Our Concept of Time

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**Abstract**

In this chapter we argue that our concept of time is a functional concept. We argue that our concept of time is such that time is whatever it is that plays the time role, and we spell out what we take the time role to consist in. We evaluate this proposal against a number of other analyses of our concept of time, and argue that it better explains various features of our dispositions as speakers and our practices as agents.

**1 Introduction**

Recent work in the philosophy of time tends to focus on one of a number of well-entrenched metaphysical debates. Presentists and eternalists face off over questions of temporal ontology: do the past and future exist? Or does only the present exist? And if only the present exists, how do we reconcile this fact with the picture of time inherited from science, which seems to favour eternalism? Similarly, A-theorists and B-theorists lock horns over the metaphysical nature of time: is time constituted by a single, unchanging sequence of temporal instances ordered by the B-theoretic relations of earlier-than, later-than and simultaneous-with – the so-called B-series – or is time richer, constituted by a dynamical sequence of times ordered by the A-theoretic properties of pastness, presentness and futurity?

 While these debates continue unabated, relatively little consideration has been given to the nature of our folk temporal concepts. What, exactly, is the structure of our everyday concept of time? And what would it take for the concept of time to go unsatisfied and thus for some brand of temporal error theory to be true? Does the folk concept favour some particular picture of temporal reality, or not? It is only by answering such questions that we can begin to develop a rigorous conceptual framework within which more general debates over time may be profitably developed. The goal of this chapter, then, is to analyse the folk temporal concept thereby providing the foundations for the development of such a conceptual framework. In what follows we begin by outlining – in more detail – the reasons why an analysis of the folk concept is needed and the constraints under which an analysis must be developed (§2). We then consider two broad strategies for analysing the folk concept already available in the literature, and find them both wanting (§3). In the final section, we offer our own analysis of the folk concept of time (§4), according to which time is a functional concept: time is as time does. We argue that this analysis better explains various features of our dispositions as speakers and our practices as agents than the accounts considered in §3.

 Note that throughout we will be assuming a general familiarity both with current debates within the philosophy of time and with the history of the philosophy of time. Note also that we will – by and large – be taking ourselves as proxies for the folk: our own intuitions about temporal concepts will be taken as evidence of a kind that the folk concept is thus and so. We recognise that this can only be the first step in a more detailed empirical investigation into the nature of everyday temporal concepts. Still, it is not unusual for philosophers to speak for the folk as we do (being part of the folk themselves). Indeed, this is a common practice within the more general methodology of conceptual analysis in the broadly Lewisian tradition of regimenting our folk concepts. Nonetheless, it is proper to offer a promissory note to more fully determine, in the future, the extent to which the intuitions we have about our temporal concepts have ecological validity (i.e., the extent to which they are genuinely representative of folk intuitions more widely).

2 A Folk Concept

2.1 Motivation

The term ‘concept’ means many things to many people. We cannot hope to defend a particular view about the nature of concepts in this chapter. Indeed, we think there are many legitimate views about what it is for something to be a concept, ranging from the broad notion that concepts are Fregean senses to the equally broad notion that they are mental representations. So we do not suggest that our use of the term ‘concept’ in this chapter is the unique best one. We only suggest that there is some interesting notion that is tracked by what we mean, in this context, by ‘concept’.

Our primary target is a *tacit* *folk* concept. In what follows it is assumed that something roughly in the spirit of the internalist tradition is right about the content of our concepts. It is assumed that conceptual content is exhausted by what a subject is, after relatively idealized reflection and consultation of her intuitions, disposed to say about the existence (or otherwise) of—in this case time—across a range of possible worlds considered both actually and counterfactually.[[1]](#footnote-1) An analysis of a concept is, on this view, a systematization of the judgments that a subject is disposed to make. A subject can, in principle, come to know the content of her concepts by coming to know this complex set of dispositions. However, since frequently subjects do not have immediate access to these dispositions, these concepts are tacit. There is no suggestion that the folk explicitly entertain these concepts or that they could easily come to know that these are the concepts they deploy.

 Why *care* which concept of time the folk deploy? Surely the nature of time is best understood through an understanding of various theories in fundamental physics, while the psychology of time (i.e., the nature of temporal experience) is best understood through an understanding of theories in cognitive psychology and neuroscience. What can any understanding of the folk notion of time tell us about time that is of interest? One might well think that there is little to be gleaned from analysing a folk concept since no such analysis can shed any light on what the world is, or must be, like. After all, folk concepts are *folk* concepts for a reason and as such we should be suspicious that they are coherent, informative, or match onto any feature of reality.

 This is quite right. We do not think that one can simply read features of the world off of features of our concepts. Many of our concepts are incoherent, and others, while coherent, simply do not answer to anything in the world. But that does not make an analysis of our concepts uninteresting or useless; nor does it make such an analysis unhelpful in answering questions about the world. After all, if we want to know whether, for instance, there is any free will, we first need to know what it would take for there to be free will. We can know everything there is to know about the external world: we can know all of the laws of nature, and the location of all the fundamental particles and so forth, but unless we know what the world needs to be like in order for there to be free will, we won’t know whether the world’s being a certain way is a way that makes it true that there is free will. We typically assume that we know what it would take for a concept to have something answering to it in the world, and proceed to examine the world to see whether or not it does. But tricky concepts, such as free will, moral responsibility, and, inter alia, time, are concepts that are sufficiently complex and difficult that we first need to do some work to figure out what our concept is like so that we can then work out whether the world is such that something answers to that concept.

 To give a sense of why this maters in the current case, we think there are two reasons why an analysis of the folk concept of time is needed. First, the folk concept of time underlies a lot of debates in temporal metaphysics. As noted above, there is still heated debate about the nature of time and of temporal relations. One such debate is the debate between A-theorists and B-theorists over the existence of the A-series. The A-series, as briefly mentioned in §1, orders events in terms of whether they are objectively past, present or future and is such that for any event in the A-series, that event instantiates a particular irreducible A-theoretic property, (pastness, presentness or futurity), that determines its place in that series. The location of events within the A-series is thus dynamic: a set of events, *E*, will be present, is future, and will then become past.[[2]](#footnote-2) According to the A-theory the A-series exists: it is an objective feature of temporal reality. According to the B-theory, by contrast, there are no irreducibly tensed properties of pastness, presentness or futurity and so the A-series does not exist. Rather, all that exists is the B-series, which orders events in terms of the relations of earlier-than, later-than and simultaneous-with.[[3]](#footnote-3)

A-theorists frequently contend (and some B-theorists seem to agree) that the A-theory gets something right about the way we ordinarily think about time: the A-theory is closest to summing up the ordinary person’s view of temporality.[[4]](#footnote-4) It also gets something right about our temporal phenomenology, or so A-theorists contend: our temporal phenomenology is as of dynamical temporal passage. Indeed, some A-theorists go so far as to hold that our ordinary concept of time is such that the A-series is, according to that concept, essential to temporality (more on this below). If that is right then either we have a powerful reason to suppose that there is, actually, an A-series given that we think that actually there is time, or we have a powerful reason to suppose that there is actually no time, if we take ourselves to have good reason to think that there is no A-series.[[5]](#footnote-5)

We cannot, of course, hope to answers questions about whether the A-theory or B-theory is right simply by looking at our concepts; nor can we hope to determine, by examining our concepts, whether or not there is actually time. But it does not follow from this that there is no role for an analysis of the folk concept of time to play in debates over the nature of time. By analysing the folk concept we can determine which of the A- or B-theory better accords with our everyday thought and talk about time which some may take to constitute a kind of evidence in favour of one or other of these views. In addition, by analysing our concept it is possible to gain a better sense of the conceptual connections between our concept of time and other nearby concepts, such as persistence and causation; the metaphysics of these latter notions – for some – is thought to bear on the debate over temporal reality. Most importantly, with an analysis of the folk concept of time in hand we can go some way toward determining what the world *must be like* in order for us to conclude that there is, or is not, time. Since part of the dispute between A- and B-theorists is precisely about this issue, i.e., about the essential features of time, an analysis of the folk concept would go some way towards adjudicating an element of this dispute.

