**Quantum Gravity, Timelessness, and the Contents of Thought[[1]](#footnote-2)**

**Abstract**

A number of recent theories of quantum gravity lack a one-dimensional structure of ordered temporal instants. Instead, according to many of these views, our world is either best represented as a single three-dimensional object, or as a configuration space composed of such three-dimensional objects, none of which bear temporal relations to one another. Such theories will be empirically self-refuting unless they can accommodate the existence of conscious beings capable of representation. For if representation itself is impossible in a timeless world, then no being in such a world could entertain the thought that a timeless theory is true, let alone believe such a theory or rationally believe it. This paper investigates the options for understanding representation in a three-dimensional, timeless, world. Ultimately it concludes that the only viable option is one according to which representation is taken to be deeply non-naturalistic. Ironically then we are left with two seemingly very unattractive options. Either a very naturalistic motivation—taking seriously a live view in fundamental physics—leads us to a very non-naturalistic view of the mental, or else views in the philosophy of mind partly dictate what is an acceptable theory in physics.

**1. Introduction**

Over the last two decades or so a number of so-called timeless interpretations of quantum gravity have developed (Barbour (1999, 1994b, 1994a) and Butterfield and Isham (1999) Anderson (2006, 2009), Deutsch (1997), Gell-Mann and Hartle (1994), Dodd and Halliwell (2003), and Rovelli (1991a, 1991b) (see Anderson (2012, pp. 769–772) for a list of timelessaccounts)). Such theories arise as a way to reconcile two theories that are apparently inconsistent, but each empirically well confirmed: general relativity and quantum mechanics. The theories are timeless because, according to Barbour (1999, 1994b, 1994a), Butterfield and Isham (1999) and Rovelli (2004, 2007) the completed theory of quantum gravity will lack a one-dimensional substructure of ordered temporal instances, and will lack any temporal metric, or distance relations, between these instances. [[2]](#footnote-3)

Let us distinguish between what we call *weakly* timeless theories and *strongly* timeless theories. Weakly timeless theories are theories in which although there is no time at a *fundamental* level, time, or something very time-like, emerges at a macro level. Such theories are perhaps not *really* timeless at all, but we call them weakly timeless since their proponents often describe them as timeless theories. Rovelli’s (2007) ‘timeless’ theory is, arguably, an example of such a view. While Rovelli holds that fundamentally there is no time, he argues that features that we commonly attribute to time really belong to the statistical distribution of macroscopic properties across physical systems. Rovelli calls this statistical distribution ‘thermal time’ and aims to show that thermal time can do much the same work as Newton’s absolute time. In what follows we shall not be interested in weakly timeless theories, since although it is an interesting discovery that time is emergent, rather than fundamental, no particular philosophical problems arise from such theories, and it is not really clear that calling these theories timeless is appropriate.

By contrast, strongly timeless accounts hold that there is fundamentally no time, and, in addition, *nothing* emerges at the macro level that is at all time-like. Instead, there is merely an appearance as of there being something time-like. Exactly which views fit where, is controversial. On one interpretation of Rovelli there isn’t really anything at the macro level which is time-like, there is merely an appearance *as of* there being said macro phenomena. On that interpretation, Rovelli’s view is strongly timeless. It is not our aim, here, to arbitrate these disputes.

In what follows we shall be interested in strongly timeless physical theories: for it is with regard to these theories that a particular set of challenges is most pressing. Henceforth, then, when we talk of timeless theories we intend to pick out strongly timeless theories (which are, plausibly, the only theories that really deserve that name).

One set of challenges to timeless theories is particularly pressing. These are challenges, which, if they cannot be met, suggest that any timeless theory is radically self-undermining.[[3]](#footnote-4) This paper proposes two new challenges, which we call the **entertainment challenge**, and the **belief challenge.** It concentrates on the former, which, we think, is the most fundamental of all the challenges.

Let’s start with some of the existing challenges in the literature. First, timeless theories must be consistent with the fact that there are creatures with experiences, since it seems undeniable that we are such creatures. Any theory inconsistent with this datum is therefore false. We call this the **phenomenological challenge**. This is the challenge that has been the principal focus of literature, and Barbour has gone the furthest towards answering it. It is for that reason that we will his version of a timeless theory as our principal target (Barbour (1999, 1994b, 1994a)).

A second challenge that has been discussed is what we call the **rational belief challenge.** Defenders of any timeless theory take themselves to believe their preferred theory is true, to have evidence that their preferred theory is true, and to be justified in believing their preferred theory to be true. If it cannot be shown that the truth of a timeless theory is consistent with one rationally believing its truth, then such a theory is, as Healey (2002) puts it, empirically self-refuting. Such a theory might be true, but we could never be justified in believing it to be so. As we see shortly, Healey thinks we might meet the rational belief challenge if we can meet the phenomenological challenge.

But there is, we think, a more fundamental challenge: to have rational beliefs at all, there need to be beliefs in the first place. Showing that there can be beliefs is to meet what we call the **belief challenge.** Further, for there be beliefs, there must be *mental entertainings*. We must be able to represent things to ourselves, (including timeless theories) such that we can wonder whether those things are true.[[4]](#footnote-5)

Before we can believe things, or desire them, we must be able to represent ways things can be. We call this the **entertainment challenge**. It is this challenge, which, we argue, is most fundamental, and which is the primary focus of this paper. Essentially, it is the challenge of how to give an account of mental content in a timeless world.

Content is itself a term of art. What we take content to be, in all its glory, is determined by which theory of content we take to be true. Some of these theories are more metaphysically heavy-weight than others (and we consider these in the remainder of the paper). Still, in its most general all we mean by (mental) representation[[5]](#footnote-6) is the existence of contentful mental states.

To see why these are all challenges for timeless theories, and how they depend on a solution to the entertainment challenge, let us focus on Barbour’s theory of quantum gravity. According to this theory there exists a relative configuration space filled with three-dimensional objects—what we call points[[6]](#footnote-7)—each of which specifies a possible configuration of all of the particles in the universe in a Euclidean 3-space alongside a probability distribution over those points (1994b). Each point is an instantaneous global state of the universe in the relative configuration space. Crucially, these points are not temporally connected. The relative configuration space is entirely spatial in nature. Barbour uses the indexical phrase ‘the actual world[[7]](#footnote-8)’ to describe the single point in configuration space in which any experience is located from the perspective of that experience. Henceforth we will either simply talk about points in configuration space, or sometimes, we will use the phrase ‘point world’ to denote one of these three-dimensional, isolated existences.

