

The Evolutionary Origins of Tensed Language and Belief¹

Heather Dyke

University of Otago

This is a preprint of an article whose final and definitive form is published in *Biology and Philosophy* [Vol. 26 (2011): 401-418]; *Biology and Philosophy* is available online at: <http://www.springerlink.com/content/0169-3867>.

Abstract

I outline the debate in metaphysics between those who believe time is tensed and those who believe it is tenseless. I describe the terms in which this debate has been carried out, and the significance to it of ordinary tensed language and widespread common sense beliefs that time is tensed. I then outline a case for thinking that our intuitive beliefs about tense constitute an Adaptive Imaginary Representation (Wilson 1990, 1995). I also outline a case for thinking that our ordinary tensed beliefs and tensed language owe their tensed nature to its being adaptive to adopt a temporally self-locating perspective on reality. If these conclusions are right, then common sense intuitions and temporal language will be utterly misleading guides to the nature of temporal reality.

1 The A-theory/B-theory debate in the philosophy of time

In this paper I apply evolutionary theory to a methodological issue in the metaphysics of time: whether the tensed nature of ordinary language and belief has any significance for the

¹ I am grateful to audiences at the Future of the Philosophy of Time conference, held at Winston-Salem in April 2010, and the Australasian Association of Philosophy conference at the University of New South Wales in July 2010, for helpful comments. I'm also grateful to James Maclaurin and two anonymous referees for this journal for suggesting many improvements.

metaphysical nature of time. The central issue in the philosophy of time over the last century has been the question of whether time is tensed or tenseless. To think that time is tensed is to think that there is an absolute, ontological distinction between past, present and future, and that time is, in some sense, dynamic. The sense in which time is thought to be dynamic by proponents of this view is the sense in which we ordinarily think that time flows, or in which we refer to the passage of time; events that are now present will become past, and events that were future are now present. Proponents of this view cash out its details in various ways, leading to quite an array of tensed, or A-theories, so-called because of McTaggart's terminology in his influential argument against the reality of time (McTaggart 1927, ch. 33). This variety of A-theories need not concern us here as my focus is simply commitment to, or denial of, the central thesis that time is tensed.

To think that time is tenseless is to reject both components of the thesis that time is tensed. That is, it is to think that there is no ontological distinction between past, present and future, and that time is not dynamic. According to this tenseless, or B-theory, all times are ontologically on a par, and the distinction that we draw between past, present and future, is not a distinction that exists independently of observers. Events are only past, present or future relative to some temporal perspective. From my perspective in 2011, the events of the twentieth century are past, but those of the twenty-second century are future. If there is no observer-independent distinction between past, present and future, then there can be no passage of time from future to present to past, so a corollary of denying the reality of tense is that time is static, and not dynamic as we ordinarily think. The temporal relations in which all events stand to each other (i.e. *simultaneity*, *being earlier than*, and *being later than*) are permanent and unchanging relations, unlike the tensed determinations of pastness, presentness and futurity. Furthermore, according to the B-theory, these temporal relations are

constitutive of time. Time is constituted by the network of temporal relations linking events and times to each other, independently of any temporal perspective on this network, and without any moment in this network being ontologically privileged.

There are a number of different strands to the debate between the A- and B-theories, but I want to focus on two in particular: the appeal to common sense intuitions, and the appeal to temporal language.

1.1 The appeal to common sense intuitions

A-theorists often appeal to the fact that common sense intuitions and the phenomenology of our ordinary, everyday experience tell us that events in time really do divide up into past, present and future, and that time flows (see, for example, Gale 1968, 3; Schlesinger 1980, 30; Craig 2000, 132; Markosian 2004, 48). Given that we have these powerful intuitive beliefs about time, we ought to treat them as veridical unless there are strong defeating considerations.

B-theorists respond to this line of argument by claiming that there are indeed strong defeating considerations that defeat our intuitive beliefs that time is tensed, so we should not treat them as veridical. One such defeating consideration involves an appeal to an argument that originated with McTaggart, known as McTaggart's paradox, that purports to show that any attempt to characterise time as intrinsically tensed will ultimately result in contradiction, so cannot be an accurate account of what time is like.²

² This is not the place for an examination of McTaggart's paradox. For discussion I refer the reader to some of the following citations. There is some disagreement, even among B-theorists, as to whether this argument ultimately succeeds. B-theorists who think it does include Le Poidevin (1991), Mellor (1981), Oaklander (1984) and Dyke (2002a). B-theorists who are skeptical about the success of McTaggart's paradox include Sider (2001) and Savitt (2000).

Another consideration that B-theorists take to defeat our common sense intuitions that time is tensed is that the A-theory is harder to reconcile with current scientific thinking about time than the B-theory. According to the standard interpretation of the special theory of relativity (SR), simultaneity does not obtain absolutely, but only relative to a frame of reference, and no frame of reference is privileged. Thus, there is no frame-independent way of determining which events are simultaneous with some event designated as present. But the A-theory requires there to be an absolute (and hence frame-independent) distinction between those events that are past, those that are present, and those that are future. Since the B-theory denies that there is an objective distinction between past, present and future, recognising only the temporal relations of simultaneity, precedence and succession, it naturally coheres with SR.