The importance of analysing the folk concept of time is not restricted to debates in metaphysics. The second reason why analysing our folk concept is useful is that an understanding of our concept of time can help to shed light on a range of contemporary scientific theories. Recent work in physics has led some physicists and philosophers to claim that time does not exist (see, for example, Barbour (1994a, 1994b, 1999, 1999), Deutsch (1997), Rovelli (2004, 2007, 2009), and Tallant (2008, 2010)). There is a number of what are now known as timeless physical theories: theories within physics according to which our world lacks a one-dimensional substructure of ordered temporal instances that provides a metric for the measure of the distance between any two time instants. Many of these theories have been offered in response to the problem of time in canonical quantum gravity. Canonical quantum gravity involves the application of standard quantization techniques to the field equations of classical general relativity. This typically involves converting general relativity into Hamiltonian form and quantizing the theory by taking pairs of configuration and momentum variables and associating with each a pair of commutative operators[[6]](#footnote-6) ranging over a Hilbert space (roughly: a generalisation of a Euclidean space into higher dimensions).[[7]](#footnote-7) Canonical quantization techniques, when applied to canonical quantum gravity appear to strip away the time variable entirely. The problem of time is what to say about this situation: should time be recovered post-quantization or not? Proponents of so-called timeless physical theories claim that we should not attempt to recover the time variable. We should, rather, take canonical quantum gravity at face value, as telling us that time does not exist (see Anderson (2012a, 2012b) for discussion).

What remains unclear, however, is what advocates of these timeless theories mean when they ultimately conclude that there is no time. We are happy to grant that there might be some scientific concept of time, such that *that* concept turns out not to be satisfied if a timeless physical theory is true. The question remains, however, whether our ordinary “folk” concept of time is such that, were a timeless physical theory to be true, we would conclude that there is no time. This is, we think, an important question. While it is indeed a very interesting discovery if there is nothing in our world that answers to the scientific concept of time, it would be an even more startling outcome if nothing answered to our folk concept of time. For our folk concept of time is inextricably bound up with other concepts that are central to our lives, including: concepts of agency, of rational and moral deliberation, of persistence and of causation. Accordingly, if it turns out that nothing satisfies the folk concept of time and that this is what physics tells us, then it may be that no sense can be made of the related folk notions of deliberation, causation and persistence and thus of our conception of ourselves as agents in the world. On the other hand, it may turn out that even though the folk concept of time is not satisfied, it is still possible to make sense of these other, for want of a better phrase, ‘timeful’ notions. Either way, there is much at stake; in order to judge the extent to which we ought to fear, or be sceptical of, timeless physical theories we must first know something about our folk concept of time.

2.2 Resistance to Error

Before turning to some analyses of the folk concept of time we must, first, outline an important constraint under which any such analysis must operate. Our folk concept of time – whatever its content and structure– appears to be ‘resistant to error’ in this sense: it is unlikely that we will discover something about our world that would lead us to conclude that the concept fails actually to be satisfied. Thus to say that a concept is resistant to error is analogous to saying that a discourse in which that concept plays a role is resistant to error theory.

There are some concepts such that we set the bar very low with respect to what the world needs to be like for something to satisfy those concepts. These are concepts for which there are, epistemically speaking, many candidate satisfiers of the concept, and are such that speakers are disposed to go a long way down the list of candidates before they decide that a candidate is not a good enough deserver to satisfy that concept. Such concepts are resistant to error because there is a vast array of ways the world could be, epistemically speaking, according to which speakers are disposed to say that the concept is satisfied.

To be clear then: that a concept is resistant to error does not mean that we cannot discover that nothing actually answers to the concept. Rather, a concept is resistant to error if it is a concept that plays such a central role in our lives, and in our conception of ourselves as agents acting in the world, that there are relatively few things we could discover about our world that would make us conclude that nothing answers to the concept. Contrast, for instance, our concept of a quark and with concept of agency. There are quite likely very many things we could discover about the world that would make us conclude that there are no quarks. Now consider our concept of agency. Of course there are very “thick” agential concepts such that there might turn out to be no agents in that sense. But consider just a thin notion of agency that the folk work with: the notion according to which there are self aware beings that deliberate about what they ought, prudentially and morally, to do, and act so as to bring about the things they take themselves to have reason to want to bring about. Agents, in this sense, are self-aware deliberators and manipulators of the world around them. Agency in this thin sense, we think, is quite likely resistant to error. There are things we could discover, perhaps, that would make us conclude that there is no agency: if for instance, all of us is really just a puppet of an alien race which makes it seem to us as though we deliberate and make decisions when really we don’t. But there are *relatively* few things we could discover that would make us conclude that there is no agency; for to abandon the idea that we are reasoning, deliberating, things that attempt to manipulate the world around us would be to abandon any sense of ourselves in the world at all. Indeed, it would be to abandon the experimental method entirely, since the idea that we could manipulate variables in order to track down-stream effects would be inconsistent with the idea that there are no agents in this minimal sense. To, to recap, the idea that a concept is resistant to error is the idea that we give the world a lot of slack when it comes to providing us something that answers to that concept. We allow that there are lots of ways the world could be, consistent with our concept being satisfied. That does not mean there are no ways the world could be, such that the concept is not satisfied. It just means that it is less likely that we will discover there are no agents, than that we will discover that there are, for instance, no quarks.

It is not our contention that one can determine, from the armchair, whether a concept is in error or not. We do think, however, that we can have reason to think that it more, or less, likely that a particular concept is resistant to error. One way to determine whether a concept is resistant to error is to look both at the historical record of speakers’ reactions to certain relevant actual discoveries and to consult our dispositions regarding various scenarios about the way the actual world might be, for all we know—that is, various epistemic possibilities­—and ask whether, were we to discover that the world is that way we would conclude that nothing in our world answers to our concept. The broader the range of discoveries we could make about the world such that we continue to think that our concept is satisfied, the more resistant to error our concept is, and the less likely we are to find that the concept is in error (i.e. is unsatisfied).