It is difficult to see how if any putative thought is located in a point-world, any of the challenges can be met. Let’s consider how Barbour deals with the phenomenological challenge. He hypothesises that some points in configuration space are imbued with a rich representational structure that can provide a basis for experience. He calls such points time-capsules. These points have an internal structure such that they appear to contain records of the past. A point might, for instance, contain what appear to be trees with rings, fossils, geological layers, diaries, birthday cards, books, mental states (memories) and so forth, all of which appear to include records of past times. Barbour hypothesises that the point world of any of our experiences is a highly structured time-capsule that contains a representation of an entire sequence of other points such that were we to order those other points in accordance with the representational structure of the point in question, we would generate what looks like a history of that point. For Barbour, the points in configuration space have associated with them probabilities (more on this later) such that structured time-capsule points are more ‘probable’ than unstructured ones. That, in part, is meant to explain why the point-world of our experience is a time-capsule (rather than not). Then the idea is that this structure gives rise to our experiences as of the point-world having a history.

It is by appealing to this same mechanism that Healey thinks we might meet the rational belief challenge. Healey’s idea is that what constitutes observation and evidence in a timeless world is a function of what is represented in the structure of our three-dimensional point. The details need not detain us. What matters is that the only extant solutions to any of the challenges presuppose a solution to the entertainment challenge. Barbour’s solution to the phenomenological challenge presupposes a solution to the entertainment challenge since it aims to explain our phenomenology by appealing to a rich, nested, mental content as of there having been past states and memories thereof. Any solution to the rational belief challenge, including Healey’s, also presupposes a solution to the entertainment challenge, since the challenge is to say how believing a timeless theory to be true, could be rational given one’s other beliefs. The assumption is not only that there is mental content, but that some of those content bearing states are belief states.

It is, therefore, clear that solutions to the phenomenological, knowledge, belief and rational belief challenges, all require a solution to the entertainment challenge. Given this, our aim is to consider what account of content, if any, can accommodate three-dimensional mental states having content. We begin (in section 2) by considering naturalist theories of content. We argue that there is no non-circular way of getting a naturalistic theory of representational content in a timeless world given the sorts of worldly connections to which current naturalistic theories appeal, and given anything like the resources just outlined for recovering the appearances as of there being time. It follows that nothing like a contemporary naturalistic theory of content is consistent with us solving either the entertainment or the belief challenge. This leads us, in section 4, to consider whether there is some new naturalistic theory of content that might do the job, a theory that appeals to a different kind of worldly connection: common determination. We argue however, that common determination does not afford the resources necessary, within a timeless world, to make sense of content. We also consider whether there could be theories of content other than the standard naturalistic ones which might be consistent with some non-standard views about what counts as naturalism, and conclude that, likely, this avenue is also foreclosed. That leaves the defender of a timeless theory with three options. The first is to reject naturalism about content in favour of a non-naturalistic theory; the second is to reject timeless theories, and the third is to concede that we do not, in fact, represent the world. All three options seem to us to be very surprising upshots of philosophical consideration of some of our best physical theories.

**2. Naturalistic Theories of Content**

In order to meet the entertainment challenge, the defender of a timeless theory must show how, if our world is as their theory says it is, it is possible for there to exist contentful mental states. Before we proceed, first, a general point. One might worry that in a timeless world there would be no mental states, since there would be no persons, (or indeed organisms more generally) since on some accounts persons are, *essentially,* persisting things, and in the absence of time there are no persisting things. There are two things to say here. First, it would be begging the question against the timeless theorist to simply insist that in the absence of persisting objects there are no mental states. After all, it is the timeless theorist’s contention that there are instantaneous mental states which give rise to the appearance as of there being persisting objects. Indeed, we take it that a solution to the phenomenological and entertainment challenges is precisely what would allow the timeless theorist to explain how such states give rise to the appearance as of there being persisting objects. So in this context insisting, without argument, that there could be no such states would be to beg the question. So in what follows we assume that it at least makes sense to talk about instantaneous ‘mental states’, instantaneous ‘persons’, and instantaneous ‘organisms’. That these might not be real persons, organisms or mental states on some accounts is just, to the timeless theorist, all the worse for those accounts. Of course the timeless theorist is required to show that their revised ontology makes sense. And it’s that latter question, as it applies to content, that we will be addressing. To do so we assume, for convenience, perdurantism about persistence: then we can simply imagine a world with an intrinsic duplicate of an instantaneous time-slice of some perduring person, and ask, of that object, about its mental states (and its neural states).[[8]](#footnote-9) That leaves entirely open that the duplicate instantaneous object might not have any mental states (phenomenological or representational)—but it does not foreclose the possibility that it does.

In what follows we consider a number of naturalistic theories of content, attempting to steer clear of the finer points of such theories where these are irrelevant for our purposes. You might ask what is meant by naturalism here. A slightly uninformative answer is that it’s whatever is in common between the attempts at accounts of content called ‘naturalistic’. Slightly more informative is that they all attempt to answer so-called ‘location problems’ (Jackson 1998): they specify what features in a more fundamental science correspond to the entities talked about in a less fundamental discourse like that of mental content. Later in the paper we will discuss what happens if we relax this specification, and consider doctrines called ‘naturalism’ (like Price’s (2008) Subject Naturalism) that reject it.

Naturalistic theories of content fall into four broad categories: causal (Dretske 1981; Fodor (on some understandings) 1987; 1990; Stampe 1986) sophisticated co-variational (Maloney 1994; Dretske 1983) teleonomic (Millikan 1984; 1989a; 1989b; Neander 1991; 1995; 1996) and functional role theories (Field, 1977; Block 1986; Horwich 2005). Causal, teleonomic, and functional role theories all require that there are certain kinds of causal relations between a mental state and the represented state. Of course, no serious naturalistic theory of mental content is a *pure* causal account, in the sense in which one might, in other contexts, say that a footprint represent the past presence of a foot. But they all in some way or other involve causation, counterfactuals, or both. Crudely put, according to causal theories what a state represents is what causes that state, according to functional role theories what a state represents is a function of both what causes that state, and what that state causes, and according to teleonomic theories what a state represents is a function of the evolutionary history of that state. Sophisticated co-variational accounts require that there is a reliable connection between the mental state and what it represents; this might be a causal connection, or it might involve a complicated story about counterfactual dependence between the two states.