Some A-theorists attempt to reconcile their theory with SR by offering an alternative interpretation of the scientific data, often reviving Lorentz's ether theory according to which there is a privileged reference frame, but it is undetectable (see, for example, Tooley 1997 and Bourne 2006). Others claim that any conflict between SR and the A-theory is the result of hidden metaphysical assumptions in SR (e.g. Markosian 2004), but this has not been a common strategy among A-theorists. Few, however, deny that there is at least a *prima facie* conflict between SR and the A-theory.³

Thus, in the dialectic between the A-theory and the B-theory, it is widely accepted that common sense and the nature of our everyday temporal experience side with the A-theory, while science sides with the B-theory. As described above, A-theorists have often sought to reconcile their view with apparently conflicting scientific evidence. B-theorists have equally attempted to reconcile their view with apparently conflicting common sense intuitions and

³ Although there are some exceptions. See, for example, Fiocco (2007).

phenomenology. Some argue that we recognise a distinction between past, present and future, and we privilege the present moment because our temporal span of direct awareness, our 'specious present', is very brief (Dainton 2001). Others argue that our experience of the passage of time is explained in terms of the way our memories accumulate (Mellor 1998), or that it is an illusion generated by the way our brains process sequences of static inputs (Paul, forthcoming).

Reconciliations such as those offered by Dainton, Mellor and Paul all attempt to explain what gives rise to the distinctive nature of our temporal experience. They accept that our experience is as the A-theorist says it is, but think that the experience is illusory, and offer an explanation for why it misleads us in the way it does. My focus is not our temporal experience, but the widespread common sense beliefs that time is tensed. It may be that we have these beliefs, at least in part, because of the nature of our temporal experience, so it is important for the B-theorist who denies that time is tensed to provide an alternative explanation for this experience. However, I want to explore the possibility that there is another explanation, not necessarily in competition with these explanations of the nature of our temporal experience, for these widespread common sense beliefs: an evolutionary explanation. First, I want to raise some questions about the weight we should assign to common sense intuitions in philosophical theorising about issues such as the fundamental nature of time.

The aim of the metaphysics of time is to discover general and fundamental truths about time. While common sense intuitions may have been a reasonable source of data for such investigations in antiquity, they can hardly be thought to be adequate today. In antiquity it was reasonable to think that the earth was at the centre of the universe; that the sun moved relative to the earth; that the earth was flat, and so on. Scientific investigation has since proved these

beliefs false. Current well-established scientific theories about time include many claims that conflict with common sense beliefs about time. They include the claim that there is no absolute simultaneity, for example, and as we have seen, this conflicts with the common sense view that there is an absolute distinction between past, present and future.

Furthermore, our intuitions are based on our limited perspective on the universe. As Ladyman and Ross (2007, 11) make clear, we are most familiar with spatial scales ranging from around a millimetre to a few thousand miles, and temporal scales ranging from a tenth of a second to years. They cite Wolpert (1992) describing how, time and again, modern science has shown us that extrapolating from our limited perspective to unfamiliar spatial and temporal magnitudes leads us badly astray.

Many of our intuitions are shaped by our natural history. Evolution has endowed us with a generic model or theory of the physical world (Ladyman and Ross 2007, 11). This has been established by experiments with very young children who display surprise when objects fail to behave in standard ways (Spelke et al, 1995). Our generic model includes the expectation that objects persist through time and that they do not undergo fission or fusion. Given the evolved nature of this model, we ought to be wary of drawing metaphysical conclusions about the deep structure of reality from it. The fact that the model has evolved casts doubt on the inference from ‘Our intuitions tell us that time is tensed’ to the conclusion that time really is tensed.⁴

1.2 The appeal to temporal language

Participants in the A-theory/B-theory debate were quick to point out that by ‘tense’ they did not mean the familiar linguistic or grammatical phenomenon (see, for example, Mellor 1981,

⁴ I develop this argument in more depth in Dyke (forthcoming)

3), but the metaphysical notion of an objective distinction between past, present and future. According to the A-theorists, the ontological distinction between past, present and future maps onto the linguistic simple tenses, where events are located relative to the moment of speech. The past tense represents an event as being earlier than the moment of speech; the present tense as contemporaneous with it, or overlapping it, and the future tense represents it as being later than the moment of speech. Tense is thus a context-dependent feature of language (Comrie 1985, 14).⁵ It relates entities to a reference point external to the content of the sentence, and for tense that reference point is usually the moment of speech. The A-theorists take the moment of speech, the present moment, to be ontologically privileged, so the simple tenses mark a genuine ontological distinction in temporal reality. They thus argue that the simple tenses, that exist in many languages, represent a genuine, observer-independent feature of temporal reality (see, for example, Gale 1968, 56; Smith 1993, 3 and *passim*; Ludlow 1999, 137; Craig 2000, 22).

Thus, the strategy of the A-theorists was to point out that many ordinary languages are temporally tensed, and to wheel in the methodological principle that we should take ordinary language to be veridical in this regard unless we have good reason to think it misleads us. So, from the fact that ordinary language, or at least, ordinary English, is tensed, which suggests that it represents a tensed reality, together with the principle that we should take it to be veridical barring strong defeating considerations (of which there are none, according to A-theorists), we can conclude that reality is indeed tensed.

Two objections from linguistic considerations to the A-theorist's methodological approach suggest themselves at this point.⁶ First, tense in English and in many other natural

⁵ Linguists use the term 'deictic' to describe context-dependent expressions.

