

A Defense of Presentism in a Relativistic Setting

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Presentism is the view, roughly speaking, that only presently existing things exist. Though presentism offers many attractive solutions to problems in metaphysics, philosophy of language, and philosophy of mind, it faces threats from two main sources: McTaggart and the special theory of relativity. This paper explores the prospects for fitting presentism together with the special theory. Two models are proposed, one which fits presentism into a relativistic setting (the cone model) and one which fits the special theory into a presentistic setting (the surface model). It is concluded that there is no good reason arising from the special theory of relativity for rejecting presentism. Presentism is tenable here and preferable elsewhere.

1. Introduction. In “The Puzzle of Change” (1996), I argued that one could solve a traditional problem about the nature and possibility of change if and only if one adopted a view about the nature of time I called *presentism*. I believe presentism offers attractive solutions to philosophical problems not only in several areas of metaphysics but also in the philosophy of language and the philosophy of mind, such as the semantics of tensed discourse, our distinctive attitudes towards past, present and future, the psychology of temporal experience, and the dynamics of continued belief. I think the presentist’s rival, the *eternalist*, also has things to say in each of these areas, but I think the presentist’s answers are better. Presentism, however, faces problems from two sources: McTaggart’s argument against the A-theory, and the theory of relativity.

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In unpublished work I have defended presentism against McTaggart's attack on the A-theory, and in the last section of "The Puzzle of Change," I took up in a cursory way the challenge posed by the special theory. In this paper I will take up the challenge again and hope to give a fuller answer on behalf of the presentist. Challenges arising from the general theory of relativity will have to wait for another day.

I will begin by saying what I take presentism to be and not to be. This will permit me to reply to Craig Callender's worry that the debate between presentists and eternalists is not a substantive one. I will then examine three models for reconciling presentism with the special theory—the point model, the cone model, and the surface model—discussing Steve Savitt's objections to these models, as well as raising some of my own. My overall conclusion will be that at least the cone and the surface models offer satisfactory presentist responses to the challenges posed by the special theory of relativity.

2. What Presentism Is and Is Not. Presentism is the view, roughly speaking, that only presently existing things exist, only presently red things are red, and so on. The presentist and his opposite, the eternalist, will agree that dinosaurs *existed* and do not presently exist; they will disagree over whether they *exist*. For the eternalist, time is like space: other times are like other places; there is nothing special about what exists *here*. For the presentist, time is like modality: other times are like other possible worlds; they are not real. As there is something special about what is *actual*—it is all there is—so there is something special about the *present*—it is all there is. The way things are is the way things presently are.

It is possible to lose sight of the substantive issue that divides presentists from eternalists. The characteristic thesis of presentism—only present Fs are Fs—can easily be confused with closely related theses that are mere trivialities. Presentism can also be saddled with old baggage from previous battles over the nature of time, or expanded to include more controversial views on the nature of time. Successful attacks on the old baggage or the more controversial views can then be mistaken for successful attacks on presentism itself. It is therefore worth taking a few moments to say more about what presentism is and what it is not.

I am using the sentence 'Only presently existing things exist' and its companions, such as 'Only presently red things are red', to distinguish the presentists from the eternalists. To serve this purpose, these "test" sentences must be given a particular interpretation. The quantifiers should be read as unrestricted quantifiers; the tokens of 'exists' should be understood as tokens of a nonindexical 'exists' and as tokens of the same word; and 'presently' should be read as an indexical tense operator. Working under these stipulations, we can see that the sentence 'Newton exists' will express

the same proposition at different times, and the sentence ‘Newton presently exists’ will express different propositions at different times. This difference in the semantics enables us to express the substantive difference between presentism and eternalism.

Though more can be said on how to formulate the issue between presentism and eternalism, I have said enough about this matter to permit me to respond to Craig Callender’s worry (1998, 2) that there is no substantive difference between presentism and eternalism. Callender uses the picture of a four-dimensional manifold of events, each carrying a light bulb that is on when the event exists and off when the event does not exist. Eternalism is then the view that all the light bulbs are on. Since a light bulb does not exist when it is not on, the only existing light bulbs, according to the presentist, are ones that are on—which is just what the eternalist says.