It could be noted that all these accounts of content are ones whose primary focus is on empirical content. Some of them have the feature that even thoughts about *a priori* matters (like perhaps theorems) require causal connections, even though historical and causal features may not play a role in determining the specific content (so that historical causal relations are required to have contentful states at all, but synchronic dispositional roles may suffice, given the historical causal conditions, to fix what the content is). Others are concerned with the content of empirical claims, not *a priori* claims, and perhaps could admit that thoughts without empirical content could be had without causal relations being in place. In any case, the claim that our world is one in which gravity and quantum mechanics are unified in a certain way is surely an empirical claim.

Relatedly, there are some accounts of content, which we won’t discuss, which might be wholly synchronic. If you accept a very strong version of inferential role semantics[[9]](#footnote-10), in which (a) inferential roles are wholly sufficient for content, and (b) these roles are exhausted by instantaneous dispositions that don’t require actual diachronic inferences and (c) we can make sense of dispositions in the absence of causation, then you might have a story about instantaneous content. But we don’t think existing accounts really accept (a) and (b), and we take the rest of this paper to count against the plausibility of (c).

Assuming, then, that causation is necessary for mental content, then if there are no past states of the world then, *prima facie*, there are no true causal claims or claims about counterfactual dependence. If so, no naturalistic theory of content, at least as we know it, will be one according to which any mental state in a three-dimensional world has mental content. In section 4 we return to the issue of whether there might, nonetheless, be a naturalistic theory that is not, as it were, ‘as we know it’, which might do the work required. For now, however, we focus on the broad features of current naturalistic theories. To see why, given these theories, there will be no mental content in a three-dimensional world, we first consider causation, then turn to counterfactual dependence.

**3. Causation in a timeless world**

Consider one leading theory of causation: a process theory.[[10]](#footnote-11) According to such a theory causation requires the intersection of worldlines. But in a three-dimensional point there are no worldlines, and thus there is nothing to do the intersecting. Hence there is no causation. Even if we think that causation is something ‘weaker’ than is suggested by a process theory it is hard to see how timeless worlds will be ones that contain causation. Humean theories, for instance, hold that causation is a matter of certain regularities obtaining across time. But if our world is a three-dimensional point, there are no such regularities. Even if we think of our world as the totality of three-dimensional points in configuration space rather than a single point in that space we still get no help. For since there is no objective ordering of the three-dimensional points in that space there is no fact of the mater regarding which regularities obtain. To put it bluntly, if regularities obtain just in case this thing, E, typically occurs near (we would usually say before, or after) this other thing, E\*, then we need a nearness metric (even if not a temporal metric) that orders the points. And that, we do not have.

Alternatively one could suppose that causation is at least in part a matter of counterfactual dependence.[[11]](#footnote-12) In that case counterfactual dependence and causation stand or fall together. In what follows, however, we argue that there is a problem for providing an analysis of counterfactuals in a timeless world. To see why, consider Lewis’s (1979) analysis:

**LEWIS** ‘P □→ Q’ is true iff there is some possible world in which P and Q that is closer to the actual world than any possible world in which P and ~Q.

Barbour calls the three-dimensional point that we experience the ‘actual world’; to take ‘actual’ seriously is to think of the other three-dimensional points in configuration space as bearing modal relations to each other. On this reading they would be the relevant possible worlds for an analysis of counterfactuals. We are inclined to think this is an illusion of terminology. The actual world in the *modal* sense is the entire configuration space: after all the configuration space is supposed to be something that physics tells us about. But let us look at the analysis under both suppositions.

On the first reading the relevant possible worlds to consider when evaluating counterfactuals are the other three-dimensional points in configuration space. Even setting aside the issue of setting up a relevant similarity metric across the points in configuration space there are deeper problems. While it may be that a point that is P and Q is more similar to the actual point than any point that is P and -Q, this will only work for Ps and Qs that exist at the same point. If we want to recover causation by analysing causation as counterfactual dependence then we need the relevant Ps and Qs to exist at different points. Since each point—each world—lacks the temporal width to allow both for some event’s non-occurrence and for any ‘downstream’ consequence, there is, quite trivially, no world in which *x* fails to occur and *y* does not occur that is closer to actuality than any world in which *x* does not occur and *y* occurs anyway, because there are no worlds that bear witness both to *x*’s non-occurrence and to the non-occurrence of *y*.

The second analysis takes the configuration space as a whole to be the actual world. Since the configuration space includes all the possible configurations of particles in 3-space, the actual world includes every nomologically possible point. It’s worth pausing to see why this is so. In classical dynamical systems one naturally takes nomological possibility to require dynamical possibility—the possibility of dynamically getting from one point, to another. There are no dynamical laws of this kind in the model; instead, as we noted earlier, there is a probability measure over the points in configuration space. Any point that has a non-zero probability is in the space, and to have such a non-zero probability is to be nomologically possible.

So consider the counterfactual ‘if *x* had not occurred then *y* would not have occurred’. The closest world that shares the same laws as the actual world, and in which *x* does not occur, is the actual world itself. For there is some point in configuration space in which *x* does not occur. Moreover, the world in which *x* does not obtain is also a world in which *y* does not obtain. For, once again, the actual world is a world in which there is a point in which *y* does not occur. So the counterfactual will come out as vacuously true. Mind you, the counterfactual ‘if *x* had not occurred, *y* would still have occurred’ will also come out as vacuously true, since the closest world to the actual world—actual configuration space—is one in which *x* does not occur (i.e. there is a point at which *x* does not occur) and in which and *y* does occur (i.e. there is a point at which *y* occurs).

Under one assumption we have only one point in actuality, and in the other we have too many. What is needed is a way of constraining the number of points in the point-world of the analysis, so that it contains a principled subset of the configuration space. In the next section we consider two different analyses that attempt to do just this. We think that the two proposals yield essentially the same results, but it will be useful to present both since the second more starkly draws attention to what will become a potential problem for using these views to make sense of content.

**3.1 Counterfactuals in a timeless world**

Of course even within classical physics there are only a few philosophers who take causation to be a fundamental feature. If a timeless theory is true, we should certainly not expect either causation, or the building blocks of causation, to be fundamental or even very much like how most of us currently understand them. They will be emergent, and likely odd. In this section we consider a range of revisionary semantics for counterfactuals in a timeless world. The aim is to find emergent building blocks for an account of causation. Each works by finding a way to string together points to form ersatz four-dimensional worlds to which relatively standard accounts of counterfactuals can be applied. Broadly these fall into three categories: linking worlds by similarity, by the apparent laws encoded at a point, and via the probability functions afforded my some timeless approaches to quantum gravity.

