Look At The Time!

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Abstract

I argue that we can get evidence for the temporal ontology of the universe by looking at the time. The argument is an extension of the 'epistemic objection' towards Growing Block theories.

1. Introduction

Metaphysicians disagree about the temporal ontology of the universe. Are there any past objects? Are there any future objects? *Presentists* say 'no' to both questions. *Eternalists* say 'yes' to both questions.[1] *Growing Block* theorists say 'yes' to the first question, and 'no' to the second. *Shrinking Block* theorists say 'no' to the first, and 'yes' to the second.[2]

How are we to decide between these views? It seems like the only way to decide between them is to engage in the complex metaphysical arguments that proponents of these views have put forward, perhaps with an eye towards the latest contemporary findings in fundamental physics.

In other work, I have argued that this tempting thought is mistaken. Straightforward observational evidence can be brought to bear on the debate between Presentism and Eternalism (no fancy physics required).[3] My goal in this paper is to extend these results, by showing that ordinary observational evidence can be brought to bear on the debate between Growing Block theorists, Shrinking Block theorists, and Eternalists. In fact, as we will see later, one way we can empirically test these views is just by looking at the time!

The arguments I will present below can also be seen as developments of the 'epistemic objection' to Growing Block theories, according to which we cannot know that we are (objectively) present if the Growing Block theory is true.[4] Sider (2011) puts the epistemic objection as follows:

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[1] *Moving Spotlight* theorists also say 'yes' to both questions, but I will be setting aside the moving spotlight theory for the purposes of this paper.

[2] Shrinking block theory is the least popular of these views, but see Casati and Torrengo (2011) for more discussion.

[3] See Builes (2019a).

[4] There is a growing literature on the epistemic objection to the Growing Block theory (and the Moving Spotlight theory). For early presentations of the objection, see Braddon-Mitchell (2004) and Merricks (2006). For a recent survey and assessment of the epistemic objection, see Deasy and Tallant (2020).

We believe that we exist in the present; indeed, we take ourselves to know this. But given the [Growing Block theory], there are ever so many people, with similar evidence to our own, who also think they are in the present but are wrong—they're wrong because the times at which they are located do not have monadic presentness. George Washington, for example, thinks in 1776 that 1776 is present; we think, here in 2011, that 2011 is present. We cannot both be right, since the property of presentness is monadic and possessed by only one moment. And our evidence is no better than Washington's (we see flowers brightly blooming in 2011; he sees flowers brightly blooming in 1776, and so on), so it's hard to believe that we're more likely to be right than Washington. Indeed, it seems likely that we're both wrong, since 1776 and 2011 are merely two of the infinitely many times, only one of which has presentness. The [Growing Block theory] leads to skepticism about whether we're in the present. (261)

I will be arguing that the epistemic objection doesn't merely threaten our knowledge of the objective present. The fact that we can't be certain that we live on the edge of the Growing Block (or the Shrinking Block) can be utilized as a premise in an argument that shows that the Growing Block theory, the Shrinking Block theory, and Eternalism all make different observational predictions. These observational predictions can then be tested to yield ordinary, empirical evidence for these different theories of temporal ontology.

2. A Toy Case

Suppose you are in a universe that is finite in temporal extent. It began some finite time ago, and it will end some finite time in the future. Moreover, suppose that, throughout the history of the universe, there will only ever be two conscious agents, both of which are perfect duplicates who are located in rooms that are also perfect duplicates. One of the conscious agents lives a life that is located earlier in time than the other. In order to distinguish the rooms, suppose that the earlier room has a '1' written on the outside of the room, and the later room has a '2' written on the outside. Both conscious agents know all of these facts.

Because you know all of these facts, you know that you are located in one of these two rooms, but you don't know which. In other words, you have a kind of 'self-locating' or *de se* ignorance. You might be located in the earlier '1' room, or you might be located in the later '2' room.

