

A Critical
Introduction to
the *Metaphysics*
of Time

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within it. However, we emphasize here that this is perhaps *only* how things 'seem'. There are a number of other important issues that bear upon this debate that we do not discuss here. For more on these the reader should see the further readings at the end of the chapter.

10.6. The incompatibility of special relativity with presentism

We now turn to one of the most discussed objections to presentism, the argument from special relativity. The argument centres on the idea that presentism is incompatible with the relativity of simultaneity. And, since the relativity of simultaneity is an entailment of the special theory of relativity (and this entailment is retained by the general theory), this is thought to be a sufficient reason for rejecting presentism. The argument assumes that our metaphysical views should be consistent with the entailments of our best physical theories. This assumption has been denied by a few. Arthur Prior (1996), for example, agrees that special relativity and presentism are incompatible, but argues in the other direction by taking this to be a sufficient reason for rejecting special relativity. And Bradley Monton (2010) argues that despite being (some of our) *best* physical theories, we have good reason to think that special and general relativity are in fact false, and so we have no reason to reject presentism on the basis of their being incompatible with something they entail (see section 10.7 for more on this). But the vast majority of philosophers who have engaged with the argument from special relativity have thought that being incompatible with our best physical theories is a serious problem for presentism, and have thought that presentists must take one of two options:

1. Deny that presentism is genuinely incompatible with special relativity.
2. Deny that special relativity is one of our best physical theories.

Before we come to what has been said about these options, let us first spell out the incompatibility claim in a little more detail.

According to presentists, the only things that exist_{simpliciter} are present things. But what are *present* things? Some argue that presentists must spell out this notion by saying that if two things are present, then they must exist simultaneously with each other. Consider, for example, how Ernani Magalhaes puts it:

It seems that given that X is present, something Y is present only if Y is simultaneous with X. How could X and Y both be present if X is either earlier or later than Y? (Magalhaes 2010: 225)

This expresses the idea that it is a necessary condition for two individuals being present that they exist simultaneously with each other. Given that only present things exist_{simpliciter} according to presentism, we can strengthen this to a sufficient condition, for we can ask: if X is present and so exists_{simpliciter} and Y exists simultaneously with X, then how can Y fail to exist_{simpliciter} and so be present? We can express this as follows:

Present simultaneous connection (PSC): Two individuals x and y are co-present if and only if x and y are simultaneous with each other.

But this, in the presence of special relativity, becomes deeply problematic for the presentist. Precisely why this is so has been spelled out in a variety of ways – but the basic idea is that, in the presence of special relativity, presentism seems to entail that reality itself becomes fragmented in an objectionable way. Consider:

- (1) Simultaneity is relative to reference frames. [Entailed by special relativity.]
- (2) Individuals are co-present only if they exist simultaneously with each other. [Entailed by PSC.]
- (3) Which individuals are present is relative to reference frames. [From 1 and 2.]
- (4) An individual x is present iff x exists_{simpliciter}. [Entailed by the definition of presentism.]

Therefore,

- (5) Which individuals exist_{simpliciter} is relative to reference frames. [From 3 and 4.]

So it seems that if both presentism and special relativity are true, then each reference frame has associated with it its own sphere of existence_{simpliciter} such that what exists_{simpliciter} for an observer in one is different from what exists_{simpliciter} for an observer in another. The following example serves to make this clearer.

Suppose that three observers, A, B and C, are moving at high velocities relative to each other (and so in different reference frames). Then, if special relativity is true, the following two propositions are jointly possible:

- (i) In A's reference frame, B exists simultaneously with A, but C does not.
- (ii) In B's reference frame, both A and C exist simultaneously with B.

But (i) and (ii) together with PSC entails:

- (iii) In A's reference frame, A and B are present but C is not, and in B's reference frame each of A, B and C are present.

And given that the only things that exist_{simpliciter} are present things according to presentism, this entails:

- (iv) In A's reference frame, B exists_{simpliciter} but C does not exist_{simpliciter}, and in B's reference frame both A and C exist_{simpliciter}.

So, there will be a time shared by A and B at which they agree that they each exist_{simpliciter}, but will disagree about whether C exists_{simpliciter}. Moreover, neither of them will be making any mistake. Furthermore, given that the Lorentz Transformation rules allow any observer to work out from within a reference frame what an observer in a different frame will take to be simultaneous with her, each of A and B will be able to work out that the other will hold a conflicting view about C's existence_{simpliciter}, and each will also know that both themselves and the other is correct in holding such a conflicting view. This is the way in which reality becomes fragmented if special relativity and presentism are both true. This, in its essentials, is the problem that was first articulated by Hilary Putnam in his influential 1967 paper 'Time and Physical Geometry'. Readers are encouraged to study Putnam's presentation of it.

We now consider some representative examples of those who have taken the two different options in responding to the argument from relativity. Option one, recall, was to deny that presentism is incompatible with special relativity. Mark Hinchliff (2000) provides the best example of someone who defends this response. One simple way of reconciling presentism with special relativity that Hinchliff considers involves reducing the scope of what exists_{simpliciter} to a single spacetime point. If presentists adopt this view, known as 'here-nowism', they can maintain that all that is strictly-speaking present is a single point of spacetime. By doing this, presentists can in effect deny PSC and so avoid the problems that it brings with it in the presence of special relativity. However, Hinchliff prefers a second way of reconciling presentism with special relativity.