**3.2 Linking by Similarity**

The first strategy, deployed by Baron and Miller (2014) is to endorse Lewis’ semantics for analysing counterfactuals and to find an analogue for each of the moving parts appealed to in that analysis. Recall that according to Lewis’ semantics:

**LEWIS** ‘P □→ Q’ is true iff there is some possible world in which P and Q that is closer to the actual world than any possible world in which P and ~Q.[[12]](#footnote-13)

Here, similarity between worlds is determined by Lewis’ (1979) preferred similarity[[13]](#footnote-14) metric, which prioritises similarity of laws of nature. A violation of the laws is a miracle. Miracles are defined intra-worldly, as follows. For any two worlds *w1* and *w0*:

A miracle at *w1*, relative to *w0*, is a violation at *w1* of the laws of *w0*, which are at best the almost-laws of *w1*. The laws of *w1* itself, if such there be, do not enter into it. (Lewis 1979, p. 469)

In the context of a timeless account we need to narrow down the many points in configuration space. Baron and Miller suggest a recipe for doing this. Start by noticing that a subset of the points can be totally ordered via a similarity relation that partially orders all of the points by comparing them in some physical respect (if it helps, imagine doing this via entropy). Each totally ordered sub-set of points is known as a *path* through configuration space. Paths look like four-dimensional Lewisian possible worlds, though they are not since no two points in the path are temporally connected, nor ordered by anything other than similarity. Baron and Miller call such paths *quasi-worlds*. These play the role of four-dimensional worlds in the amended Lewis semantics.

Now a notion of laws is required to ground the relevant similarity metric. The proposal is to extract quasi-laws from quasi-worlds in the same way they are extracted from Lewisian possible worlds. These are the apparent laws relative to a quasi-world, bearing in mind that in fact the points in the quasi-world are not nomically connected. Finally we need to define a quasi-miracle. This is taken to be a violation of the deterministic quasi-laws. Using quasi-laws and the notion of a quasi-miracle they then modify Lewis’s metric for similarity across worlds as follows:

1. It is of the first importance to avoid big, widespread, diverse violations of quasi-law.
2. It is of the second importance to maximize the region of configuration space throughout which perfect match of particular fact prevails.
3. It is of the third importance to avoid even small, localized, simple violations of law.

(4) It is of little or no importance to secure approximate similarity of particular fact, even in matters that concern us greatly.

Finally, since the actual world is a single point in configuration space we need to define an actual quasi-world. Baron and Miller suggest that if the actual world is point, *p*, in configuration space then the actual quasi-world will be one of the quasi-worlds that has *p* as a member. The actual quasi-world is the quasi-world that passes through *p,* and possess deterministic quasi-laws such that (i) the points in the order prior to *p* agree as far as possible with whatever evidence exists at *p* regarding what (appears to be) the past history of a four-dimensional world and (ii) the quasi-laws defined by that path correspond as far as possible to whatever laws can be extrapolated from the empirical evidence at *p* by conscious agents at that world.[[14]](#footnote-15) Baron and Miller then suggest the following amended semantics for evaluating counterfactuals.

**B&M** ‘P □→ Q’ is true iff there is some quasi-world in which P and Q that is closer to the actual quasi-world than any quasi-world in which P and ~Q.

This account will generate true counterfactual conditionals of the kind that are necessary for a naturalistic theory of content. Although we think that this, or something very like it, is likely to produce a satisfactory semantics for counterfactuals in a timeless world, there are problems using this analysis in a naturalistic theory of content. This problem will be most obvious in the next account of counterfactuals, so we return to it after we consider that proposal.

**3.3 Linking by Apparent Laws**

The second account of counterfactuals does not appeal to similarity relations between points in relative configuration space. Instead, we simply take the point in that space that is the actual world and ask, first, what the apparent laws are, and what its apparent history is. The apparent laws are what one would take to be the laws on the assumption that what appear to be the past states of the world are really past states. The apparent history is something like the consensus of the evidence that that world contains, both in (apparent) memories and in the world. From this apparent evidence we can generate laws that govern the *apparent* dynamical unfolding of the actual world over time. Now suppose we want to evaluate the claim, if *x* had not occurred, then *y* would not have occurred. We go to the most similar point in configuration space where *x* does not occur or in which there is no apparent trace of *x*, and we see whether, in that point, either *y* occurs or there is an apparent record of y or whether it would be quasi-rational to project that *y* will occur.

Quasi-rational projection is projection based on the way the apparent laws and the way the world is. It’s at best *quasi-*rational because the dynamical laws are merely apparent. Which world is the relevant closest world to evaluate the antecedent of the conditional? The world that shares almost the same apparent laws as the actual world except that, from the perspective of the apparent actual laws, there is a miraculous glitch in the apparent history such that *x* does not occur, or there is no record of *x*, and such that the apparent history is the same as at the actual point up until the time at which *x* occurs actually, or the apparent time at which *x* occurs actually given the apparent records. Then we look to see what other apparent records of past times exist in that world: if according to these apparent records *y* does not occur after the time at which *x* fails to occur, then this vindicates the counterfactual that had *x* not occurred, *y* would not have occurred.

**Our Proposal**

‘P □→ Q’ is true iff there is a point in which P (or an apparent record of P) and Q (or an apparent record of Q or it is quasi-rational to project Q) and that point is more similar to the actual point than any such point which is P & -Q (or apparent records of -Q, or -Q is quasi-rational to project).

This strategy delivers the same results as Baron and Miller’s. Instead of appealing to quasi-laws of a set of points we appeal to merely apparent laws of a single point. Instead of appealing to an actual quasi-world and to the closest quasi-world to that world, we appeal to the actual world, and to the closest point to that world that is relevantly similar to it with respect to the *appearance of past times at that point*.

The problem is that although this strategy delivers true counterfactuals, it is riven with representational talk. In order to make sense of the idea that there are apparent laws we need to make sense of the idea that the actual point is one according to which there are records of what appear to be past times. Likewise, we need to make sense of the idea that other points can be more, or less, similar to the actual world with respect to those worlds’ apparent records of (merely apparent) past times. But the fact that a world seems to be one in which there were past times is explained in terms of the representational structure of the point. While it is well and good to deploy the so-called representational structure of the actual world to explain our phenomenology, it clearly will not do to appeal to such a structure to analyse counterfactuals if we wish to deploy those counterfactuals in an account of content. That would be viciously circular.