The crucial question we will be asking is the following: *how confident should you be that you will observe a '1' if you walked outside of your room?*

Let us first consider this question under the supposition of Eternalism. If Eternalism is true, the world is a four-dimensional static block, which contains two equally real, subjectively indistinguishable agents. On this kind of ontology, it seems clear that you should assign the following credences:

Cr(I am in the '1' room | Eternalism) = 1/2

Cr(I am in the '2' room | Eternalism) = 1/2

After all, you're certain that both agents are equally real, and you are certain that they are subjectively indistinguishable. Since you have no reason to privilege one room over the other, it would be completely arbitrary to assign any other credences. In fact, these 50-50 credences can be derived from a widely accepted version of the principle of indifference that is discussed in the literature on self-locating belief. Roughly speaking, this principle of indifference states that, in any given possible world, your credence should be divided evenly among the agents that are subjectively indistinguishable from yourself.[5]

Next, let us consider our question under the supposition of the Growing Block theory. On the Growing Block theory, our question crucially turns on 'how much' the block has grown. Let Growing Block$_{early}$ be the hypothesis that only the '1' room exists, because the edge of the growing block has yet to reach the '2' room. Let Growing Block$_{late}$ be the hypothesis that both rooms exist, because the edge of the growing block has passed both rooms. Since you know that you yourself exist, you are certain that at least *one* of the rooms exist, so you are certain that either Growing Block$_{early}$ or Growing Block$_{late}$ is true (given that the Growing Block theory is true).

Since the '2' room doesn't even exist according to Growing Block$_{early}$, it is obvious that you should assign the following credences:

Cr(I am in the '1' room | Growing Block$_{early}$) = 1

Cr(I am in the '2' room | Growing Block$_{early}$) = 0

Applying the same principle of indifference from above, we also get the following credences:

Cr(I am in the '1' room | Growing Block$_{late}$) = 1/2

Cr(I am in the '2' room | Growing Block$_{late}$) = 1/2

Now, what should your credence be in Growing Block$_{early}$? For our purposes, all we will need is that it is rational to have a *non-zero* credence in Growing Block$_{early}$. This seems perfectly reasonable. After all, the hypothesis that the edge of the Growing Block is somewhere between the earlier and later rooms is a hypothesis that is perfectly compatible with your evidence. In fact, given that the edge of the block could be any time after the existence of the first room, a natural credence to give to Growing Block$_{early}$ is the temporal distance between the two rooms divided by the temporal distance between the first room and the end of time.

In any case, if we let g be your credence in Growing Block$_{early}$, where $g > 0$, then we have that:

Cr(I am in the '1' room | Growing Block)

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[5] Both Elga (2000) and Lewis (2001) appeal to this kind of principle in their original discussions of the Sleeping Beauty problem. In fact, almost every proposed solution to the Sleeping Beauty problem involves assigning equal credences to the hypotheses "The coin landed Tails and it is Monday" and "The coin landed Talis and it is Tuesday" on the basis of this kind of principle. For further defense of this principle, see Elga (2004). Weatherson (2005) criticizes the principle.

= Cr(I am in the '1' room | Growing Block$_{early}$ or Growing Block$_{late}$)

= 1*g + (1/2)*(1-g)

= (1+g)/2

Consequently:

Cr(I am in the '2' room | Growing Block)

= 1 - Cr(I am in the '1' room | Growing Block)

= (1-g)/2

Let us finally consider our question under the supposition of the Shrinking Block theory. In this case, the very same issues arise from the Growing Block case. Let Shrinking Block$_{late}$ be the hypothesis that the edge of the Shrinking Block is strictly between the two rooms, and let Shrinking Block$_{early}$ be the hypothesis that the edge of the Shrinking Block is earlier than the earliest room. Again, it is obvious that you should assign the following credences:

Cr(I am in the '1' room | Shrinking Block$_{late}$) = 0

Cr(I am in the '2' room | Shrinking Block$_{late}$) = 1

Applying our highly restricted principle of indifference:

Cr(I am in the '1' room | Shrinking Block$_{early}$) = 1/2

Cr(I am in the '2' room | Shrinking Block$_{early}$) = 1/2

Letting *s* be your non-zero credence in Shrinking Block$_{late}$, we have that:

Cr(I am in the '1' room | Shrinking Block)