⁶ I am grateful to two anonymous referees for this journal for drawing these objections to my attention.

languages is a much more complex phenomenon than is suggested by a consideration of just the simple tenses. The A-theorists must explain why their limited attention on just the simple tenses is not merely arbitrary. Second, grammatical tense is not a universal feature of all natural languages, as there are some tenseless natural languages, for example, Burmese (Comrie 1985, 51). Hence, it seems that the A-theorists must explain why they take natural languages that do contain tense to be veridical, but not those that do not.

The A-theorist must acknowledge that many natural languages have vastly complex systems of tenses, and that there are many ways in which a language can convey the A-series location of events. English, for example, has six basic tense structures: present, past, future, present perfect, past perfect, and future perfect (Hornstein 1990, 15).⁷ The perfect tenses introduce a further reference point, in addition to the moment of speech, to represent the temporal locations of events. For example, the past perfect sentence “By lunchtime, Jane had caught the bus,” locates the event of Jane’s catching the bus before lunchtime, which acts as a temporal reference point, which is itself located before the moment of speech.

Furthermore, English has many other lexical means of identifying the temporal location of events. Lexically composite expressions, such as *three days into the holiday*, *three years hence*, *15 minutes ago*, and *10⁻³⁰ seconds after the atoms collided* are potentially infinite in number, as they are formed by filling the positions of a syntactic expression with more or less accurate time specifications (Comrie 1985, 8). Some of these identify the A-series location of an event, i.e., how far it is from the present moment (e.g., *three years hence*, *15 minutes ago*). Others identify its B-series location, i.e., its temporal relation to some other event (e.g., *three days into the holiday*, *10⁻³⁰ seconds after the atoms collided*). Then there are the lexical items

⁷ However, not all linguists treat the perfect as a tense, treating it instead as an aspect (Comrie 1976, 6).

in a language that express location in time. In English these include temporal adverbs such *now*, *today*, and *yesterday*, which identify the A-series location of an event.

However, neither the existence of complex tenses, nor the potentially infinite number of expressions in a language for identifying the temporal location of an event, pose a problem for the A-theory. The metaphysical claim of the A-theory is simply that there is an ontological distinction between past, present and future. The simple tenses map directly onto this distinction. The perfect tenses do not need to be thought of as introducing further ontological distinctions; indeed it would be implausible to think they did. Since they merely introduce a further temporal reference point, their role is to locate an event in relation to both the moment of speech and a further temporal location. Thus, the perfect tenses can be thought of as providing a more precise specification of the temporal location of an event within a network of events, while also ultimately locating it in either the past, present or future. No matter how complex a tense construction, the event reported will ultimately be identified as being somewhere in either the past, present or future. The complexity of the tense construction indicates a complex route to specifying precisely its A-series location, rather than a more complex ontological distinction.

Of course, events can be past or future to different degrees, and both systems of tenses and lexically composite expressions provide us with means for specifying this with different degrees of precision. But this is merely to assign a more precise A-series location, rather than to introduce further ontological distinctions of tense. Hence, the complexity of any language's means of referring to the A-series locations of events is consistent with the A-theory's claim that there is an ontological distinction between past, present and future.

The second linguistic objection to the A-theory's position is that the existence of tenseless natural languages undermines its entitlement to argue from the existence of tense in

natural language to the metaphysical reality of tense. However, while it may be the case that some languages lack grammatical tense, this does not establish that these languages lack any means of identifying the temporal locations of events. As Comrie (1985) notes, Burmese “is a language where time reference per se is not grammaticalised, i.e. there is no tense.” (p. 51) But he quickly goes on to point out that “It is, of course, possible for time reference to be expressed in other ways” (p. 51). Elsewhere Comrie remarks that “It does, however, seem to be the case that all human languages have ways of locating in time” (p. 7). And this is all that the A-theory needs: some means of distinguishing events in the past, present and future. Indeed, some B-theorists have argued that any language must have some means of distinguishing past, present and future, otherwise timely action would be impossible (Mellor 1981, 1998). This, not grammatical tense, is the feature that the A-theorist must claim is universal: a way of identifying the temporal location of events by reference to one’s own temporal location. Furthermore, this is not a peculiarly linguistic feature, as there are a potentially infinite number of ways in which this distinction might be marked in a language. Hence, it is not dependent on the Chomskyan view that there are universals in language, a view that is currently challenged (Evans and Levinson, 2009). Consequently, neither the complexity of linguistic tense in some languages, nor the fact that some languages lack grammatical tense, undermines the A-theorist’s claim that tense in language represents a tensed reality.

A-theorists further argued that linguistic tense was essential to language, and attempts to eliminate it would result in some attendant loss of meaning, or expressive power. This, they claimed, further supported their conclusion that temporal reality itself was irreducibly tensed. They argued that tensed sentences convey more information than tenseless sentences, so there

must exist some feature of reality that corresponds to this additional information conveyed.⁸

A purely tenseless description of reality would fail to describe some aspect of reality, and so would be an inadequate metaphysical description of reality.

As with the appeal to common sense intuitions, B-theorists effectively endorsed the A-theorists' methodology, as their response was that there *are* strong defeating considerations not to treat ordinary language as veridical. They argued that ordinary language is not *irreducibly* tensed (see, for example, Russell 1915; Goodman 1951, 287-301; Quine 1960, §36; Smart 1963, 132-42). If tense could be eliminated from language, this would show that it is not essential for an adequate description of the nature of reality. They then attempted to show how tense could be excised from language by showing how tensed sentences could be translated without loss of meaning by tenseless sentences. Early B-theorists, such as Russell, Quine and Smart all argued either that tensed sentences could be replaced by tenseless sentences without any loss of meaning, or that tensed sentences were unnecessary when our aim is to describe the fundamental nature of reality.