We grant that that there are things we could discover about the actual world that would lead us to conclude that there is no time; being in error about this particular concept is not a conceptual impossibility. Nevertheless, we think there is reason to believe that our concept of time is resistant to error. First, there is some historical evidence that supports this claim, evidence concerning the stability of speaker’s dispositions with respect to their concept of time through paradigm shifts. Consider, for instance, the shift from Newtonian mechanics to relativistic mechanics that occurred in the early part of the 20th Century. The Newtonian understanding of time is one according to which there is an absolute fact of the matter about the temporal ordering of events. If two events, A and B, are related by a particular B-theoretic relation, then that is an inalienable fact about reality, and one upon which every observer should agree (assuming they have appropriate access to the evidence and, as such, are epistemically on a par). The understanding of time that we find in the special and general theories of relativity is completely different. According to relativity, there is no fact of the matter about the B-series temporal ordering of events. For any two events A and B, whether A and B are simultaneous with one another, or whether they stand at some temporal distance to one another, depends entirely on an observer’s state of motion. Indeed, if, for an observer, O1, events A and B are simultaneous with one another, then there is some observer O2 for whom A is earlier than B and there is some observer O3 for whom A is later than B. Worse than this, the temporal judgements made by all three observers are on a par: there is no physical reason to suppose that O1’s judgements are ‘more correct’ than O2’s or that O2’s are ‘more correct’ than O3’s.

The shift from Newtonian mechanics to relativistic mechanics, then, is revolutionary: according to the latter theory events are not objectively ordered by a single B-series. What we see, rather, is a number of different B-series orderings, each of which is equally good. But things get worse: general relativity does, in fact, make use of an invariant metric of some kind and so there is a sense in which some events are – objectively – in the ‘past’ of an observer or in an observer’s ‘future’. However, the metric used to make such determinations is one that rolls space and time together into a single four-dimensional manifold in which time is treated as a space-like dimension. The sense in which an event is ‘past’ for every observer is that some events are at a constant spatiotemporal distance from everybody. The shift from a single ordered B-series to a multiplicity of B-series orderings and then, finally, into a spatiotemporal metric is radical indeed.

This is just one part of a much larger story about how our understanding of time has changed. The scientific view of the nature of time, as posited by physicists, has changed substantially from the ancient Greeks, through Newton, to Einstein and now to recent developments in quantum gravity. Yet despite the fact that what many philosophers have thought to be platitudinous about the folk concept of time—for instance that there is an absolute fact of the matter regarding which events are simultaneous with which other events—turned out not to be satisfied by the ‘t’ parameter in our best science, it is notable that the folk have never openly declared that nothing satisfies their concept of time.

This brief history of time in the sciences tells us something about the folk concept. Ordinary folk will find themselves disposed to say, across a wide range of epistemic possibilities, that if the world turns out to be that way then their concept of time is satisfied, albeit by something rather different than what they had expected. That there is *something* in our world that is a good enough deserver to count as time typically seems more certain to us than any particular view we have about the metaphysical or physical nature of time. Because the folk concept of time appears to be satisfied across a wide range of epistemic possibilities the concept is not likely to be in error.

We come now to the second reason to suppose that our concept of time is error-resistant. Temporality is one of the most entrenched, fundamental, and pivotal notions, not least in terms of our conception of ourselves as agents who *did* things in the past, and who must *decide* what to do in the future. A concept that is central to our conception of ourselves in the world is less likely to be in error than those that are less central. Plausibly, the concepts of agency, deliberation, decision, prudence, responsibility, causation and time are important concepts of this kind.

If we think of our concepts as forming an interrelated web, with some concepts more central to the web than others, then it seems likely that the concepts of deliberation, prudence, responsibility, and causation will be at the centre of that web. For it is difficult to imagine discovering that our folk concepts of deliberation, agency and causation are unsatisfied. That is not to say that we cannot imagine any particular philosophical theory of those concepts being shown to be false: we can. It is to say that we cannot imagine discovering that nothing deserves to be called agency or deliberation or causation. We think our concept of time will also be at the centre. For our concept of time is implicitly and explicitly intertwined with the central concepts of deliberation, agency, causation, prudence and causation. Just as it is difficult to see how these concepts might be unsatisfied, it is also difficult to see how we could make sense of deliberation or agency (and perhaps causation) in the absence of time, at least as that notion is understood by the folk.

It is, moreover, plausible that our concept of time is central to our phenomenology: it *seems* to us that we acted at moments previous to this one; we seem to have memories of the past, it *seems* to us that what we did in the past causally affected the way things are now; it *seems* to us that the decisions we make now will affect our future but not, in general, our past, and so on. Additionally, it seems to us that some events are earlier than, later than or simultaneous with others. Since our concept of time is inextricably bound up with our phenomenology of ourselves in the world, a phenomenology we cannot imagine failing to have, it is plausible that that concept is central to our conceptual web.

That a concept is central to our conceptual web does not show that the concept cannot be in error; it does not show that the concept will be satisfied no matter what features the actual world has. But it does suggest that we are more likely to accommodate discoveries we make about our world by both conceptual change at the periphery of our conceptual web, and by setting the bar relatively low in terms of what the world needs to be like to satisfy those core concepts. That’s because the cost associated with taking a concept core to the conceptual web to be unsatisfied is far too high: if we give up on a core concept in this way, then we are forced to hold that a range of other core concepts are unsatisfied as well. The cost is particularly high in the case of time, since the concept of time is central to our sense of self simply because it is central to a range of agential phenomena, such as moral and rational deliberation and causation. So taking the concept of time to be unsatisfied would, potentially, undermine the sense we have of ourselves as agents.

In sum, then, if a concept, C, is resistant to error then for conditionals of the form: if the actual world is \_\_\_\_, then nothing satisfies C, there is a limited number of ways of filling out the \_\_\_\_ to render the conditional true. As discussed, we think our concept of time is like this for two reasons. First, it is very resistant to paradigm shifts in science and, second, it lies at the core of a conceptual web that is central to our self-conception as agents. Any analysis of our concept of time must both be consistent with the fact that our concept of time is resistant to error, and ideally should explain what features of the content of our concept render it resistant in this manner. In the next section we examine two different candidate analyses of our concept and evaluate them according to this desideratum.

**3 Our Concept of Time**

**3.1 A-theoretic and B-theoretic analyses**

The first kind of analysis we will consider is what we shall call a ‘one feature’ analysis. These analyses typically take some feature to be essential to time, and then use this essentiality to analyse the concept; time just is, on the one feature analysis, this or that essential feature. The classic version of a one feature analysis of the folk concept of time is the analysis that appears to underpin the A-theory. According to many A-theorists, our concept of time is a concept of something that is essentially connected to dynamical change. If the A-theorist is right about this, then temporal relations must be at least partially grounded in the A-series. For only the A-series permits that time is genuinely dynamical by allowing that events change from being future, to being present to being past.