The problem is manifest in the statement of the account. It mentions apparent records, apparent laws, and quasi-rational projection. The problem is less up front in Baron and Miller’s proposal, but now we are in a position to see how it falls foul of the same worry. Most of the best-matching that occurs in their account is matching of similarity that does not appeal to any contentful features of the points. But in an attempt to narrow the very many possible paths that include the actual world, into a single path that is the actual quasi-world, they appeal to the appearances, in the actual world, as of there being past states of a certain kind. The actual quasi-world is taken to be that world whose past states are ones that are most similar to the apparent past states of point that is the actual world. Yet it is hard to see how to make sense of this similarity relation without an appeal to content, since it is hard to make sense of the idea of an apparent actual past time without an appeal to content. The similarity metric requires that some non-actual point in the actual quasi-world is similar to *what is represented to be,* in the actual world, a past time, t. It requires that some other point in the actual quasi-world is not similar to what is represented to be, in the actual world, some past time t\*. And so forth.

If we are to put these counterfactual analyses to work we need a way to specify the similarity metric that does not appeal to contentful features of worlds. One possibility is to appeal to structural isomorphisms. Suppose, for instance, that the actual world is structured like a Russian doll except that each doll is slightly different to the doll in which it sits, and slightly different from the doll that sits within. Thus the outside doll is very different from the innermost doll. Without any appeal to the idea of a doll, or more generally to content, we can point to similarities between the nested structures. We can, if you like, order the dolls just by the structural isomorphisms between them. In a similar fashion, we can string together worlds to create an ordering of worlds into a quasi-world merely by appealing to structural isomorphisms between worlds.

There are two problems with this way forward. First, if the only way we have of matching for similarity lies in an appeal to isomorphism then some worlds that, intuitively, seem to involve states with the same, or similar, content, will count as ones in which the states have very different content. For instance, worlds in which the neural substance used to represent the world is structured very differently to the way it is actually structured will be worlds in which the content of the representation must be different since different isomorphisms will be preserved between that world and the actual world. Thus an appeal to isomorphism seems, sometimes, to get the wrong result.

The second worry is that whether or not there are such structural isomorphisms is an empirical matter. It may turn out that there are not. Appealing to isomorphisms would commit us to the view that, in the case of mental representation of past-times, there is something in the head that is structurally isomorphic with the real way the world would have been at that past time, if it has been any such way. For instance, if, inside the head, there were a little picture of a past time, then that picture would share structural isomorphisms with some other three-dimensional world at which things are as they are represented to be, by that head. But heads might not work that way. Indeed, there is little reason to think that heads *do* work that way. In general, the sorts of apparent records that give rise to the belief that there were past times might not be structurally isomorphic to any point in configuration space. And, once more, there is reason to think they will often fail to be. There are no structural isomorphisms between the (non-representational) contents of, say, books or other paper records, or indeed, computer records, and the points in configuration space that we suppose those record to represent. Moreover, we can expect that records will often fail to share any structural isomorphisms with the things about which they are records, because efficient ways of storing information (as in brains, or computers, or books) are typically ways that do not preserve said isomorphisms.

Given this, we cannot appeal to structural isomorphisms to ground the similarity relations we need. But it is hard to see what else might do the trick. If that is right, then although there are ways to make sense of counterfactual conditionals in a three-dimensional timeless world—such as that suggested by Baron and Miller—those ways are ones that presuppose a notion of representational similarity. They cannot, therefore, be something we can appeal to in trying to explicate a notion of mental content in such a world.

**3.4 Linking by probabilities in timeless worlds**

Here is a final proposal. As noted earlier, Barbour (1994b) supposes there to exist a probability distribution over the points in configuration space. A natural thought is that the associated probability function could be used to construct a quasi- world of the kind the previous proposals aim to deliver. This would proceed by taking the actual world—a point—and calculating what "next" point is most probable and what "previous" point is most probable and iterating this procedure until we have constructed a quasi-world: the actual quasi-world. Said points will not be temporally, or spatially, or even strictly causally, connected, but they will be probabilistically connected.

This is, though, to mistake the nature of the probability function in question. These probabilities are not *transition* probabilities. They do not tell you, from a given point, what is the most likely "next" point, or the most likely "previous" point. Rather, all points exist and have some probability density. The 'probable' ones are the ones you are more likely to find yourself in. (An incorrect but helpful way to think of it is like this: imagine that all the points in the configuration space exist, but exist in multiple copies—the more the 'probability' of the point, the more copies there are. Which location in configuration space should you expect to find yourself in? Well, apply the principle of indifference across all the copies, and you should expect to find yourself in a point in configuration space that has more copies).

This plays a role for Barbour in explaining the appearance as of history and dynamics. He argues, on grounds that need not detain us here, that "time-capsule" points—ones with apparent memories etc.—have a higher probability, so we should expect to find ourselves in one. For what it's worth we think this proposal is at once unnecessary and unhelpful. It's unnecessary because even if such points are not probable, plausibly they are the only ones which support organised conscious experience. So we can argue on broadly anthropic grounds that we will find ourselves at such points, since they are the only points we *could* be in. More importantly, however, all this just *assumes* that these structures have a contentful nature. Regardless, the probability function, in virtue of its not being an account of transition probability, but rather of self-locating probability roughly speaking, can play no role in spelling out a similarity metric that can help us to define plausible substitutes for counterfactuals.

**4. A New Naturalistic Theory**

At this point it would be tempting to conclude that naturalistic theories of content are incompatible with timeless physical theories, and therefore that either content is non-naturalistic, or timeless theories are false, or we are not, in fact, representers at all.

But that is too swift. If one is tempted to reject out of hand the idea that we are not representers, on the grounds that patently we are, then one might be inclined to say that if ours is a timeless world, there *must be* some naturalistic account that explains how we represent. In this section we consider two options: a naturalistic theory which weakens some of the assumptions of existing naturalistic theories, and a second option we call the “there must be a theory theory” and we consider how each fares.

**4.1 Common Cause and Common Determination**

We have made much about how, given timeless physical theories, there are no causal relations between brain states and any of the states of affairs of which they might be thought to be representations. In addition, we have explored various substitutes for causation, and found them wanting. Given that we have ruled out causation and counterfactual dependence as naturalistic connections between minds and the world conditional on a timeless theory being true, are there any other options for spelling out some sort of naturalistic connection? There is only one option that we can see. Rather than looking for substitutes for causation, we might look for substitutes for common cause. We have focussed on causation because it’s the most direct naturalistic relation that can convey information, and thus be a plausible candidate for essential involvement in representation. Causation, after all, underlies much of the co-variation in the world. If there is some type of neural state that co-varies with the presence of cats, it’s because cats cause those states—or so goes the intuition gives rise to taking causation to be a necessary component of representation.