As is now widely accepted in the philosophy of time, the attempt to eliminate tense by translation failed.⁹ But the B-theorists offered an alternative strategy that rested on the same principles. They argued that while tensed language may not be eliminable in favour of

⁸ As should be clear from the preceding discussion, 'tensed sentence' here is not restricted to grammatically tensed sentences, but refers to any sentence that, by whatever means, locates some event in either the past, present or future. Conversely, 'tenseless sentence' refers to any sentence that carries no implications for the A-series location of any event. Examples of tenseless sentences include " $2 + 2 = 4$ ", and "E1 *occurs* (tenseless, not present tense) before E2".

⁹ The existence of tenseless natural languages does not support the early B-theorists' claim that language could be detensed, as those languages have other means of locating events in the past, present and future so they are not tenseless in the requisite sense. Neither, for the same reason, does the existence of such languages undermine the widely accepted view that tense cannot be eliminated from language without loss of meaning.

tenseless language, reality itself need not be tensed in order to account for the irreducibly tensed nature of language. Mellor (1981), Smart (1980), Oaklander (1984) and Le Poidevin (1991), for example, all argued that the truth conditions of tensed sentences could be stated in entirely tenseless terms. What this showed was that in order to account for the truth of a true tensed sentence, there needn't exist a tensed fact that makes it true. Rather, tenseless facts are all the facts that are needed to make true tensed sentences true. So, while language may be irreducibly tensed, reality need not be tensed in order to accommodate that fact.

The linguistic strategy proceeds on the assumption that we are to expect an isomorphism between ordinary language and the fundamental structure of reality. The A-theorists assume there is a direct isomorphism, arguing that the tensed nature of language maps on to the tensed nature of reality. The old B-theorists seemed to endorse this assumption since they thought that the way to avoid the A-theorist's conclusion was to argue that the fact that ordinary language is tensed is not an essential feature of language, and so is not a feature that is isomorphically matched by reality. Having suitably de-tensed language, their argument then proceeded on essentially the same assumption, viz., that there is an isomorphism between a tenseless language and the tenseless nature of reality.

Why should we expect there to be an isomorphism between the nuances and subtleties of ordinary language and the fundamental nature of reality? Ordinary language, like common sense, is shaped by our perceptions and interactions with the world. But we know that many common sense beliefs about the world are, strictly speaking, false. The structure of ordinary language suggests that effects cannot precede their causes, that there is a property answering to every predicate, and that there exist multiply located universals, such as redness and roundness. But that they are suggested by the structure of ordinary language is not sufficient to establish that they are true. Far from telling us about the fundamental structure of reality,

the nature and structure of ordinary language can at best tell us how we conceptualise reality. And just as with common sense beliefs, the way we conceptualise reality is defeasible, and is not a reliable guide to the fundamental nature of reality.¹⁰

2 Evolutionary explanations

There are further reasons why we should not expect language and common sense intuition to be reliable guides to the nature of reality, which have to do with our evolutionary history. It is reasonable to think that the capacity for language has evolved as a fitness-enhancing device; it is an adaptation. In their influential article, Evans and Levinson (2009) argue that language is the product of coevolution; “the twin-track descent mechanisms of culture and biology, and the feedback loops between them” (p. 446). They ask how we are to reconcile the fact that human cognition and physiology are late-evolved and shared across all members of the species, with the diverse linguistic systems that these features have produced. Their answer is that language is the product of “evolved biological underpinnings for culturally variable practices, where the biology constrains and canalizes, but does not dictate linguistic structures” (p. 446). But its being the product of evolution, and hence an adaptation, does not necessarily align with its being an accurate representation of reality.

There is an alternative to the view that language has evolved as a response to adaptive pressures. The Chomskyan view maintains that human cognition incorporates a Language Acquisition Device, and that there is a Universal Grammar. Hence, rather than being the product of selection pressures, the language faculty is a product of sufficiently complex brains paired with the fact that all languages share, at a high level of abstraction, certain universal features. However, even if this competing view of the origins and nature of

¹⁰ I develop this position in much greater detail in Dyke 2008.

language is correct, it does not affect my argument that we should not expect language to be a reliable guide to the fundamental nature of reality. Just as with many of our common sense intuitions, I will argue that sometimes evolution favours false beliefs.

2.1 Evolutionary cost-cutting

Acquiring true beliefs is evidently crucial to our evolutionary success, but it is a costly process, in evolutionary terms. It takes a great deal of energy to acquire true beliefs, and that energy could be more usefully expended elsewhere; in respiring, foraging or procreating. So acquiring true beliefs is an evolutionary strategy in competition with other evolutionary strategies for our energy resources. As a consequence, we track truth less efficiently than we could because truth-tracking competes with other selection pressures. Our capacity to form true beliefs, like our visual acuity, could be better than it is, but the payoff would not be worth the evolutionary cost. Evolution is a satisficer, not an optimiser; it produces traits and phenotypes that are good enough for the organism in its particular situation, rather than ones that are optimal for their purpose. Our eyesight is good enough for our purposes; not the best it could be. Evolutionary cost-cutting ensures that we have enough true beliefs, but it will inevitably let in some false beliefs.