 It was McTaggart (1908) who first suggested that our concept of time is a concept of something that is essentially dynamical. He then famously went on to argue that the A-series, which he took to be essential to time, is inconsistent, and hence concluded that there is no time. Gödel (1949) later made a somewhat different – though similar in spirit – argument for the conclusion that there is no time, by appealing to features of the A-series which he, too, took to be essential to time. The details of those arguments need not concern us. The point is that no one was convinced by their conclusions. There are, no doubt, some A-theorists who, like McTaggart, would conclude that there is no time were they to discover that there is no A-series; such A-theorists differ from McTaggart only in that they believe there is, actually, an A-series. We suspect, however, that such A-theorists are in a minority. Most of us, even many A-theorists who *explicitly* say that they would conclude that there is no time were they to discover that there is no A-series, would in fact continue on exactly as they do now upon such a discovery. It is our empirical speculation that upon such a discovery almost all of us would continue to feel guilt and pride at actions we take ourselves to have engaged in previously; most of us would continue to deliberate about what to do in the future; most of us would continue to form plans and intentions; most of us would continue to engage in causal reasoning, and so forth. Indeed, we doubt that the everyday life, and the everyday assertions of most folk would change at all upon the discovery that there is no A-series. At most, some A-theorists would explicitly say things like ‘there is no time’ all the while continuing to act as if there is time. If our empirical speculation is right, then most speakers are disposed to hold that their concept of time is satisfied even if there is no A-series.

 It is worth emphasising something at this juncture. A-theorists, and sometimes even B-theorists, sometimes suggest that the A-theory is a better characterisation of our folk concept of time, though of course B-theorists go on to argue that the A-series is either inconsistent, or at the very least, does not obtain in the actual world and that the B-series is a perfectly good deserver to satisfy that concept. It may be true that the folk are inclined explicitly to talk about time as though it flows; as though future events come ever closer until they become present, and then recede into the past. From this it does not follow that their concept is one according to which time is essentially dynamical. Recall that for us, the content of a concept is exhausted by what a speaker is ideally disposed to say about whether their concept of time is satisfied across a range of scenarios—i.e., epistemic possibilities considered as actual. That is consistent with a speaker assuming that time is essentially dynamical, and even with a speaker explicitly asserting that time is such. Nevertheless, if such a speaker is disposed to say that there is time if actually it turns out that there is no A-series then, for us, it follows that their concept of time is not one according to which the A-series is essential to time: such a speaker is simply wrong about their own concept. Thus if we are right and most speakers are disposed in this manner then this is enough to show that the A-series is not, according to our folk concept, essential for time.[[8]](#footnote-8)

 Turn now to the B-theorist’s one feature analysis of our concept of time. The B-theorist thinks our concept of time is a concept of something that provides an objective ordering of events via the relations of earlier than, later than, and simultaneous with: the B-theorist thinks that the B-series is essential to time.

 Certainly, we think, if asked the folk are likely to say that time provides an ordering of events into earlier, later, and simultaneous sets of events such that there are measurable distances between events at different times. Quite likely folk are (or at least were) inclined to say that time not only orders events in this manner, but that there is an absolute fact of the matter regarding that order of events, and an absolute fact of the matter regarding the distance in time between events. So if we were inclined to think that the content of our folk concept is, at least in part, given by what the folk might explicitly assert about time, then we would likely think that the folk suppose the B-series to be an important feature of time. However, as already discussed, we now know that there is no absolute fact of the matter concerning the order of events, and yet – while this is widely known these days – we continue to accept that there is time; we are not even tempted to deny that time exists simply because there is no unique B-series ordering of events. It is doubtful, then, that an absolute B-ordering is essential to the folk concept.

This puts to rest a basic B-theoretic analysis of the concept of time. But there is, perhaps, a nearby analysis that does better. Rather than treating the B-series ordering as essential to time, it is the existence of an invariant metric of some kind in which the B-series plays a role that is essential for time. On this view, it is essentially something like space-time – i.e. a metric in which B-series orderings are woven together with spatial ones – that is needed to satisfy the folk concept. The folk concept continues to be satisfied in the face of the shift from Newtonian to relativistic mechanics, then, because enough of the B-series continues to live on within the framework of space-time.

Even this modified B-theoretic analysis of the concept, however, appears fraught. To see why, suppose, as some physicists suggest, there is no B-series ordering of times at all. That is, there is not even an invariant spatiotemporal metric within which some sense can be made of a B-series. Events are not related by any invariant ordering relations at all. Anderson (2012a) calls such views *tempus nihil est* approaches to canonical quantum gravity.

To be sure, this would be a startling discovery. Nevertheless, we suggest that upon making such a discovery the folk would continue to think and talk as they had previously; they would continue to suppose that there exist events at other times; they would continue to have a phenomenology as of some events being past, and others future; they would continue to engage in deliberation about what they ought to do, and they would continue to engage in causal reasoning regarding how to bring about what they take to be desirable outcomes. Accordingly, we think that, under those circumstances folk would still not be disposed to say that there is no time, due to the second feature of the folk concept discussed above: namely, the centrality of the time concept to a web of similar timeful concepts that underpin agency. But if we are right in this piece of speculation about what the folk would do and say under such circumstances then it follows that no invariant ordering – be it a B-series, or a spatio-temporal metric composed of different B-orderings woven together into a four-dimensional manifold—-is an essential feature of the folk concept of time.

Even if we are wrong about what the folk would do were they to learn that there is no invariant ordering relation over events, there is a further reason for dubiety concerning the general strategy under consideration, whereby some particular notion such as the A-series, the B-series or a spacetime metric is taken to be core to the folk concept of time. The problem is this: taking any particular ordering feature to be essential to the folk concept renders that concept extremely inflexible. The concept so construed cannot easily make sense of the manner in which the concept is resistant to error. It cannot, for instance, easily explain why it is that the shift from Newtonian to relativistic mechanics did not result in widespread error theory about time. Nor can it explain the shift from an A-theoretic conception of time to a B-theoretic conception of time more generally.

None of this, of course, shows that either the A-theory or the B-theory is false. It might easily be that although it is not part of our *concept* of time that the A-series is essential to time, it is nevertheless the case that, in our world, time is characterised by an A-series. It is just that this would be an empirical or metaphysical discovery, not a truth about our concept. *Mutatis mutandis* for the B-theory. The point, rather, is that if we take seriously the idea that an analysis of our folk concept of time must be sensitive to the fact that that concept is resistant to error, then we have reason to reject the contention that either the A-series or the B-series or, indeed, any particular invariant metric is, according to that concept, essential to time (at least if one accepts our speculation about what the folk would be disposed to do under conditions of making certain discoveries about the actual world). In what follows we move on to consider another kind of analysis of our concept of time, a conditional analysis, which is ultimately more flexible than the ‘one feature’ analyses just considered and so promises to do better.