But direct causation is not the only explanation of correlation. Common cause can explain it as well. Indeed Reichenbach’s common cause principle (Reichenbach 1956) was invoked to explain how there can be explanations of correlation that do not involve direct causation, by hypothesising that there is a common cause of the correlated things that screens off their probabilistic connection. Such correlations retain an informational connection. One of the commonly caused events bears information about its cause, and so indirectly about other states caused by that cause. So one can imagine a new naturalistic theory of content according to which when A causes both B and C, B gets to represent C in virtue of the fact that it shares with C it’s cause—A. Is there any substitute for common cause within a timeless model? There is.

Although in timeless worlds there is (let us suppose) no causation or any plausible substitute, between points, there is some form of determination between the underlying quantum gravitational reality and the ensemble of such points. It is not at all clear just what the nature of that determination relation is. Perhaps it is mere supervenience, or some kind of timeless causation, or grounding, or the limiting case of a determination relation: identity. But it is a determination relation of some kind. And determination relations of a non-causal kind seem perfectly suited for representational work. At least, that seems to be so, on the assumption that the determination is something other than a trivial case of determination, namely identity. If the relation between the underlying quantum gravitational reality and the ensemble of points is just identity then a common cause proposal does not get off the ground. So let’s suppose that the determination relation in question is not identity.

Few naturalists in the philosophy of mind would hold that the relation between a mental state and underlying neural states is a causal one. It’s either supervenience, or identity with a part of those states, or grounding. Nonetheless, any given mental state is generally held to bear informational relations both to its underlying state and to states which are in causal relations to its underlying state, and—in addition—*to past states which are non-causally determined by those past states which are in causal relations to its underling state.*

For instance, suppose Annie has a belief about what Descartes’s phenomenal experience was like. Her belief is, perhaps, in a non-causal determination relation to her current physical state. That state, in turn, is caused indirectly, (of course this is all schematic) by various things including Descartes’s past physical states, which in turn are the non-causal basis of his mental states (their supervenience base, ground etc.). What is the relation between Annie’s mental state and Descartes’? Not causal, even if causation does play a role. Nonetheless there is a chain of determination relations at play. That chain has something of the structure of common cause: even abstracting from causation to generic determination relations, there is no chain of determination that goes from Descartes’ thought to Annie’s. Annie’s thought and Descartes’ thought seem to be in some sense commonly determined by the whole chain of physical causal relations between Descartes and Annie. No determination runs from Descartes’ thought to its supervenience base, so even though Annie’s thought is determined by much of this story, it’s not determined by Descartes’ thought. Yet surely she can represent Descartes’ thought.

Two separate but connected ideas are revealed by the example. First, there can be representation even though the determination relations between the represented (Descartes' thought) and the representing (Annie's thought) are not (or are not all) causal. Second, there can be representation even when the determination relations do not point in the same direction from represented to representing—a common determination structure will do.

Since according to timeless physical theories my current physical state and some state I think of as ‘past’ are both determined by underlying quantum gravitational reality, they can be thought of as being related by common determination. Common determination meets the minimal constraint of being naturalistic, and since we have argued that the common determination relation is information bearing, it might play a central role in a new naturalistic theory of content. Roughly, according to such a story my neural state in this point represents past states in virtue of those past states and my neural state being commonly determined by underlying quantum gravitational reality.

While there is, however, a common determination relation in timeless physics, we do not think that it can be marshalled in the service of providing a naturalistic theory of content. The problem is that there are too many points related by common determination. That is because every nomologically possible point in configuration space bears the common determination relation to every other point. That, in turn, is because all the points in that space are determined by a single underlying quantum reality. So Annie’s current neural state is determined by the same underlying ground as, say, the Michelson-Morley experiment. But according to timeless theories there are points that are part of configuration space in which (given the apparent records) the Michelson-Morley experiment seems to have a quite different outcome than it did. The problem is that there is not, even *prima facie*, any privileged set of states that bear *common* determination relations. So what makes Annie’s mental state a representation of *this* apparent outcome of the Michelson-Morley experiment, rather than *that* apparent outcome, or any other myriad outcomes that obtain at different points in configuration space? Each of these points bears the very same determination relations to Annie’s mental state. Yet we want to say that her mental state represents just one of these. So we would need to find some additional way to cut down the number of points in configuration space to which Annie’s mental states bear relations of determination were we to use determination relations such as these in an account of content. But this just seems to bring us back to the sorts of circularity worries that we considered in section 3. For it is clear that if we already had an account of what represents what, we would be able to determine which common determination relations that obtain between which sets of points, are the relevant ones. Once we know that Annie’s neural state represents the Michelson-Morley experiment with a particular outcome, it is relatively straightforward to then focus in on those common determination relations that obtain between Annie’s neural state and the things we take that state to represent. But that, clearly, will not do.

Is there anything within timeless physical theories themselves that might play that role? No. We have already considered some proposals for ‘cutting down’ the number of points to consider in evaluating counterfactuals. And we have already argued that there is no way to do so, without smuggling in representation. Certainly, there is nothing within the physics *itself* that allows us to group sets of points in such a way that the common determination relation between *just those points,* is one that supports representation. If there were, there would be something like real histories (even if not unique real histories) amongst the points, and there is not. There are just the points, and the probability measure over those points. But, again, we have already shown that this probability measure is not of the right kind to allow us to ‘cut down’ the points to paths (again, even if not unique) that would allow us to then appeal to determination relations between just those points. Given all this, while we think that appealing to common determination relations is the best way forward in developing a new naturalistic theory of representation for timeless worlds, we simply do not see how such an account could be made to work, given the resources of such theories.

**4.2 The “There Must be a Theory” Theory**

One might think that since current naturalistic theories have been developed under the assumption that there is time, it will be no surprise if, having discovered there is not, any successful naturalist theory of representation will look very different from our current theories. So, the thought is, we should be looking to new naturalistic theories that can accommodate timelessness in a way which makes them look very different from existing theories. In the previous section we considered a theory that makes significant departures from existing naturalism in order to accommodate timelessness. We noted there that we remain sceptical of its success. In this section we consider a more radical approach. Perhaps if we hold fixed that we are definitely representors, and we hold fixed that a timeless theory is right, then we should simply think that *whatever* the best account of representation, on the assumption, *that* is our naturalistic theory. If we were to take this route, however, naturalism about representation will be trivially true, whatever account of representation ends up being the right one. The analogy here would be with a view about physicalism in the philosophy of mind, according to which we simply say that *whatever* properties we discover to be responsible for, or associated with, our phenomenal experiences, are physical properties. Sure, we then vindicate physicalism, (or naturalism, in our case) but doing so is entirely consistent with vindicating something that looks just like non-naturalism.