There is no doubt that cognition is metabolically costly. Developing powerful brains has been a costly process to humans, but the payoff in terms of the ability to acquire true beliefs about our environment has been high. The high cost of acquiring such highly developed cognition is balanced by the obvious benefit of obtaining a large number of true beliefs. There is, therefore, good reason to think that truth-tracking is more costly than arriving at false beliefs. The same is true of the sensory modalities (sight, touch, taste, etc). It is costly for a species to develop and maintain a sensory modality, such as sight. This can be seen in animals

that evolve to become troglodytic. They very quickly (in evolutionary terms) lose their eyes, as eyes are costly to maintain, being easily damaged and open to infection. When eyes are no longer needed for acquiring accurate information about an organism's environment, they are lost, and the organism evolves alternative means of navigation. Hence, acquiring true beliefs is costly, in evolutionary terms.

A prey species, such as an antelope, will be, on average, more successful in avoiding being eaten by a lion if it knows the precise location of every lion. But there are costs associated with such a high level of knowledge. The evolutionary cost-cutting strategy would be to be able to detect just the nearby lions. Since this is imperfect knowledge, the antelope will not always get it right, and will sometimes succumb to an undetected lion. But as a cost-cutting strategy, allowing the antelope to acquire as many true beliefs and as few false beliefs as possible, it will have a relatively high success rate, and so is a strategy worth pursuing (Maclaurin and Dyke 2002).

But sometimes it is adaptive to have a tendency that more readily leads to acquiring false beliefs. Prey species are much more easily spooked than predator species, and for good reason. As Dawkins (2006, 250) remarks, adapting one of Aesop's fables, the fox is only running for its dinner; the rabbit is running for its life. Dawkins dubs this the 'life-dinner principle'. As far as prey species are concerned, it is to their advantage to err on the side of caution and run for their life when they suspect a predator is nearby, even if they are frequently mistaken about the presence of predators. At the risk of anthropomorphising, we might say that it is adaptive for prey species to readily come to acquire false beliefs.

Thus, on the one hand, developing the means for acquiring true beliefs is costly in evolutionary terms, so evolutionary cost-cutting will ensure that our belief-forming capacities inevitably result in our acquiring some false beliefs. On the other hand, it is sometimes

adaptive for a species to readily acquire false beliefs. Evolutionary pressures, then, can favour the formation of false beliefs.

One of the strategies that has enabled *homo sapiens* to thrive is, arguably, that of having different attitudes to the past, present and future. In our 2002 article, James Maclaurin and I argue that our different emotional attitudes towards events in the past, present and future are adaptations, and that our different emotional attitudes towards temporally proximate and temporally distant events are a form of evolutionary cost-cutting. If those conclusions are right then forming such responses might naturally bring with it beliefs about the ontological status of the past, present and future. For instance, if it is adaptive to care more about proximate future pain than it is about distant future pain, that may well encourage the belief that the future is unreal, or at least less real than the present. When we discount future pain because it is adaptive to do so, we discount the future along with it. Similarly, if it's adaptive to care less about past pain than future pain, that might well encourage the thought that the past no longer exists. Finally, it is clearly adaptive to believe that the present is the time for action, that there's no point in trying to affect the past, and that the future is open and can be shaped by our actions. Evolutionary cost-cutting then, may provide an explanation for our common sense intuitions that time is tensed.

Furthermore, language is based on, and emerges out of underlying mental representations. If our underlying mental representation of the nature of time is a tensed one, we should expect language to be similarly tensed. However, if it is adaptive for us to have a tensed mental representation of the nature of time, and also a tensed language, we should not expect to discover fundamental truths about the nature of time, as it is, independently of us, by examining that mental representation and language.

2.2 Adaptive Imaginary Representations

David Sloan Wilson (1990, 1995) has argued that there are many situations in which it can be adaptive to believe a distorted representation of reality. Even massively fictitious beliefs can be adaptive if they motivate behaviours that are adaptive in the real world (Wilson 2002, 41). To believe one's enemies to be despicable monsters is to believe a distorted representation of reality. A more accurate representation of reality would be that one's enemies are much like oneself. But the distorted representation is adaptive because fear and hatred of despicable people is highly motivating. Adopting the distorted representation will cause one to fight harder than one's competitors who adopt the more accurate representation. It will thus make one more successful in the real world than one's competitors in an environment in which there is competition for limited resources (Wilson 1990, 39). To believe one's children are more special than any other children is, equally, to believe a distorted representation of reality.¹¹ A more accurate representation of reality would be that one's children are pretty much like other children. But the distorted representation is highly motivating because believing one's children to be special motivates one to go to great lengths to protect them. Wilson argues that there are certain domains where successful behaviours are motivated better by distorted representations of reality than by more accurate ones. He calls these distorted representations of reality 'adaptive imaginary representations' (AIRs).

AIRs contrast with what Wilson calls 'models of reality' (MORs). A MOR is a more-or-less accurate representation of reality such as we form, for example, of the objects in a room upon first entering it. According to the branch of evolutionary epistemology which sees our cognitive mechanisms as products of evolution, this is the prevailing notion of mental representations. The idea is that we form mental representations which are a model of the real

¹¹ I am grateful to Hugh Mellor for suggesting this example to me.

world, and these enable us to conduct trial-and-error experiments without suffering the consequences of conducting those experiments in the real world (Campbell 1974, Popper 1972, Dennett 1978). We don't, for example, need to shape our behaviour, on entering a room for the first time, by bumping into objects and then avoiding them in future. Instead we almost instantaneously form an accurate mental representation that allows us to smoothly negotiate the room (Wilson 1990, 43). But even MORs are distorted to a certain extent. They accentuate certain features of the terrain, those in which we are most interested, or which are most relevant to our goals, and diminish others.