**3.2 Conditional Analyses of our Concept of Time**

So-called conditional analyses of concepts came to prominence in the debate over the status of phenomenal concepts, such as the concept of a raw feel, or quale. Phenomenal concepts are, according to a conditional analysis, to be analyzed, roughly, as follows:[[9]](#footnote-9)

CA1) If there are nonphysical states of the relevant type in the actual world, phenomenal

concepts are satisfied by these states, and

CA2) If there are no nonphysical states of the relevant type in the actual world then phenomenal concepts are satisfied by physical states of the relevant type.[[10]](#footnote-10)

Analyses of this broad type were motivated by the insight that even physicalists about the phenomenal typically find zombie worlds (minimal physical duplicates of our world that lack phenomenal content) conceivable and hence, according to some lines of thought, should conclude that such worlds are possible. But if zombie worlds are possible then physicalism is false. Thus physicalists need to explain why it seems so compelling that zombie worlds are conceivable, and hence possible, if in fact they are not. The conditional analysis of phenomenal concepts offered a way to do this. According to said analysis the appearance of the conceivability of zombie worlds is to be explained by the structure of our concept of a phenomenal state. The concept effectively tells us that if there were nonphysical dualistic states of a certain kind actually, these would be the phenomenal states. Since even physicalists give some non-zero credence to there actually being such states (even though they think there are not) such physicalists will seem to find zombie worlds conceivable. For such worlds are conceivable on the assumption that phenomenal states are actually non-physical states. Such worlds are not, however, conceivable if phenomenal states are physical states. Thus the physicalist confuses the conceivability of zombie worlds given that CA1 is satisfied, with their conceivability given that CA2 is satisfied.

 It is controversial exactly what makes for a conditional analysis of a concept. According to Majeed[[11]](#footnote-11) we have a conditional analysis of a concept where not only does the term expressing the concept have different extensions in different contexts, but it also has different referencing-fixing conditions in different contexts. For Majeed, such analyses are ones that attribute two or more competing sets of reference-fixing conditions to a concept: what satisfies the concept, then, depends on which set of referencing-fixing conditions is the right one, and that, in turn, is determined by features of the actual world. According to Majeed, neither set of referencing-fixing conditions is privileged. Rather, the only way to determine which set of reference-fixing conditions in fact determines reference is by determining what the actual world is like.

 Majeed argues that out concept of time is conditional in this way. He argues that there are two sets of reference fixing conditions associated with ‘time’, i.e. ‘being ordered in an A-series’ and ‘being ordered in a B-series’ and that the right analysis of our concept of time is as follows:

T1) If there are A-properties in the actual world, and there is A-theoretic change, ‘time’

refers to that which is ordered in an A-series.

T2) If there are no A-properties in the actual world, but there is B-theoretic change, ‘time’

refers to that which is ordered in a B-series.

 A conditional analysis of our concept of time such as this affords certain benefits. First, it goes some way towards explaining why our concept is resistant to error. For it tells us that even if there is no A-series, our concept will be satisfied so long as there is a B-series. So the analysis can explain why it is that philosophers are generally not persuaded by arguments that move from the inconsistency of the A-series to the unreality of time (such as McTaggart’s famous argument, or the argument offered by Gödel). The reason why these arguments are unpersuasive is that the folk concept of time would continue to be satisfied even if there is no A-series actually, simply because when there is no A-series actually that concept is satisfied according to the reference-fixing rule governing T2 in the conditional analysis.

But while Majeed’s analysis is a step in the right direction, it still will not do as a general account of the folk concept of time. According to Majeed there is no *a priori* privileging of one set of referencing-fixing conditions over the other: they are two candidates to fix reference, either of which might, as it turns out, do the referencing fixing, depending on the nature of the world. If what is intended by Majeed’s claim that the reference-fixing conditions are on a par is that speakers are equally committed to, in the case of our concept of time, T1 and T2, then this seems right. If a conditional analysis is the right analysis of our concept of time then speakers dispositions ought to be such that if there are A-properties then time is what is ordered by the A-series, and if there is no A-series then time is what is ordered by the B-series. This is not really, however, to say that there is no *a priori* privileging whatsoever of one set of referencing-fixing conditions over another.

Some kind of conceptual priority is clearly built into any conditional analysis. After all, in the case of our phenomenal concepts, it seems clear that the relevant non-physical states could co-exist with the relevant physical states. The point is that the non-physical states are a *better* deserver to satisfy our concept ‘phenomenal state’ and hence that it is *only if* there are *no* states of that kind that the physical sates are what satisfies our concept of a phenomenal state (this is what we meant above when we said that the conditional concept ‘prioritises’ the nonphysical states). Moreover, this is something that we can know *a priori*. We can see this clearly in the wording of the two conditionals CA1 and CA2 outlined above. In each case the antecedent mentions the presence, or absence, of the relevant non-physical states. The presence of the relevant physical states is only mentioned in the context of the non-existence of the relevant non-physical states. So there is a clear conceptual priority given to the presence of the relevant non-physical states. It is this which partly explains why, even though physicalists give low credence to such states obtaining, they still seem to find zombie worlds conceivable.

For if the concept prioritises the relevant non-physical states, then all it takes is some low credence in the actual existence of such states to render zombies conceivable. To see this more clearly, imagine the conceptual priority in the phenomenal case were reversed, to give us a conditional analysis such as the following:

CA1) If there are physical states of the relevant type in the actual world, phenomenal concepts are satisfied by these states, and

CA2) If there are no physical states of the relevant type in the actual world then phenomenal concepts are satisfied by nonphysical states of the relevant type.

If the analysis is reversed in this way, then even if one has a non-zero credence in there being nonphysical states of the relevant kind, it is hard to see why one would thereby take zombies to be conceivable. For assuming that one believes that there are physical states of the relevant kind, then one has no reason to think that zombies are possible, even if one gives some non-zero credence to there also being the relevant non-physical states.

 We find the same conceptual privileging in the proposed conditional analysis of time. In effect the two conditionals implicitly tell us that it is the presence of A-theoretic properties that is the best deserver to satisfy our concept of time. After all, the presence of A-properties is consistent with the presence of B-properties. Yet a world with A- and B-properties is, according to the analysis, one in which time is what is ordered by the A-series. It is only if there is no A-series that time is what is ordered by the B-series. In effect, then, the conditional analysis of time grants that what is ordered by the A-series is a better deserver to count as being time, given our folk concept of time, than is what is ordered by the B-series. Now, we think some A-theorists will find this a desirable outcome; it allows that what is ordered by the A-series is a better deserver to be time than what is ordered by only the B-series, yet it has the benefit that if there is no A-series, the A-theorist need not conclude that there is no time. Such an analysis might, indeed, capture the concept that some such A-theorists deploy. But we do not think it a good candidate to capture the folk concept of time.

To see why, consider the following thought experiment. Suppose that the actual world happened to be one in which half of the world had B-properties and no A-properties, and the other half had both A- and B-properties. According to the conditional analysis just offered, only half of the world would contain time.[[12]](#footnote-12) Perhaps some A-theorists would embrace this conclusion. But most B-theorists would not; most B-theorists would conclude that both halves of the world contain time. Such B-theorists would either think that time is just somewhat different in the two halves of the world, or they world think that time is what is ordered by the B-series in both halves of the world, and one half of the world has an additional, metaphysically peculiar A-series that has nothing to do with time. More importantly, our guess is that ordinary folk would not be disposed to say that only half of the world has time if this were the discovery they made about our world. Certainly we think it most unlikely that those in the half of the world with only a B-series would conclude that they should move to the other hemisphere, since only by doing so can they get some time! The point here is that we do not think that the ordinary folk concept conceptually prioritizes the A-series in the manner in which the conditional analysis suggests that it does. So we are skeptical that this is the right analysis of our concept.