Right, everybody is going to say that every bulb that is on is on, that everything that exists, exists; and nobody is going to say that some bulb that is on is off. I agree with Callender that a substantive issue cannot be formulated in nonindexical terms. That is why I have formulated the issue with the aid of the indexical ‘presently’. The eternalist thinks every bulb is on, but he does not think every bulb that is on is *presently* on; some bulbs are on that are off now. However, the presentist will think every bulb that is on is presently on, and no bulbs are on that are off now. Are any bulbs on that are not presently on? Contrary to what Callender contends, we have a substantive question and the debate is on.

An older, and perhaps more familiar, issue in the metaphysics of time is the dispute between the A and B theories of time. An A-theorist, or tensor, thinks events have tenses, the properties of presentness, pastness, and futurity, as well as degrees of pastness and futurity, such as being three days past, and nine months future. A B-theorist, or detensor, thinks there are no such properties, though there are the temporal relations of being-earlier-than and being-later-than, and relational properties composed of those, such as being nine months later than Monica’s first visit.

Events do not change their relational properties. If an event is earlier than Clinton’s testimony, it stays earlier. Events do, however, change their tenses. An event that is five days future, becomes present, then past. It was the continual gaining and losing of the tenses which was thought to account for the apparent flow or passage of time.

But when compared to masses or temperatures or charges, the tenses do seem to be a peculiar and suspicious class of properties. What differences could they make in the world? But the presentist is not committed to the tenses as irreducible properties. Sentences involving them can be paraphrased into relatively uncontroversial claims. For example, instead of saying ‘Clinton’s testimony is past’, we may say ‘Clinton *has given* his

testimony'. In short, sentences involving the tenses can be paraphrased into tensed sentences.

When the present is distinguished from other times, it becomes possible to draw further distinctions among the other times, to speak, for instance, of the past and the future, and to speak of differences between the past and the future. Familiar ideas about the purported difference are, for instance, that the past is fixed or closed or determined and the future is open or indeterminate. These ideas have played a role among some authors in the contemporary debates about the present in relativity theory. It has been thought sufficient to show that presentism is incompatible with the special theory to show that all events are "determined" or fixed. But presentism is not committed to any view about the difference between the past and the future or to any difference between the past and the future. Strictly speaking, it is not even committed to the past and the future; it only draws a distinction between the present and other times.

A second notion that has played a role in the recent history of the philosophy of time is a notion of *temporal becoming*. As a matter of grammar, the verb 'become' is a linking verb. Like the 'is' of predication, 'become' takes a complement: particles become charged, students become rich, I become fat and bald. Temporal becoming differs from becoming by taking no complement. Events *become*. (The difference is like the difference between 'is's in 'Gates is rich' and 'Gates is'.) Once again, the idea was to account for the apparent flow and passage of time by events becoming. Once again, the presentist is not committed to such an idea.

3. Open and Closed Avenues. I turn to the prospects for presentism in the special theory of relativity. In my paper on change, I discussed Hilary Putnam's argument from relativity against presentism (Putnam 1967). Following Larry Sklar's 1981, I pointed out that Putnam's argument rests on two assumptions which the presentist is free to deny: a transitivity principle that A is real for C if A is real for B and B is real for C, and an assumption about what presentism is in a relativistic setting, that the real events are the events simultaneous with us now in our frame of reference. I said this latter assumption of relativized presentism was one proposal among many for fitting presentism into a relativistic setting, and I mentioned two others: identifying the present with the here-now and identifying the present with the surface of the past light cone. (In this paper I am going to call these two proposals the point model and the cone model.)

I then went on to suggest that we could even consider proposals that reverse the direction of fit between presentism and relativity, fitting the special theory, or at least a theory with its empirical consequences, into a presentist picture with a relation of absolute simultaneity—a type of proposal I'm going to call a surface model. Finally, I suggested in my paper

that we approach this topic the way we would the problem of how to fit together our intuitive views of our mental lives and our best psychological theories. Proposals for understanding that relationship are varied and complex, and a “refutation” of one proposal is not taken to be a refutation of our intuitive views of our mental lives. No one believes the question about the mind to be easy to answer; the question about time seems just as hard.