Wilson argues that the view that our mental representations are constituted solely by MORs, and that we make decisions about how to behave based on these representations, is wildly implausible. It implies a degree of knowledge about the world and an ability to calculate decisions based on that knowledge that is simply beyond our cognitive capability. Wilson creates a concrete example of a mental representation. It is a representation of the nexus of connections between people, objects and events in a magazine article. Even a simple, clearly circumscribed network of relationships such as this involves an overwhelmingly complex causal structure, such that if one were attempting to choose between actions based on how their consequences would ramify through that structure, the decision procedure would far outrun our cognitive capacities. He concludes that "adaptive mental representations cannot be accurate models of a real world causal structure which we use to calculate adaptive phenotypes. If they were, then we would spend most of our time paralyzed by indecision" (Wilson 1990, 51).

Wilson thus rejects this 'Olympian' view of mental representations according to which we have a single mental representation that corresponds with a certain degree of accuracy to 'what is really out there'. His alternative view is that we have a myriad of mental

representations underlying our adaptive phenotypes. Sometimes we need a representation that more-or-less accurately models reality. But there are many other occasions on which it is more adaptive to distort the properties and relations between entities, or even to invent entirely new entities that have no counterpart in reality. The diversity of adaptive phenotypes is indicative, he thinks, of a corresponding diversity of mental representations motivating those phenotypes.

One advantage of AIRs over MORs is that they are easy to use (Wilson 1995, 79). Intelligence is required to construct them, but once constructed they are easy to adopt and be guided by. They can also be more compelling than MORs. Recall the individual who sincerely believes his enemies to be despicable monsters. This belief will motivate him to fight harder, and will hence be adaptive in evolutionary terms, in an environment in which physical combat is the best route to evolutionary success. A further feature of AIRs is that, once adopted, they are extremely tenacious in that they tend to be fiercely maintained by those who have adopted them. This is the result of mechanisms built into their design that ensure their preservation (Wilson 1990, 57), so they are not subject to normal belief-revision procedures. A further element of Wilson's view is that belief systems are expressed and transmitted by language, so to each belief system there corresponds a domain of discourse. Hence, a single natural language, like English, will be made up of many overlapping domains of discourse, each corresponding to a belief system.

Let's assume, for the moment, that Wilson is right, and that we have many mental representations, some of which approximate reality (MORs), but some of which distort reality or even fabricate a fictional representation that contains elements that have no counterpart in the real world (AIRs). The fictional world of an AIR is sincerely believed to represent reality. The function of our mental representations is to motivate adaptive suites of behaviour, and

MORs and AIRs do this in different ways. MORs typically function to allow us to run virtual scenarios to enable us to calculate the most effective action to take in the real world. AIRs function quite differently. They are representations constructed so as to encode sets of instructions on how to behave. They thus unambiguously and directly motivate suites of behaviour, and those that motivate adaptive suites of behaviour will have been selected for and will have taken hold.

3 The evolution of tensed language and belief

In considering the evolution of tensed language and belief we need to make an important distinction. What we might loosely refer to as the ‘tensed belief system’ is, I think, made up of two domains of tensed belief. First, there are the fundamental beliefs about the nature of time, encompassing the intuitive belief that time is tensed. I indicated in §1 above that the belief that time is tensed incorporates two beliefs about the nature of time. First there is the belief that *being past*, *being present*, and *being future* are genuine features or attributes that objects and events can possess. The distinction between past, present and future is one that divides up the whole of temporal reality. Everything that has existed, exists or will exist falls into one or other of these categories. Furthermore, there is a difference in ontological status between entities that are past, present and future. Past entities no longer exist but did once exist. Future entities do not exist yet, but will exist. Present entities belong firmly in the realm of the existent. Furthermore, these categories carve up temporal reality entirely independently of any human experience or perspective. If humans had never evolved there would still have been an objectively present moment. The second component of the belief that time is tensed is the belief that time has a dynamic aspect, that it flows from future to present to past. To think that this aspect of time is real is to think that which objects and events are present is

continually changing, and not merely in virtue of human temporal experience. Again, if humans had never evolved, time would still have flowed inexorably. I'll call these beliefs the Fundamental Tensed Belief System.

The second domain of tensed belief consists of the more common-or-garden, everyday tensed beliefs. These include virtually any belief expressed in a tensed format, such as, for example, 'I have an appointment in two hours', 'My coffee is hot', and 'The movie has now finished'. I'll call this the Ordinary Tensed Belief System. The ordinary tensed belief system permeates most of our ordinary thinking.