Even if one can make a case for the conceptual priority of the A-series over the B-series with respect to the folk concept, there is a further difficulty with the conditional analysis. As explicated above the conditional analysis is not sufficiently exhaustive. It therefore cannot do justice to the apparent flexibility of the folk concept of time, a flexibility that underlies its resistance to error. Not everyone thinks that the candidates to be time are exhausted by what is ordered by the A- or the B-series. As discussed above, some hold that time is best thought of spatiotemporally, as a space-like dimension within a four-dimensional manifold, one that cannot be characterized by any single B-series ordering. Still others hold that time is what is ordered by the C-series, which is a *symmetrical* ordering of events and so is not, strictly speaking, a B-series ordering (which is a strict total order of events). And then there are those who offer a causal theory of time, taking the time ordering to be given by a causal relation of generation (see, e.g. Tooley (1997)).

The general problem for the conditional analysis, then, is that a great many more conditionals will need to be added. After T2, presumably we will have T3: if there are no A-properties and no B-properties, then time is a space-like dimension within a four-dimensional manifold across which signals can propagate at or below the speed of light. Then we will need T4, time is a C-series ordering. Then we will have T5, time is a causal relation of generation, and so on. This not only makes for a messy analysis, but there is plenty of scope for us to disagree about the various conceptual priorities: not just whether the A-series should be prioritized over the B-series, but whether both should be prioritized over the C-series, and so on down the line.

The analysis that we are about to offer is simpler and more informative. It tells us something important about time, rather than merely cataloguing a long list of things that, as it were, might be time depending on the way the world is.

**3.3 Time is a Functional Concept**

We think that the folk concept of time is a functional concept. That is, very roughly, according to our folk concept of time, time is whatever it is that realises a particular functional role—the time role.[[13]](#footnote-13) What is the time role? In what follows we consider a number of candidates until we settle on our preferred understanding of the time role. This examination of the time role will prove useful since it will allow us to note some important things about the relationship between our ordinary concept of time and the scientific concepts of time mentioned earlier.

One possibility is that the time role is the role spelled out by the function of the t-parameter in fundamental physical theory. Let us call this the physical time role. The physical time role best captures a particularly narrow, specialised concept of time as it is deployed within physics. It would be an interesting discovery, to be sure, if nothing played this role. And that is precisely what some of the aforementioned timeless physical theories suggest is the case. When physicists say that there is, according to those theories, no time, they are in effect saying that if one of the timeless physical theories is true, then the physical time role is unrealised. Even if that is the case, however, it does not follow that the folk concept of time is unsatisfied. For, we think, a timeless physical theory could be true, and yet the world seem just as it is, experientially speaking. Indeed, that must be so if a timeless physical theory is to be at all plausible, since otherwise any such theory would be flatly inconsistent with the everyday experiences we have of the world. But the world seems like it has time. Indeed, it seems as though part of what we mean when we talk about time just are the various ‘timey’ experiences that we have: experiences as of deliberating about the future, regretting the past, reasoning about how to manipulate the world around us, its feeling as though there is temporal passage, its seeming as though we have memories of the past, and so on. Since these timey experiences would still be present even if a timeless physical theory were true, we suspect that use of the folk concept of time would continue unabated.

A second reason for doubting that the physical time role is the time role corresponding to the folk concept relates back to the flexibility of the folk concept. If the physical time role were the correct role for elucidating the folk concept, then our explanation for the apparent resistance to error that our concept has would be poor. That is not to say that there would not be an explanation for some features of the resistance to error of that concept. If the physical time role is the role specified by the t-parameter of the best fundamental physical theory of a certain kind, then the physical t-role itself will change as scientific theory changes. Indeed, as long as the best theory of fundamental physics includes a t-parameter and something realises that t-parameter, the physical time role will be realised. So even the physical time concept will be somewhat resistant to error. It will not, however, be resistant to error in all of the ways that the folk time concept is resistant to error. For it is epistemically possible (and perhaps actually true) that the best fundamental physical theory posits no t-role. In such an event, trivially, nothing realises the physical time role. Yet because it is not clear that the folk concept thereby goes unsatisfied, we have reason to think that the physical time role and the time role that captures the folk concept are different. In essence, this is because there are fewer ways that the world could be, such that the folk concept of time goes unsatisfied, than there are ways the world could be such that the physical time role goes unrealised.

Moreover, one might think it unlikely that a folk concept will be structured around a role specified by scientific theory in a case in which the folk concept predates the various physical theories in question. If we think there is continuity between the folk concept of time deployed many hundreds of years ago and our folk concept then the time role cannot be the physical time role. Even if we think that the folk concept includes an aspect of deference and so currently picks out the physical time role, it will not follow that the time role just is the physical time role. For suppose one thought that the folk concept, has, all along, deferred to ‘experts’. Thus one might hold that time is whatever it is that is realised by the role that experts tell us is the time role. The current experts in question are physicists, so the time role is the physical time role. But the experts in the distant past were not physicists. Since we are not historians we are not sure what role the purported experts in fact did or would have pointed to in the past. But we are pretty confident it would not have been the physical time role as it is now understood. So even an appeal to deference that brings together the folk and physical time roles at this point in time fails to show that the time role and the physical time role are one and the same roles.

Finally, it is possible, and quite likely, actual, that different physical sciences disagree about the t-role. For instance, it seems plausible that this is the case with respect to quantum mechanics and general relativity: the thing that plays the time role in quantum mechanics cannot play the time role in general relativity and *vice versa*. That’s because – very roughly – quantum mechanics appears to require an absolute time variable, something much closer to a classical conception of time from Newtonian mechanics. General relativity, by contrast, not only makes no use of an absolute time variable, it is deeply hostile to the existence of any such thing. Indeed, some models of general relativity are not even globally hyperbolic: they do not possess even a single total temporal ordering, one that orders all of the events in reality into an ordered series. So if we are going to set the content of the folk concept to the physical role, we need to ask: which one? We see no good way to answer this question without just picking one in an *ad hoc* fashion. Or at least any reasons we might have for selecting one physical role as the time role over another one would be based on a prior conception of time – e.g. one is more like the folk concept than the other. But that presupposes an account of the folk concept prior to the physical time role, and so the physical time role cannot be used to elucidate the folk concept.

A second possibility is that the time role is spelled out by the function of the t-parameter in the various special sciences—for instance in biology, evolutionary science, archaeology, palaeontology and so forth. Call this the special time role. Again though, similar problems arise. It seems likely that each of the special sciences will posit a somewhat different t-role. If so then there will be no special science time role, but rather, an array of different special science time roles. Even if the special sciences were intimately linked to our folk concept of time, it is hard to see on what basis we would decide that just one of these special science roles is the time role.