Hinchliff first argues that the presentist can simply accept that reality is fragmented in the way described above. He points out that reality being fragmented in this way only *shows* that presentism is false on the assumption that something like the following principle is true:

The transitivity of existence (TE): If x exists_{simpliciter} for y, and y exists_{simpliciter} for z, then x exists_{simpliciter} for z. (See Hinchliff 2000: S587.)

Consider again our example from above. In the situation described C exists_{simpliciter} for B, and B exists_{simpliciter} for A, but C does not exist_{simpliciter} for A. And this contradicts TE. But, Hinchliff argues, presentists are free to reject TE and thus adopt a version of their view that is relativized to reference frames (or, individuals within those frames). He goes on to argue that presentists can endorse PSC but maintain that what is present is relative to reference frames (e.g. the one we are in now). According to this view everything in our reference frame exists_{simpliciter} and so do all events that are such that light from them reaches our reference frame now. (He calls this view 'cone presentism' by virtue of the fact that light waves reaching us can be pictured as a cone stretching out back in time behind us.) Earlier we imagined standing on a residential street at night within a frame of reference F, and said that on Einstein's proposal the events that are to be counted as being simultaneous with one's looking out include those such that the light emitted from them reaches one *now*. On this way of reconciling presentism and special relativity, then, presentists count each of the objects that feature in such events as being present. However, because what is present is relativized to reference frames on this view, and because what is present is just what exists_{simpliciter} according to presentists, this view does seem to be one in which existence_{simpliciter} is also relativized to reference frames, and so one in which TE is rejected.

Other suggestions have also been made about how the presentist might reconcile presentism with special relativity, but many think that each fails to provide viable ways of taking option one for traditional presentists (see, e.g. Sider 2001: 45–52). The reason for this is that taking each of these ways involves accepting something that strays too far from the spirit of traditional presentism, and in so doing undermines the reasons for believing the view to be true. And it is not hard to see why many think this by considering the suggestions mentioned. Presentists, as we saw in Chapter 5, take themselves to be defending the common-sense view of time. But here-nowism involves accepting that only here-now exists, and accepting cone presentism involves denying that existence_{simpliciter} is an absolute notion, each of which is a far more radical thesis than common sense would ever allow. Cone presentism also involves admitting that events that we ordinarily want to say are past, are in fact present, which clashes with common sense too. One example of this is the following. Physicists routinely say that the Cosmic Microwave Background Radiation is the current visible sign of events that occurred around fourteen billion years ago (it is just that it happened so far away and so long ago that their light has taken that long to reach us). According to cone presentists, however, those events are happening *now*. As the light from them is only now reaching us, they are simultaneous with the events that we now feature in, and so are present (see Savitt 1998: 6). The general conclusion that many draw, then, is that whatever independent

support the suggestions made by Hinchliff and others can be given, adopting one of them is not a good dialectical move for the traditional presentist to make in response to the argument from special relativity. So, many think, option one is closed to presentists.

We now turn to option two: the option of denying that special relativity is one of our best physical theories. Hinchliff also discusses this option and (following up on other suggestions in the literature) suggests that presentists can adopt the Lorentz theory instead of Einstein's special theory of relativity (Hinchliff 2000: S285). As we have seen, the Lorentz theory makes the same predictions about observations as Einstein's theory while retaining the notion that there is absolute simultaneity. And so if Lorentz's theory is better than (or equally good as) Einstein's, then presentism faces no problems from our best scientific theories. Of course, most physicists do think that Einstein's theory is better than the Lorentz theory on the basis of the reasons we have already considered, e.g. that unlike in special relativity, there are possible states of the universe that are empirically indistinguishable if Lorentz's view is true. But presentists can defend option two by arguing that despite facts such as these, the Lorentz view is still better than special relativity overall. This task has been taken up most thoroughly by William Lane Craig (2000b) (see also Craig 2001b), who develops a Neo-Lorentzian view in detail, concluding that 'despite the widespread aversion to a neo-Lorentzian interpretation of relativity theory, such antipathy is really quite unjustified' (Craig 2000b: 126). If Craig is right, then option two may be a viable option for presentists (but see Balashov and Janssen 2003 who argue that Craig is not right).

10.7. Quantum mechanics, quantum gravity and the philosophy of time

Finally, then, we turn briefly to the most recent developments in fundamental physics. In fact, though, we will say relatively little about how they impact upon the metaphysics of time. This is for two simple reasons: first, on this matter we are simply not in a position to judge. Much of the literature on quantum mechanics and quantum gravity, even in the philosophical literature, is technically advanced and only accessible to those with a background in physics (which we lack). Second, even judging from the side-lines, it is plain that as things currently stand, quite how they impact is anyway entirely unclear. So here we restrict ourselves to giving a sense of this unclarity. We begin with a very brief explanation of what quantum mechanics and quantum gravity are.

General relativity might well be the best physical theory that we have for dealing with large-scale phenomena – e.g. those involving the movements