Having made this distinction I now want to consider, for each of the fundamental and the ordinary tensed belief system, whether it is a MOR or an AIR. I think there are compelling reasons for thinking that the fundamental tensed belief system fits the model of Wilson's AIRs. If that's right, then the belief that time is tensed would be a distorted representation of reality, but one that motivates adaptive behaviours in the real world. It would be false that there is an ontological distinction between past, present and future, and that time flows, but it would be in our interests, in evolutionary terms, to believe it. It's not difficult to see that it is adaptive to direct one's actions towards affecting the future rather than the past; to believe that the time for action is the present; to believe that some anticipated future event for which one can prepare will eventually become present, and so on. The fundamental tensed belief system shares other features of AIRs. It is sincerely believed to be an accurate model of reality. It directly motivates suites of behaviour that are adaptive, and does not require individuals to make complex calculations in order to decide how best to act. In other words, it encodes sets of instructions on how to behave, directly motivating those who have adopted it to act in ways that are adaptive. Decision procedures do not have to be calculated independently of it. And this is significant, because if the fundamental tensed

belief system were a MOR, we should expect to use it to run virtual scenarios and calculate optimal decision procedures.

Another feature of AIRs, as we saw above, was that once they have been adopted they are extremely tenacious, and very hard to overthrow. This is certainly true of the fundamental tensed belief system. Not only is it fiercely adhered to by people in general, but its success in enabling people to negotiate the world ensures that its firm grip on us continues. The grip that the fundamental tensed belief system has on people in general, then, may not be due to the fact that it is veridical. Instead it may be due to the fact that it constitutes an AIR, which comes with in-built mechanisms to ensure that it is preserved and transmitted.

Yet another feature of AIRs is that they are associated with a domain of discourse that is peculiar to it. A belief system manifests itself in a linguistic system, which is characterised by various linguistic elements. These may include specific vocabulary and grammatical mechanisms. The fundamental tensed belief system manifests itself in a linguistic system including lexical and lexically composite expressions, and the grammatical mechanism of verbal tense. Almost all of our ordinary language is tensed, referring to events located at some distance from the present. This all-pervasive nature of tensed language makes it very easy for the fundamental tensed belief system to take hold in an individual, and to be transmitted among individuals.

In conclusion, there are compelling reasons to think that the fundamental tensed belief system fits the model of Wilson's AIRs. It is adaptive to adopt it; it comes with ready-made instructions on how to act in ways which are adaptive; it has a tenacious grip on those who have adopted it, and it manifests itself in an all-pervasive linguistic system that contributes to its tenacity and makes it easily transmissible. Suppose that the fundamental tensed belief system is indeed an AIR. In that case, the methodology of examining our intuitions about

time and our temporal language to discover the fundamental nature of time would be a complete non-starter. Our intuitions about time would have no claim to being veridical; indeed, there would be compelling reasons to think them non-veridical. Our temporal language, likewise, far from being a guide to the nature of temporal reality, would give us a misleading picture of the nature of time. Our intuitions and common sense beliefs about time, so far from occupying a default position of truth because they are intuitive, might actually be ‘massively fictitious’ (Wilson 2002, 41) but we have them because they motivate behaviours that are adaptive in the real world. As Wilson puts it “mental representations can motivate behaviors that are adaptive in the real world without themselves directly corresponding to the real world” (1990, 37). In the temporal case, believing that there is an ontological distinction between past, present and future, and that time flows, will motivate behaviours that are adaptive in the real world, and need not correspond to reality in order to do so.

However, I think there are also compelling reasons for thinking that the ordinary tensed belief system is a MOR, and not an AIR. To think it was an AIR would be to think that practically all of our utterances and beliefs are false because they are tensed. If, however, the ordinary tensed belief system is a MOR then it more or less approximates reality, although some elements of reality may be accentuated in the model while others are downplayed. It may also be subject to evolutionary cost-cutting constraints, so there are various ways in which it might fail to accurately represent reality. But even if it represents reality to an acceptable degree of accuracy, it’s important to remember that it will be a reflection not just of reality, but of our perception of reality. It will therefore be a function of the nature of reality and of the perceptual and cognitive capacities we employ in perceiving reality. And of course our representation of reality is formed from a particular temporal point of view. Hence

the fact that it is tensed may very well be due to the fact that it is an essentially perspectival, self-locating representation.

If our ordinary tensed belief system is a MOR then ordinary tensed beliefs are capable of being true, rather than massively in error as would be the case if it were an AIR. But if time is not tensed, then an ordinary tensed judgement that, say, an event is past, will be true or false not in virtue of the fact that the event really is past, but rather, in virtue of the fact that the end of the event is earlier than the judgement. Tensed beliefs, sentences and judgements will be true or false in virtue of the tenseless temporal relations in which they themselves stand to the events that they are about. So our tensed beliefs, sentences and judgements which are, on the face of it, non-relational, possess the truth-values they do in virtue of a relational network of events. The fact that we adopt a temporally self-locating perspective on the world can thus easily be seen to encourage the thought that being past, present and future are non-relational, rather than relational features of times and events. So the adoption of that perspective itself is complicit in the acquisition of the tensed AIR.

The linguistic phenomenon of aspect supports the conclusion that the ordinary tensed belief system is a MOR rather than an AIR. Unlike tense, aspect is not context-dependent (deictic) (Comrie 1985, 14). Aspect is concerned with the internal temporal structure of events and situations; whether they are extended or punctual, completed or ongoing, etc. It is also concerned with situating events relative to other events in the temporal network. It is for this reason that the perfect 'tenses' are often treated as aspects. While they do locate events in either the past, present or future, they also relate them to other temporal reference points. Aspect can thus be thought of as concerned with the network of temporal B-relations that events stand in to each other which, for B-theorists is constitutive of time itself.