Savitt (1998) has attempted to close each of the avenues I suggested were open for the presentist. About attempts to fit the present into a relativistic setting, Savitt concludes, “[Presentism] can not even be expressed in Minkowski spacetime.” About attempts to fit relativity theory into a presentist setting, Savitt concludes that “taken at face value,” the idea “really should not be respectable in the least”. Savitt is thus led to advise that “the presentist should throw in the towel *with respect to STR*,” but he offers me the hope that perhaps things will go better for me with the general theory of relativity. To which I say, “Beware Canucks bearing gifts.”

4. The Point Model. What I am going to call “point presentism” is the view that in the special theory of relativity, the present is to be identified with the here-now. On this view, the way things are is the way things are here-now. Though the view has been discussed by several authors, I know of no one who actually holds this view. Howard Stein (1968) comes closest to being a point presentist. He does think the present is to be identified with the here-now. He writes, “In Einstein-Minkowski spacetime *an event’s present is constituted by itself alone*” (15). However, Stein is one of the philosophers I mentioned who wishes to define a notion of becoming definite and to use that notion to establish what is real as what has become definite. In Stein’s terms, the absolute past has become real. So in my terms, Stein is not a point presentist.

The common objection to point presentism is that it is *lonely*. Only the here-now exists. Though I am moved by this objection, I have often thought I should not be. It is really just a restatement of the view as an objection. It is like objecting to solipsism by saying the problem with solipsism is that there are no other people. Perhaps, though, in cases like these, an objection can be just a restatement of the view.

The objection I prefer is one given by Putnam (1967, 246). If the present is the here-now, there are events that are past that were never present. These events were spacelike separated from the earlier events on my world line. So they never were present. But they are timelike separated from me here-now; so they are here-now past. The objection is, in other words, that point presentism violates the “conceptual truth” that what *is* past *was* present.

Stein has an interesting reply to Putnam, interesting because (a) I find it unconvincing and (b) it is similar to some replies I am going to give myself. After saying, “in Einstein-Minkowski space-time an event’s present is constituted by itself alone,” Stein goes on to say,

In this theory, therefore, the present tense can *never* be applied correctly to “foreign” objects. This is at bottom a consequence (and a fairly obvious one) of our adopting relativistically invariant language—since, as we know, there is no relativistically invariant notion of simultaneity. The appearance of paradox only confirms that the space-time of Einstein and Minkowski is quite different from pre-relativistic space-time. (1968, 15)

Many of the objections and replies we will encounter have this general form. First, the presentist is urged to take relativistic spacetime seriously. The presentist then makes a proposal about what his view comes to in a relativistic setting. An objection is then made to the presentist’s proposal which is based on some principle from outside relativity theory, such as the principle that what is past was present, which fails to hold in the relativistic setting on the presentist’s proposal. The presentist then replies that the principle’s not holding is just what we should expect given the relativistic setting.

I do not know what to think about this familiar dialectic except (1) that not every objection like this will be fair, since some things will have to change for the presentist (and the eternalist) when we move to a relativistic setting, and (2) that not every reply like this will be acceptable, since we cannot call just anything presentism in a relativistic context.

I think it is a mistake to try to identify the “core” of presentism which must be preserved in a relativistic context. I think we should instead explore different proposals for fitting presentism in. We may conclude no proposal fits well enough to say that presentism is compatible with a relativistic spacetime. We may conclude that more than one proposal fits well enough. My own view is that point presentism does not fit well enough, but it may be that I just do not want to be alone.

5. The Cone Model. I am going to call “cone presentism” the view that in the special theory of relativity, the present for an event *E* is to be identified with the surface of *E*’s past light cone. I believe this view was first suggested by William Godfrey-Smith (1979). One virtue of the view is that it captures the idea that what is present is what I am seeing now. A second virtue is that it identifies the present with an invariant feature of the special theory. A third virtue is that we are not alone. Nevertheless, cone presentism faces a number of objections, two of which Steve Savitt presses as “consequences that should make a red-blooded presentist squirm” (1998, 6).