Even on the simplifying assumption that there is a single special science time role—either because all the special sciences posit the same role, or because we can abstract away from the particularities of each special science to discern a role that each has in common—it is still not plausible that that special time role is the time role undergirding the folk concept. For, once again, even if we discovered that nothing realises the special time role this would not obviously lead us to the view that there is no time. As with fundamental physics, in order for a given special science to be empirically adequate in a broad sense, it must not imply that we lack the experiences of the world we in fact have, experiences that seem to us to be strongly temporal. Any such science must therefore recover our timey experiences. But the existence of such experiences would be sufficient evidence, for many, that the time role is being played by something. So because the lack of anything to play the time role in a special science would not obviously lead us to cease to talk about past and future events, to cease deliberating, planning and intending; to cease reasoning about or manipulating our environment in a temporal way and so forth, we should conclude that the time role we are looking for is distinct from the special time role or, indeed, the physical time role.

 While the physical and special time roles do not appear to be good candidates for explicating the folk concept of time, the discussion so far is instructive, for it points us in the right direction. A central difficulty with both the physical role and the special role is that the discovery that nothing plays either role would not obviously be the discovery that nothing plays the folk time role. So long as our timey experiences persist we have reason to think the folk role is being played by something.

This suggests that the functional role of the folk concept of time is closely connected to certain everyday ways of experiencing the world. In particular, we experience the world as being one in which we deliberate, plan, intend, and manipulate the world around us to attain certain ends we take to be desirable. We experience the world from an agential perspective. This perspective, as we have been stressing here, is deeply interconnected with our concept of, and experience of, temporality. We deliberate about events that we might bring about at times other than the one at which we currently find ourselves. We intend to act at times other than the one at which we currently find ourselves. Manipulating the world around us occurs by bringing about certain events, which, we take it, will in turn bring about other events. Thus our experience of our world is an experience as of persisting objects, most notably ourselves, other agents, and other objects. Which is to say that it is an experience as of events being located at different times, and as of different times being differentially related to one’s current self via some kind of temporal ordering. It is also an experience as of certain events being causally connected. Our experience of the world is, finally, an experience not just of an ordering of events at different times but also an experience of there being a duration or distance between these events; it may even be an experience as of future events coming ever closer, and past events receding ever further away.

Let us call the experience as of deliberating our practice of deliberation; let us call the experience as of manipulating the world the practice of causal intervention; let us call the experience as of reasoning about how to manipulate the world the practice of causal reasoning; let us call the experience of acting in the world the practice of agency; let us call the experience as of existing at different times and the experience of tracking the same object at different times the practice of persistence.

These practices are all central to our way of being in the world. To be clear, however, it is not our contention that these are the only aspects of the folk concept of time. It may be that the folk concept of time is responsive to more than just deliberation, planning, intending, manipulating and so on. The folk concept may be richer by far. The point we are trying to make is that the folk concept is at least this rich and, what’s more, that these aspects of the folk concept are an integral part of the everyday notion of time. Accordingly, an adequate account of time ought to be responsive to these core aspects and, as such, ought to forge a link between the practices mentioned above and a theory of those practices.

Note that by a theory, here, we mean an account of these practices that has certain features. First, we expect that any such theory will make sense of, and vindicate, these practices. That does not mean that we expect such a theory to make reasonable every instance of causal reasoning, of agency, of deliberation or of causal intervention. Rather, our suggestion is that because these practices are so central to our being in the world—they jointly constitute a large part of our being in the world—any good theory of these practices will be one that vindicates the practices themselves. That is to say that any good theory of these practices will be one that, at the very least, does the following: (a) it renders assertible a range of assertions within the relevant discourses associated with the practices (causal, deliberation, agential) and it clearly draws a distinction between claims that are assertible in those discourses and those that are not and (b) it renders reasonable the practices in question. These are relatively minimal constraints; they do not require that a theory of the practices render the practices justified, in some deep epistemic sense; nor does it require that the theories render any claims in the discourses associated with the practices true. To get a feel for the difference here, consider our moral practices and the associated discourse. One way to vindicate the practices is to offer a realist theory of morality which not only renders moral discourse truth apt and true, but makes moral practices reasonable and justified. But notice that even error theorists about moral discourse will typically want to say that moral practice is reasonable and they will want to offer some account of when claims in the moral discourse are assertible and when they are not. They may do this by appealing to moral fictionalism, or moral noncognitivism, or some other view. But however they do so they, in some sense, vindicate moral practice. By parity, we think, it is even more important to vindicate the deliberative, causal and agential practices and we assume that the best theory of these practices will do just that.

With this in mind let us suppose that the best theory of deliberation and, more generally, practical reason will have a time parameter, a t-parameter. Call this the deliberative t-role. This is the role spelled out, and indeed exhausted by, the function of the t-parameter in the best theory of deliberation. Let us suppose that the best theory of causal intervention will have a t-parameter. Call this the intervention t-role. This is the role that is exhausted by the function of the t-parameter in the best theory of causal intervention. Let us suppose that the best theory of causal reasoning will have a t-parameter. Call this the causal reasoning t-role. This is the role exhausted by the function of the t-parameter in the best theory of causal reasoning. Let us suppose that the best theory of persistence will have a t-parameter. Call this the persistence t-role. This is the role exhausted by the function of the t-parameter in the best theory of our persistence. Finally, let us suppose that the best theory of agency will have a t-parameter. Call this the agential t-role. This is the role exhausted by the function of the t-parameter of our best theory of agency.

We suspect that there will be a good deal of overlap in these five t-roles; but we are happy to concede that each of these t-roles is different. What, then, is the connection between these five t-roles and the time role? It could be that just one of these t-roles is the time role, and the rest are closely related roles. Yet there seems no principled reason to suppose that to be so; particularly since if the roles are somewhat different it is conceivable that what realises the causation t-role is not what realises the deliberative t-role, which, in turn, is not what realises the persistence t-role and so forth. Since all five of these roles are clearly central to our temporal discourse it would be *ad hoc* to choose just one as the time role.

Our suggestion is that the time role is *the role of having all five t-roles realised*. The time role, then, is a higher-level role: it is the role of having some other set of roles realised, where, crucially, the set of lower-level roles in question are specified by the best theories of certain “timeful” phenomena that are central to our self-conception. We are inclined to think that the five t-roles, though distinct, come as a package. It is difficult to imagine that the causation t-role is realised but the persistence t-role is not. It is difficult to imagine that the deliberative t-role is realised but the causation or persistence t-roles are not. Thus we think there is relatively little danger that some, but not all, of the five t-roles will be realised. That is important; if the time role is the higher-level role of having all five t-roles realised then our concept will not be resistant to error if there is any real likelihood that even one of the t-roles might not be realised since in such an event our concept of time would be unsatisfied.

Hence on our view ‘time’ might not pick out a single process or phenomenon. Different processes might realise each of the five t-roles, and thus the time role would be jointly realised by these five processes. But it is precisely this kind of flexibility that renders our account appealing. First, our analysis leaves it entirely open that what realises the physical time role and the special time roles is one and the same thing, and that what realises those roles is also what realises the folk time role. Thus it leaves it open that what the folk are talking about when they talk about time is what physicists are talking about when they talk about time, even though physicists and the folk are deploying somewhat different concepts. But it also leaves open that what realises the physical time role is *not* what realises the special time role. Thus it remains an open possibility that even if a timeless physical theory is true and nothing realises the physical time role, nevertheless the special time role is still realised. If that were the case then much of the special sciences would be vindicated even if the physical time role were unrealised. Of more interest to us is that our analysis renders it an open possibility that if nothing realises the physical time role (or the special time role) nevertheless the time role may still be realised. This nicely explains how physicists could be right to say ‘there is no time’ given their concept of time, and yet be wrong to suggest that this means the folk should conclude that there is no time given the folk concept of time. Indeed, our analysis can explain why we should be pretty confident that our concept of time will be satisfied, and indeed, why we should be confident about this even if we think there is a reasonable chance that the physical time role will not be realised. Let us explain.