The point, then, is that while it is entirely reasonable to search for new naturalistic theories of content within a timeless context, it is also reasonable to suppose that those theories must meet some sort of naturalistic constraint if they are to count as naturalistic in *any* interesting sense. It seems to us that a very minimal constraint on a theory’s being naturalistic, in this domain, is that it posit *some* material connection between the world, and the mental states that represent the world. This is an assumption shared by most existing theories, and the proposal we considered in the previous section. In the absence of any such connection it is hard to see why we should think of such a theory as in any way naturalistic. And that might be fine: but if all that we have said so far is right, there are no connections between minds and a timeless world, that can do the job. In that case we should call a spade a spade and be clear that we take timeless theories to be consistent with representation only given a non-naturalistic theory of content. Or so one might think. In the following section, however, we consider a version of naturalism that might allow us to loosen, or perhaps entirely jettison, the sorts of connections we have hitherto assumed would be required between mind and world.

**4.3 Other Kinds of Naturalism**

Methodologically, the sorts of naturalisms we have discussed so far agree that we should look for reductions, or perhaps grounds, for phenomena like mental content in more basic science. We are trying to solve the so-called ‘location problem’. We imagine a complete naturalistic story about the world in terms of fundamental science, which does not mention content, and so we suppose that if content exists it must be some aspect of that story (since that story is supposed to be a complete story about the world). So we seek to find what aspects of that story content depends on.

Huw Price, in various places but explicitly in his (2008) suggests we consider a different kind of naturalism—what he calls ‘subject naturalism’—in contrast to the rough picture we have painted of most kinds of naturalism, which he calls ‘object naturalism’. The idea is to deny a doctrine he calls (upper case) Representationalism, according to which the terms in our discourses represent discrete aspects of the word in ways that call out for analysis or reduction.

“Without a representationalist conception of the talk, however, the puzzle takes a very different form. It remains in the linguistic realm, a puzzle about a plurality of ways of talking, of forms of human linguistic behaviour. The challenge is now simply to explain in naturalistic terms how creatures like us come to talk in these various ways” (Price 2008 p 18)

One way to read this is that we should just seek to explain our use of terms. Why do we use terms like ‘truth’ or ‘representation’ or ‘content’? How did these linguistic phenomena come about, and what functions do they serve for us? Having done that we have done, on this account, all that there is to be done. There is not further job to be done in matching up a notion like content with features in the naturalistic explanation of why we talk that way. That would be to blur two discourses: the discourse of content, and the scientific discourse in terms of which we explain our use of terms like that.

One lesson you might take from this is that subject naturalism, because it isn’t looking for grounds or reductions of content, has no problem with any possible discoveries in fundamental physics. Since we aren’t in the business of trying to find these, it doesn’t matter what the right story is, about how we come to use a term like ‘content’. There’s no naturalistic project to be undermined, and our conviction that our thoughts have content should survive any discovery about the way the world is.

One easy response to this is to accept it, and say that it just shows another surprising thing: that potential discoveries in physics favour a somewhat controversial doctrine—subject naturalism—over other kinds of naturalism. If that were all we had to say perhaps we would rest content. But in fact we think things would not be as rosy for the subject naturalist, or at least for many who are fellow travellers of that doctrine, if a strongly timeless theory were true.

Suppose that we accept the idea that we should not look for representational correspondence between notions like ‘mental content’ and specific features of the scientific image of the world. Does that mean that the two ways of talking—the way of talking about content, and the way of talking in which we naturalistically explain why we talk the first way—have no bearing at all on each other? To accept that is to accept a strong version of a doctrine held by various temporal stages of Carnap: that there are sharp borders between discourses. But what are these sharp borders, and how are we supposed to determine them? The only principle of determination that makes sense to us is to see if said discourses affect each other. To see whether as a matter of fact a change in how we talk in one discourse affects another. Let’s take a classic example: talk about witches. You might think that it requires an object naturalist story to say that there are no witches. We look in the naturalistic picture of the world for women who sleep with the devil and are given magic powers, we find none, so we conclude that there are no witches. The term “witch” has failed the representational test. But there’s a more nuanced story to be told which does not require that we locate exactly where witches are supposed to be found in the world. We behave as subject naturalists; we explain how it is that we have come to have witch discourse, we discuss the politics of the medieval church, the history of misogyny and so on until we are sure that we have a good naturalistic picture of how we came to talk that way. But then somehow we are dissatisfied. The explanation of how we came to talk that way is very unlike the one expected by those who believe in witches, and unsatisfactory in ways which undermine, for them, the importance of their witch discourse. There may be no, specific, local feature of the story about how the discourse came into being which is crucial, but the overall effect is to problematize the claim that witches exist. Perhaps the absence of devil shagging broomstick riders is part of this; perhaps not. Might not the same be true of content? As good subject naturalists we seek to explain how we come to use the term. If we accept a timeless theory of fundamental physics our past uses are *not* part of that explanation. Any causal relation between our thoughts about yesterday, and any part of being that is like that part of being, is also no part of that story. Correlations between our thoughts, and ways the world is, are no part of that story. We may not be looking for specific reductions and failing, but accepting that naturalistic story about why we have the notion of, in this case, content, makes the notion unsatisfying, and makes us tempted to reject it. And then we wonder what’s going on when we think we have a thought whose content is that a timeless physical theory is true. If something like this is right, then even the move to subject naturalism will not resolve the central tension this paper articulates, between mental content and timeless theories.

**5. Where Next?**

So far we have shown that given current naturalistic theories of content, and given what we take to be the only promising alternative to current such theories, there is no non-circular and otherwise acceptable way to spell out a naturalistic account of representation in a timeless world. If that is right, we should conclude that defenders of a timeless theory must embrace a non-naturalistic theory if they wish to say that we do, in fact, represent. Such non-naturalistic theories are strongly and weakly non-naturalistic; strongly non-naturalistic because they do not take representational states to be a natural kind; weakly non-naturalistic because they do not suppose that representational states are some, perhaps highly gerrymandered, set of natural states. On such views mental states do not come to have the content they do because of some naturalistic connection they bear to the things they represent. Representational Platonism is such a view[[15]](#footnote-16) On such a view, mental states are held to have the content they do in virtue of bearing some relation to the Platonic forms; these forms are, as it were, the content, and mental states get their content by sharing in the forms. Thus one’s mental states could have the very same content they do, even if the world were very different from what it is. Another version of non-naturalism is a kind of primitivism about content. On such a view it is simply a brute matter that our mental representations have the content they do. Since non-naturalistic theories require no connection (causal or otherwise) between states of the world, and our mental states, it is clear that they are viable accounts of representation in a point-world (insofar as they are viable accounts at all).

