery. So some machinery needs to be added.

First, we could add nominals, which are special atomic propositions true only at one moment of time.[31] We could then introduce a 2-place operator that produces a truth only when the first argument is a nominal that temporally precedes the second argument's nominal. Informally, this method transforms the < symbol from a predicate into a propositional connective.[32]

Second, we could add something analogous to Kamp (1968)'s S ('Since') and U ('Until') operators. Typically, these operators are dynamically evaluated. $\varphi S \psi$ is true

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[31] Nominals were first introduced in Prior (1967), but see Areces and ten Cate (2006) for a more comprehensive treatment of nominals and hybrid logic more generally.

[32] Nominals are typically used to construct a satisfaction operator that shifts the evaluation of an arbitrary statement to the moment in question. But this function is already provided by TQR's temporally relativized quantifiers.

relative to some moment of time, t, if and only if ψ is true at some moment of time that temporally precedes t but φ is true at every moment of time between then and t. Consequently, [¬Q(a)]S[Q(a)] would be true relative to a moment of time after a changed from Q to ¬Q but false relative to a moment of time before the change. I suggest that the analogous operator for TQR – call it R – need not be dynamically evaluated in this way. Instead, a statement like $[\exists_{t1}\varphi]R[\exists_{t2}\psi]$ is true if and only if $\exists_{t1}\varphi$ is true at t_1, $\exists_{t2}\psi$ is true at t_2, and t_2 is 'accessible' to t_1 – i.e. t_1 temporally precedes t_2 in the semantic model. Understood this way, the R of TQR behaves like its quantifiers and preserves TQR's status as a non-dynamic B-theory of time. $[\exists_{t1}\varphi]R[\exists_{t2}\psi]$, if true at one time, is true at every time.

I'm not sure which piece of machinery is better. Nominals have the advantage of being part of a pre-existing and therefore well-studied system. But the R operator coheres better with the core ideas of TQR as well as its special-purpose machinery. Tentatively, then, I will use it in the final analysis as follows:

$$\text{a changed from Q to } \neg Q =^{df} \exists\Omega_1\exists\Omega_2[[\Omega_1 x[Q(x) \wedge (x = a)]]R[\Omega_2 y[\neg Q(y) \wedge (y = a)]]]$$

Without doubt, the analysis is an eyesore. But the intuitive idea is clear enough: an object can have contradictory properties so long as it does so in different domains of quantification. TQR permits this sort of answer because it uses a semantics according to which quantificational claims are relativized to a moment of time. Some may consider this relativization to be a disadvantage. But relativization seems to me to be a better foundation for a theory of time. Even if there is a non-relativized sense in which something is true, it must be constructed from what is true in the relativized sense.

Furthermore, this solution invalidates the inference that is central to the problem of temporary intrinsics. Consider the scenario where David is 75kgs in 2012 and 85kgs in 2020. Ordinarily, we could employ the Indiscernibility of Identicals:

$$\forall x \forall y[(x = y) \rightarrow \forall P[P(x) \rightarrow P(y)]]$$

to derive a contradiction. Since David in 2012 (x) is identical to David in 2020 (y) and David in 2012 is 75kgs (P(x)), it follows that David in 2020 is 75kgs (P(y)). But if David in 2020 is 75kgs, then he is not 85kgs. Unfortunately, David in 2020 is 85kgs. Contradiction!

Notice how the above way of stating the Indiscernibility of Identicals relies on the unrestricted quantifiers of classical first-order logic. TQR should reject this formulation of the Indiscernibility of Identicals and replace it with something more amenable to its quantificational system. Following the convention of using Y as the variable for universal quantifiers produces the following:

$$\forall Y[YxYy[(x = y) \rightarrow YP[P(x) \rightarrow P(y)]]]$$

This way of stating it is both acceptable and plausible for a proponent of TQR. But notice that the Indiscernibility of Identicals so formulated does not lead to contradiction when combined with the other conditions given above. That is because the temporally relativized version of the principle says nothing about how an object is at other times. This is as it should be.