We can be confident that our folk concept will be realised even if the physical time role is not realised, if we can be confident that each of the t-roles will be realised even if the physical time role is not realised. There are only two circumstances in which the five t-roles could fail to be realised. The first is that our best theories of persistence, causation, deliberation and agency all include a t-role, but that role is not realised. The second is a circumstance in which the best theories of persistence, causation, deliberation and agency simply fail to include any t-role, and hence, trivially, that role fails to be satisfied. Let us consider each in turn.

If our best theories of these phenomena included a t-parameter but this parameter fails to be realised by anything then this is to say that our best theories of these phenomena are false. If our best theory of T is false, then presumably we ought to be error theorists about T. But that hardly seems likely in the case at hand: it is unlikely indeed that we will discover that there is no true theory of persistence, causation, deliberation or agency. To be sure, there might turn out to be no true theory of some metaphysically laden notions of persistence, causation, agency or deliberation. We, however, are interested in the best theory of these (relatively) ordinary notions; notions that figure in the way in which we all understand ourselves. It seems almost inconceivable that we could discover that there is no sense to be made of the idea that we plan, deliberate, intend, reason about how to bring about desirable ends, experience events as ordered, and so forth. It seems no more conceivable that we should discover this even if a timeless physical theory is true: if the physical time role is not realised. After all, any such theory must be consistent with the appearances of our world, and those appearances strikingly include the appearance of deliberation, causation, persistence and temporal phenomenology. Our best theory of said phenomenon is a best theory of those appearances: of the way things seem to us. Thus there is excellent reason to suppose that if our best theories of deliberation, persistence, causation and temporal phenomenology include a t-role, then that t-role will be realised even if the physical time role is not realised.

The other possibility is that the best theory of these five notions fails to include a t-role. But here, again, we think this most unlikely. It is difficult to see how to make sense of the ordinary notions of agency, deliberation, persistence and so forth without the appropriate theory having something like a t-parameter: after all, as agents who deliberate we are deliberating about actions that will occur at other ‘times’; we are deliberating about how to manipulate events at other ‘times’ and so on. So some kind of t-role is sure to be found in the best theory of these phenomena.

Finally, our analysis explains why our concept of time is resistant to error. For our analysis remains utterly silent on what it is that plays the time role. Anything at all will do, for us, as long as the relevant role is played. Almost certainly there are, epistemically speaking, many possible candidates that could realise the time role actually; we can conceive of *any of these* being time since we can conceive of any of them realising the relevant role. On our analysis at best a number of these jointly realise the time role and thus turn out to be time. Our analysis also allows us to explain why there are many different epistemically possible scenarios under which we will say that there is time: every scenario under which something plays the time role, no matter how weird and wonderful that thing might be, is a live possibility. So there are very many ways the world could be, consistent with our concept being satisfied. In some sense this is exactly what we would expect from a functional analysis of the time concept: if time is a functional concept then it is multiply realisable. Multiple realisability, however, is exactly the kind of thing that renders a concept resistant to error.

**4 Conclusion**

Let’s take stock. We have considered three putative analyses of the concept of time: a one feature analysis, a conditional analysis and a functional analysis. We have argued that it is a functional analysis that best accounts, on the one hand, for the relative flexibility in our concept and thus its resistance to error, and, on the other hand, to the centrality of the time concept to a range of other important concepts, such as causation, deliberation, persistence and prudence. If we are right, then there is much to be done. First, we must now take this analysis of the concept of time and feed it back into contemporary physical and metaphysical theories that are billed as timeless to see if such theories really do imply that nothing plays the time role. We have suggested that there is reason to doubt that such theories imply any such thing, but we recognise that a more careful study of the various timeless theories is required to fully establish this conclusion. Second, the conceptual relationship between the concept of time and the other central concepts just mentioned must be investigated more fully, so as to round out our conceptual understanding of temporality. We have begun this process but there is more to be done in, for instance, understanding the relationship between causation and time. Finally, and in a similar vein, the individual t-roles that, we have claimed, jointly constitute the higher-order time role need to be clarified. What, exactly, is the role of time in the theories of causation, persistence and prudence? What demands on time do these theories make? To answer these questions we must now return to the metaphysical, normative and epistemic debates over these various notions and refigure them through the lens of a functional approach to time.

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1. Internalist views of this stripe are defended by, *inter alia*, Jackson (1998; 2004; 2007; 2009); Chalmers (2004); Braddon-Mitchell (2004a; 2004b; 2005; 2009); Pettit (2004). [↑](#footnote-ref-1)
2. See for instance Zimmerman (2005; 2008). [↑](#footnote-ref-2)
3. The B-theory is typically supplemented with an account of tensed talk and thought. The A-theorist takes tensed thought and talk to pick out A-theoretic properties. The B-theorist takes tensed thought and talk to be indexical, picking out the time at which a proposition is expressed either in speech or via some doxastic state. [↑](#footnote-ref-3)
4. For instance, Putnam (1967), Schmidt (2006) and Deng (forthcoming). [↑](#footnote-ref-4)
5. McTaggart (1908) and Gödel (1949). [↑](#footnote-ref-5)
6. A two-place operator Rxy is commutative just when for any *a* and *b* such that R*ab*,Rab if and only if Rba. [↑](#footnote-ref-6)
7. This account of canonical quanization is taken from Fradkin (ms., p. 92) and §3.2 of Weinstein (2011). For a more detailed (and more technically demanding) overview of canonical quantum gravity, see Isham (1993) and Kuchař (1992). For a more accessible, philosophical overview. [↑](#footnote-ref-7)
8. Notice that it is consistent with what we say, here, about our concept of time, that it is metaphysically impossible for any world to seem the way our world seems, and to lack an A-series. Perhaps the A-theorist is right, and the A-series is necessary to produce our phenomenology of time. Then it turns out that time is A-theoretic. But this is not a conceptual truth: our concept of time does not demand any such thing. [↑](#footnote-ref-8)
9. The details vary depending on the particulars of the account. [↑](#footnote-ref-9)
10. Stalnaker (2002), Hawthorne (2002). Braddon- Mitchell (2003), [↑](#footnote-ref-10)
11. Paper presented at the Frontiers in the Philosophy of Time Conference, Kyoto, Japan. [↑](#footnote-ref-11)
12. With thanks to David Braddon-Mitchell in discussion. [↑](#footnote-ref-12)
13. Something along these lines has been suggested by Craig Bourne (2006, pp. 220–222; *a lá* Lewis (1970)) in the context of discussion about our concept of time. [↑](#footnote-ref-13)