It is not our aim, here, to argue against such accounts. It is, however, worth noting that even if one is prepared to accept a non-naturalistic theory of mental content, there is, in this case, a risk of what we might call creeping non-naturalism.

Suppose one endorses representational non-naturalism because one thinks that given timeless physics, there simply are no naturalistic connections of the right sort, between our mental states and states of the world. Then one will also be unable to offer a naturalistic account of the way in which intentional states are differentiated. For naturalistic accounts will differentiate kinds of intentional states at least in part by the different causal relations (both between mental sates, and between mental states and the world) into which those states enter. If no appeal to the way in which intentional states interact in our cognitive economy is possible, then a naturalistic account of intentional states is impossible. Instead, one is pushed to think that there are non-naturalistic properties, or psychological primitives, in virtue of which we distinguish kinds of intentional states.

We can, moreover, expect the creep to creep further: to rationality. After all, naturalistic theories of rationality can be expected to appeal to the ways in which a belief is hooked up to the evidence for that belief. But, again, these are precisely the connections the non-naturalist about representation has conceded to not exist.

Thus, it is worth bearing in mind that although non-naturalistic theories of content effectively side-step the problems faced by naturalistic theories in the face of a three-dimensional world, it is very likely that said non-naturalism will creep beyond just content, to belief individuation and accounts of rationality and beyond. So if accepting timeless theories commits one to such a view, it is a radical view indeed to which one is committed. This is worth bearing in mind, since if, as we have argued, naturalistic theories of content cannot be supplied, we are left with only three options: accept non-naturalism about content, reject timeless physical theories, or reject the existence of representational states (and with them, intentional states and rational states).

Thus either the timeless theorist ought to accept a non-naturalistic theory of representation, or she ought think she has reason, from the nature of representation itself, to reject timeless theories, or she ought concede that there are not *really* representations at all. According to this last option she will hold that there are mere seemings. There is phenomenal content, but no representational content. Whichever route she chooses, however, it is important to see that all three options are radical. Either there is representation that is non-natural, or timeless theories are false, or we are not, in fact, representors (and hence not believers, or rational believers) at all.

**6. Conclusion**

Healey’s (2002) work is an attempt to make sense of the idea that we could rationally believe that a timeless theory is true. His emphasis is on the rationality component, not the belief component. For the worry Healey addresses is that were a timeless physical theory true, we could not have access to evidence for its truth. But, we think, the worries begin far before we ever get to try and make sense of rational belief. If a timeless theory is true, and if all that can be recovered at higher levels is roughly what Barbour supposes can be recovered, then it is nontrivial to show that there can be any mental content at all given a naturalistic theory of content. Little progress can be made in explicating how rational belief is possible without first having an account of how mental content is possible. Ironically, there is an ill fit between the kind of naturalism[[16]](#footnote-17) that motivates at least some individuals to accept a timeless physics, and naturalist theories of mental content. Given even a fairly minimal sense of what a naturalistic theory of content would need to look like, we can see little reason to be confident that any such theory is consistent with timeless physics. So either we have, here, reason from physics to think that a non-naturalistic theory of content is true, or, alternatively, a reason from philosophy to think that our world is not timeless, or a reason from both, combined, to think that we are not representers at all! We leave it to the reader to consider which of these options is most palatable.

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1. Thaks to X, Y, and all the participants at Z and Z\* for helpful criticisms and encouragement. [↑](#footnote-ref-2)
2. For more on various kinds of temporal error theory see Baron and Miller (2015) and Tallant (2008). [↑](#footnote-ref-3)
3. For a related discussion of self-falsifying propositions see Bardon (2005). [↑](#footnote-ref-4)
4. It suffices to either think of theories as models (which represent, or fail to represent, the way the world is) or as sets of propositions (which jointly represent, or fail to represent, the way the world is). Then the wordily state represented by an entertaining of, say, a timeless theory, is the worldly state that the theory qua model, models, or the worldly state that the set of propositions represent. Believing the theory to be true, then, is believing that the model holds of the world, or believing that the set of propositions are jointly true. [↑](#footnote-ref-5)
5. In particular, we do *not* mean by ‘representation’ the relatively specific doctrine called the ‘Representational Theory of the Mind’ by Fodor and others, which requires belief in very local and syntactically individuable representational states, and is more or less equivalent to the Language of Thought hypothesis. [↑](#footnote-ref-6)
6. Points, here, are points in configuration space; they are not point-sized objects: each is a three-dimensional object. [↑](#footnote-ref-7)
7. There is no reason to suppose that this phrase denotes the essentially modal notion that the phrase has in the lexicon of most philosophers. [↑](#footnote-ref-8)
8. Though we do not require that perdurantism is true: arguably one can make sense of there existing a lonely intrinsic duplicate of an enduring object at-a-time. [↑](#footnote-ref-9)
9. See Harman (1982); for a more skeptical take see Lepore (1994) [↑](#footnote-ref-10)
10. See for instance Dowe (1992). [↑](#footnote-ref-11)
11. Such as, for instance Lewis (1973). [↑](#footnote-ref-12)
12. [↑](#footnote-ref-13)
13. It is of the first importance to avoid big, widespread, diverse violations of law.

    It is of the second importance to maximize the spatiotemporal region throughout which perfect match of particular fact prevails.

    It is of the third importance to avoid even small, localized, simple violations of law.

    It is of little or no importance to secure approximate similarity of particular fact, even in matters that concern us greatly (Lewis 1979, p. 472). [↑](#footnote-ref-14)
14. This may not pick out a single unique path. Baron and Miller suggest that this will make little difference to the evaluation of counterfactuals [↑](#footnote-ref-15)
15. For a useful survey of such views see Cummins (1989) [↑](#footnote-ref-16)
16. Exactly what naturalism is, and how to characterize it, is a vexed issue. If naturalism is nothing more than following science where it takes us, then perhaps almost all defenders of timeless theories are motivated by naturalism. Equally, there are other characterizations of naturalism that build more into a conception of naturalism, and which might be such that at least some defenders of timeless theories are not motivated by naturalism thus understood. [↑](#footnote-ref-17)