My claim is that the ordinary tensed belief system is a MOR, and hence partly accurate, rather than an AIR, and hence massively inaccurate. The phenomenon of aspect can thus be thought of as a feature of ordinary language that, more accurately than tense, represents the true nature of time. When this is combined with the claim that tensed sentences can be given B-theoretic, relational truth conditions, the view that the ordinary tensed belief system is a MOR, with ordinary language being roughly accurate in representing tenseless reality, is strengthened.

A further reason in favour of my claim that the ordinary tensed belief system is a MOR, and hence partly accurate concerns the specious present. As is well known, our temporal span of direct perceptual awareness, our 'specious present', is very brief. Given that fact, our temporal representation of reality is bound to privilege the temporal span in which any perception occurs. Thus, in so far as our ordinary tensed belief system and the linguistic system it produces are reliable guides to the nature of reality at all, they will be reliable guides only to the nature of reality *as perceived and experienced by us*. We should not expect it to reflect features of the world that science is only now discovering.

It might be objected that the reason why our temporal span of direct awareness is very brief is that the temporal span of which we are aware (i.e. the present) is itself very brief. That may be right, but my point is that we cannot reach that conclusion by examining either our tensed belief system or our tensed language. It is just as likely that our experience is made up of a succession of brief perceptual 'windows', but that what they are perceptions of are brief successive states of a tenselessly existing reality.

In conclusion, I think there are good reasons for thinking that our fundamental tensed belief system is an AIR, while our ordinary tensed belief system is a MOR. If those conclusions are right, then they cast serious doubt on the methodology of drawing

metaphysical conclusions from either common sense beliefs about time or from the nature of temporal language. The set of beliefs that make up the fundamental tensed belief system would constitute a misrepresentation of temporal reality. The set of beliefs that make up the ordinary tensed belief system, from which tensed language emerges, would constitute a roughly accurate model of reality, but its being tensed would be better explained by the fact that it is adopted from a temporal point of view than by the fact that it reflects a tensed reality. We can conclude then, that common sense intuitions about time and temporal language are not good guides to metaphysical truth concerning the fundamental nature of time.

4 Evolutionary Debunking Arguments

One possible reaction to what I have done here is to say that I have offered an evolutionary debunking argument with the aim of undermining our confidence in our tensed beliefs. Evolutionary debunking arguments (henceforth, EDAs) are arguments that claim to show that the causal origin of beliefs of a certain kind undermines our reason for holding those beliefs. In particular, they claim that there is an evolutionary explanation for our having those beliefs, which undermines our reason for thinking them true. EDAs have been most commonly applied to moral beliefs (see, for example, Huemer 2005). Other domains of belief that have come under attack from EDAs include religious and common sense beliefs.

Can the argument that I have put forward so far with respect to the evolutionary explanations for our tensed belief systems be construed as an EDA? We first need to separate out the claim that I have offered an EDA for our fundamental beliefs about tense from the claim that I have offered an EDA for our ordinary tensed beliefs. Here is the EDA schema, adapted from Kahane (forthcoming):

Causal premise: We believe that p because we have an intuition that p, and there is an evolutionary explanation for our intuition that p.

Epistemic premise: Evolution is not a truth-tracking process with respect to p-type beliefs.

Therefore, *p-scepticism:* None of our p-type beliefs are justified.

If p-type beliefs here are taken to be ordinary tensed beliefs, then I would reject the epistemic premise of this argument. I do not think that our tensed beliefs are all false, nor that we are not justified in believing them. I have argued extensively elsewhere (Dyke 2002b, 2003a, 2003b, 2008) that we have true and justified tensed beliefs, but that what makes them true are tenseless relational facts. Consequently, the argument I have offered here with respect to ordinary tensed beliefs cannot be slotted straightforwardly into the EDA schema.

It has served us well in evolutionary terms to adopt a temporally self-locating perspective on the world, with asymmetric attitudes to the past and the future, and to privilege the present moment in that perspective. The ordinary tensed beliefs that emerge out of this mental representation are quite capable of being true, and many of them are true. Those beliefs *are* formed by a truth-tracking process. Of course, we have some false tensed beliefs, but these are due to evolutionary cost-cutting rather than to a non-truth-tracking belief formation process.

If, on the other hand, p-type beliefs are taken to be fundamental beliefs about tense, then I think the EDA looks more promising. In order to provide enough support for the causal premise it would be necessary to show that it is more plausible to think that the formation of fundamental beliefs about tense was caused by a non-truth-tracking evolutionary process than by a truth-tracking process. The empirical details of that belief-formation process would need

to be carefully worked out and supported. I think I have gone some way towards providing an evolutionary story as to why we believe that time is tensed. Obviously more work is needed, particularly to fill out the empirical details of this story, but at first blush I think the story I have given is a plausible one. The question that must be addressed is whether it is more plausible than the converse claim that fundamental beliefs about tense were formed by a truth-tracking process. I think a case can be made for this conclusion, but this is work for another day.

5 Conclusion

I have argued that the strategy in the debate over tense of appealing to common sense intuitions and tensed language is misconceived. It assumes that we have good grounds for treating both common sense intuitions about the nature of time, and tensed language as veridical with respect to the fundamental nature of time. I have argued that this is not the case. The development of our language, and of our suite of common sense intuitions has an evolutionary history worthy of investigation. My preliminary discussion of the adaptive nature of the fundamental tensed belief system and tensed language provides empirical reasons why we should emphatically not expect common sense beliefs and the nature of ordinary language to be a reliable guide to the fundamental nature of time.

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