= Cr(I am in the '1' room | Shrinking Block$_{early}$ or Shrinking Block$_{late}$)

= 1/2*(1-s) + 0*s

= (1-s)/2

Consequently:

Cr(I am in the '2' room | Shrinking Block)

= 1 - Cr(I am in the '1' room | Shrinking Block)

= (1+s)/2

We have completed answering our question on the supposition of Eternalism, Growing Block theory, and Shrinking Block theory. Given that *g, s* > 0, our results are as follows:

$$Cr(\text{I am in the '1' room} \mid \text{Shrinking Block}) < Cr(\text{I am in the '1' room} \mid \text{Eternalism})$$

$$Cr(\text{I am in the '1' room} \mid \text{Eternalism}) < Cr(\text{I am in the '1' room} \mid \text{Growing Block})$$

Eternalism doesn't give you any reason to favor either the hypothesis that you are in the '1' room or the hypothesis that you are in the '2' room. You should be indifferent between both hypotheses given Eternalism. However, the Growing Block theory should make you more confident that you are in the earlier room, and the Shrinking Block theory should make you more confident that you are in the later room. The reason for this is straightforward. On the Growing Block theory, there's a live chance that the '2' room *does not even exist*, so of course you can't be located in the '2' room! After all, there's a live chance that the edge of the block has not yet passed the '2' room. Similarly, on the Shrinking Block theory, there's a live chance that the '1' room does not even exist, which of course means that you can't be located in the '1' room.

Having answered our original question, we can now show what we wanted to show. Suppose you finally decide to step outside of your room and observe the number on the outside. Turns out that there's a '1' outside of your room! Conditionalizing on your evidence, your credence in Growing Block theory should increase, and your credence in Shrinking Block theory should decrease. After all, you were *most* confident that there would be a '1' outside of your room given the Growing Block theory, and you were *least* confident that there would be a '1' outside of your room given the Shrinking Block theory. Lastly, your credence in Eternalism should increase or decrease depending on the exact values of *g* and *s* that you assigned.[6]

Congratulations, you've successfully received evidence about the temporal ontology of the universe by looking at a number written outside of a room!

3. Look At The Time

This toy case establishes the in *principle* possibility of receiving ordinary, observational evidence that is relevant to temporal ontology. While this in principle possibility is already

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[6] This instance of conditionalization involves conditioning on a *de se* fact. It is an instance of what Meacham (2008) has called 'Centered Conditionalization'. Although most philosophers would accept this instance of conditionalization, some have argued for a different way of conditioning on *de se* facts. An alternative updating procedure, defended by Meacham (2008), Cozik (2011), and Builes (2019b), is called 'Compartmentalized Conditionalization'. Compartmentalized Conditionalization entails the 'Relevance-Limiting Thesis', according to which updating on irreducibly *de se* facts should not affect one's credences in non-indexical hypotheses. For more on the Relevance-Limiting Thesis, see Titelbaum (2008, 2013). However, it is important to note that this toy case can *still* be used by those who endorse Compartmentalized Conditionalization. For example, when you see a '1' on the outside of your room, you do not eliminate any (non-indexical) Eternalist hypothesis, but you *do* eliminate certain (non-indexical) Shrinking Block hypotheses. For example, you eliminate the hypothesis of Shrinking Block$_{late}$. So, observing a '1' gives you evidence for Eternalism over the Shrinking Block theory. Similarly, if you were to see a '2' on the outside of your room, you would not eliminate any (non-indexical) Eternalist hypothesis, but you would eliminate certain (non-indexical) Growing Block hypotheses (e.g. you would eliminate Growing Block$_{early}$). So, our toy case shows that you can receive ordinary observational evidence for these views in temporal ontology irrespective of the correct epistemology of self-locating belief.

surprising in itself, I'd like to suggest that the kind of issues involved in our toy case are in fact ubiquitous in daily life.