Yet this modification only solves the problem for quantificational statements. Even though David's mode of existence in 2012 is distinct from his mode of existence in 2020, he still both is and is not 75kgs. If we can directly refer to David by name, then TQR as stated does not fully solve the problem of temporary intrinsics.

I suggest that TQR should eliminate names from its vocabulary. In fact, TQR should eliminate any expressions that refer outside of its quantificational machinery. For instance, if demonstratives are not disguised quantifier phrases, then TQR should also eliminate demonstratives from its vocabulary

The elimination of names demonstrates how TQR can be different from a view that combines strict Quineanism, eternalism, and endurantism (SEE, for short). Those who endorse SEE also try to solve the problem of temporary intrinsics by relativizing claims to times. But these solutions either entail that the instantiated properties are in fact relations to times or they entail that the instantiation relation itself is in some way a relation to time.[33] The version of TQR that eliminates names avoids these entailments. Furthermore, because SEE still relies on a single pair of quantifiers to express quantificational claims, it cannot adopt TQR's existentially relativized solution. Thus, TQR has an advantage insofar as it is not forced into one of these unattractive consequences.

I admit that some philosophers might see the elimination of names and other referential devices as a serious cost. But how serious the cost is depends on what TQR is being used for. Throughout my discussions above, I've tried to remain neutral with respect to various background commitments. It is now time to bring those commitments to the fore and see how they impact the debate about which theory of time to endorse.

Section 4: Weighing the Costs and Benefits

In the previous section, I identified several potential costs and benefits to endorsing TQR in comparison to some of its prominent rivals. But how costly are the costs and

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[33] See, e.g., Sider (2001): 93–97.

how beneficial are the benefits? After all the scores have been tallied, does TQR emerge as the winner, as the best theory of time?

There are no universal answers to these questions. Philosophers may reasonably disagree about how the costs and benefits ought to be weighed. How someone weighs them ultimately depends on the background commitments that they bring to the decision. In fact, these background commitments may even lead philosophers to disagree about which features are costs and which are benefits.

In this section, I will briefly discuss some of the ways that background commitments influence the evaluation of TQR. Given my particular background commitments, TQR is a very attractive theory of time. But other philosophers may come to a different conclusion.

The most influential background commitment is the decision that I mentioned in section 1 between ideological externalism and ideological internalism. Roughly speaking, the goal of an ideological externalist is to endorse the theory that most accurately characterizes the world as it really is. Thus, whether or not an ideological externalist should endorse TQR depends on whether there is reason to believe that TQR's multiple quantifiers 'carve nature at its joints' – or, more carefully, carves nature at its joints better than rival theories like presentism and four-dimensionalism.

If what I've argued for up to this point is correct, then there is reason to believe that TQR carves nature at its joints better than its rivals. First, I have argued that TQR is comparatively parsimonious, both with respect to ontological parsimony and with respect to ideological parsimony. Although parsimony's theoretical value is contested, many philosophers are willing to accept that a theory that is more parsimonious is more likely to be correct in the way that the externalist cares about. In fact, considerations

regarding parsimony have motivated some philosophers to adopt theories as revisionary as mereological nihilism and modal realism.[34]

That brings us to another influential background commitment: tolerance for revisionary metaphysics. In multiple respects, TQR departs from standard ways of thinking. Most immediately, it rejects the strict Quinean dogma that has dominated metaphysics for nearly 100 years. While TQR's ontology is comparatively non-revisionary (it retains ordinary objects like bass guitars and eschews exotic objects like temporal parts of bass guitars), TQR does require us to revise our understanding of ordinary objects. Given ideological externalism as a background commitment, TQR's commitment to infinitely many quantifiers seems to entail a commitment to infinitely many modes of being. Thus my bass guitar, despite its ordinariness, enjoys an extraordinary amount of being.

Revisionary metaphysics is nothing new. But TQR is somewhat unique in the ways it deviates from natural language. Near the end of the previous section, I suggested that TQR could provide an excellent solution to the problem of temporary intrinsics but only if it eschews the use of names. TQR also introduces an uncountably infinite stock of quantifiers, whereas natural languages don't seem to be that big.[35] Finally, my development of TQR relies on expressions that quantify over quantifiers; plausibly, though, there is no natural-language analogue of such expressions. To be fair, every rival to TQR also deviates from natural language in some way. But I am willing to accept that in this respect TQR is the biggest offender.