Here is an example. Within any busy work week, many people wake up in the same room, in the same bed, at the same hour, perhaps by the same kind of alarm sound. Often times, the days can pass by in a haze. When you wake up from a deep sleep on Thursday, you might initially not remember exactly what day it is. It might be Wednesday, or it might be Thursday. You know that you will in fact wake up on both of these days in roughly the same kind of situation, but you are just unsure of which day is *today*.

Just as in our toy case, this is a case of self-locating or *de se* ignorance. In fact, how you should reason about this ordinary case of self-locating ignorance is closely parallel to how you should reason about the toy case. Eternalism doesn't favor the hypothesis that today is Wednesday or the hypothesis that today is Thursday. After all, given Eternalism, you're certain that there are two perfectly real time-slices of you that exist on Wednesday and Thursday. You're just unsure of which time-slice you currently are. However, just as in our toy case, the Growing Block theory gives you some reason to think you are the earlier Wednesday time-slice, and the Shrinking Block theory gives you some reason to think you are the later Thursday time-slice. After all, on the Growing Block theory, there's a chance that your Thursday time-slice does not even exist, and on the Shrinking Block theory, there's a chance that your Wednesday time-slice does not even exist.[7] So, learning that you are the Wednesday time-slice should count as evidence in favor of the Growing Block theory (and against the Shrinking Block theory).

In general, there are cases in daily life where we lose track of the time. When we lose track of the time, we acquire a kind of *de se* ignorance. We can entertain various live epistemic possibilities for what time it is, and we are unsure of which is correct. Eternalism doesn't favor any of these possibilities, but the Growing Block theory should make us biased towards earlier possibilities, and the Shrinking Block theory should make us biased towards later possibilities. So, in general, when we lose track of the time, we are in a position to gather evidence about the temporal ontology of the universe. All we have to do is to look at the time.

4. Conclusion

I have described certain situations in which it is possible to gather straightforward, observational evidence about the temporal ontology of the universe. Furthermore, I have suggested that these

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[7] One possible worry here is that the universe might have an infinite past and/or future. If the universe has an infinite future, then one might think it is reasonable to assign a credence of 0 to the hypothesis that the edge of the Growing Block is strictly between your Wednesday-waking and your Thursday-waking. After all, there is only a finite amount of time between your Wednesday-waking and your Thursday-waking, but there is an infinite amount of time after your Thursday-waking. Applying a natural kind of indifference principle has the implication that you should assign a credence of 0 to the hypothesis that the edge of the Growing Block is strictly between your Wednesday-waking and your Thursday-waking. In response to this objection, it seems to me that we should at least have a *non-zero* credence that the universe will have a finite future. In fact, there should be some number n such that we have non-zero credence that the universe will end before n years. If we do have such a non-zero credence, then applying this kind of indifference reasoning will result in an overall non-zero credence that the edge of the Growing Block is strictly between your Wednesday-waking and your Thursday-waking, as desired.

situations may in fact be ubiquitous. This result is not only intrinsically surprising, but it also serves as a powerful counterargument against those philosophers who are inclined to view debates in temporal ontology as somehow nonsubstantive. Some have suggested that debates about temporal ontology are merely verbal, or perhaps there is just no fact of the matter about the correct temporal ontology of the universe. Views of this kind have been defended in different ways by Callender (2000), Meyer (2005), Dorato (2006) Savitt (2006), Balaguer (2014), and Norton (2015).[8] However, if different views in temporal ontology make different observational predictions, then it seems that even the most hardcore logical positivst should think that debates about temporal ontology are substantive.

It is often thought that the epistemic objection to the Growing Block theory is a cause for concern. At first blush, it seems that, unless the Growing Block theorist can know that they are objectively present, then they should abandon their theory. The arguments I have presented here open up space for an alternative perspective on the Growing Block theorist's epistemic situation. Rather than regarding the epistemic objection as a *reductio ad absurdum* of their ontological views, they can, at least in principle, view it as an exciting opportunity to experimentally verify their controversial ontological claims. I will leave it to the reader to decide which perspective is the more rational one to take.

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[8] Balaguer (2014) actually argues that *either* debates in temporal ontology are not substantive *or* debates in temporal ontology are 'physical-empirical' debates. The arguments in this paper support the latter claim.

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