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[34] See, *inter alia*, Sider (2013); Lewis (1986).

[35] Though see Langendoen and Postal (1991) for an argument that natural languages are, in some sense, really big.

Consequently, whether someone judges TQR to be better than its rivals heavily depends on how much tolerance they have for metaphysical theories that deviate from natural language. Philosophers can reasonably disagree about the right level of tolerance. But here is why I am inclined to excuse TQR's linguistic deviance.

I want to endorse the theory of time that has the best chance of accurately representing the way the world truly is. Plausibly, some features of natural language already do that. But there is no straightforward way to discern which features of natural language track the way the world is and which features are mere artefacts, no more informative than the air bubbles of a poorly mounted microscope slide. So the mere fact that a theory is stated in a language that deviates from natural language in some respect says very little about the accuracy of the theory. Some further reason must be provided to justify the claim that that particular feature of natural language is a feature that matters.

Names clearly matter. Besides being among the most basic features of natural language, names are important to a variety of theories in epistemology, the philosophy of mind, and the philosophy of language. It's undeniable, then, that TQR's elimination of names is an important cost.

But the cost isn't too high. In general, I think metaphysical theories can impose constraint on language so long as those constraints are sufficiently motivated. And the elimination of names in particular is, I think, sufficiently motivated. First, names don't seem to play an essential role in metaphysical debate. Debates about what exist can be stated using only quantifiers, truth-functional connectives, and the identity relation. Second, names, especially empty names, create their own philosophical problems. So perhaps metaphysics is better off replacing names like 'Pegasus' and 'David' with

predicates like ‘Pegasizes’ and ‘Davidizes’. If so, then TQR’s elimination of names isn’t too high of a cost.

Finally, it could be said that some deviations from natural language render a theory unintelligible. Van Inwagen (2004), for instance, argues that quantification over predicates is unintelligible unless it can be interpreted in terms of expressions found in natural language, most plausibly in terms of first-order quantification over abstract objects. The same argument could be extended to TQR’s quantification over quantifiers. I did not provide any such interpretation in my presentation of TQR. Perhaps no such interpretation is possible. Thus, on the assumption that an unintelligible theory should be rejected, TQR should be rejected.

I deny that meaning must always derive from natural language through straightforward analysis. First, such analysis ignores the role that metaphor plays in the creation of meaning.[36] Furthermore, when it comes to a theory of time, its distinctive terminology gains meaning from its theoretical role. In some sense, the tense operators employed by presentism have analogues in natural language. But tense logic stands on its own merits. So, too, does TQR.[37]

Conclusion

In this paper, I’ve developed a quantifier-pluralist theory of time according to which there is a quantifier for each moment of time. This theory has significant advantages over its main rivals, especially in connection to temporal ontology. It also has its fair share of disadvantages. Despite those disadvantages, however, I conclude that this theory of time is worth further exploration. (In particular, it’s worth exploring how TQR

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[36] Lakoff and Johnson (2003)

[37] See Turner (2015) for an analogous defence of second-order logic.

compares to other theories in relation to special relativity.) In addition, I hope that my development of a quantifier-pluralist theory of time will inspire other philosophers to develop other novel quantifier-pluralist theories. Strict Quinean dogma has deeply impoverished contemporary metaphysical disputes, and it will take our collective action to right this wrong.[38]

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[38] This paper's ancestry can be traced as far back as 2012. Consequently, I owe my thanks to many over the years, including Andrew Brenner, Rebecca Chan, Robin Dembroff, David Dick, Michael Longenecker, Brannon McDaniel, Callie K. Phillips, Michael Rea, Amy Seymour, Ted Sider, Joshua Spencer, Jason Turner, the audience of my 2015 Central APA conference presentation, and the audience of my 2013 Western Michigan University graduate student conference presentation. Thanks, also, to the anonymous reviewers and editors of Inquiry for their patience and support. Special thanks belong to Meghan Sullivan, who many years ago encouraged me to keep working on my seminar paper. It took me longer than expected, but I kept working!

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