Savitt presents the first of these squirm-inducing objections in the following passage:

First of all, we have been observing for about four decades the Cosmic Microwave Background Radiation (CMBR), which is thought to have originated about 300,000 years after the Big Bang, or about 15 billion years ago (give or take a few billion years). On Godfrey-Smith's view, the origin of this radiation counts as part of the present of the contemporary astrophysicists who observe it! (1998, 6)

To the extent you find this objection compelling, you should be a presentist. The objection derives its force from the "fact" that CMBR originated 15 billion years ago. This "fact" comes from outside the special theory. The special theory is silent on this matter. Indeed, according to the special theory, there is no fact of the matter concerning how long ago this event happened. If we think it is a fact that this event happened 15 billion years ago, we must think there is a distinguished inertial frame which assigns events their "correct" dates. As a presentist, I say, "Great, the events that are simultaneous with me now in that special frame are the existing events." If we think there is no distinguished inertial frame, then we cannot appeal to alleged facts like the radiation's originating 15 billion years ago in objecting to cone presentism. If there is a distinguished frame, we can stay good old-fashioned presentists. If not, we can be cone presentists. Either way, presentism is unscathed by objections of this sort.

A point that emerges from this discussion is that the cone presentist also need not assign a unique temporal metric. It also is not a fact that the origination of the radiation is simultaneous with the physicist's observation. The cone presentist does not have to assign the same time to the two events, engendering worries about the infinite speed of light and a photon being two places at once. Presentism in a pre-relativistic setting was put in terms of which times were past, present, and future. In that setting, hyperplanes of simultaneity were invariant, hence real, features of the manifold. But in a relativistic setting, these planes are not invariant; simultaneity is relative. The invariant features are the spatiotemporal intervals. In that changed circumstance, the cone presentist should not say that the radiation's origination is simultaneous with the physicist's observation, but should say the origination is at spatiotemporal interval 0 from the physicist's observation.

Savitt's second squirm-inducing objection begins by making a similar point:

[Cone presentism] seems to rest on the idea that events on the past light cone of E have a lightlike separation from E and hence the spacetime interval from E to (say) E' (on the past light cone of E) is 0. But

then it seems arbitrary to exclude from the present events on the future light cone of E, which are also lightlike separated from E. (1998, 6)

Let us call this idea that an event's present is to be identified with all the events lightlike separated from it "double-cone presentism." I find this position unappealing. It permits single events to be present twice; an event that is present because it is on the surface of my future light cone will be present again when it is on the surface of my past light cone. However, this objection poses no threat to cone presentism because the cone presentist is free to reject double-cone presentism. Savitt's reason for thinking otherwise is, to repeat, that "it seems arbitrary to exclude from the present events on the future light cone of E, which are also lightlike separated from E" (1998, 6). But the difference, as I understand it, between the past light cone and the future light cone is a non-arbitrary difference. The surface of E's past light cone is the set of events *from* which a light signal or ray could be sent *to* E. The surface of E's future light cone is the set of events *to* which a light signal or ray could be sent *from* E. The difference between the cones is due to the asymmetry built into the nature of a light ray or signal. And that asymmetry arises from the asymmetric nature of causation itself, which is a non-arbitrary foundation on which to rest the distinction between cone and double-cone presentism.

Savitt's last squirm-inducing objection arises from a requirement of *achronality*, which says that if two events, X and Y, are present for E, then neither should be in the absolute past or future of the other. I agree with Steve that this requirement has some intuitive plausibility. How *can* an event X be in E's *present* when all observers agree that X is *earlier* than E? After all, it certainly seems that if X is earlier than E and E is present, then X is *past*. I also agree with Steve that cone presentism violates this principle. An event X on the past light cone of E is earlier than E in all inertial frames. The cone presentist thus says the event X is in E's present. The principle of achronality says it is in E's past. Something has to give.

I think it is the principle. (Here, I may go beyond Godfrey-Smith.) The principle of achronality derives its plausibility from classical settings, where I would not choose to deny it. But it loses that plausibility in a relativistic setting. In a classical spacetime where temporal intervals are invariant features of the manifold, presentism can be understood as a view about *time*. What the indexical 'presently' picks out is, roughly speaking, the set of events at temporal interval 0 from the time of utterance. However, in Minkowski spacetime where temporal intervals are *not* invariant features of the manifold, presentism should be understood not as a view about time, but as a view about spacetime. The invariant features are the *spatiotemporal* intervals, and the present is not the events at temporal interval 0 from the time of utterance, but the events on the rearward cone at *spatiotemporal* interval 0 from the "spacetime" of utterance.

In a classical setting, to have an event be present that happened six million years ago would be a serious problem. An event would be present that was not at temporal interval 0 from us. But because the cone presentist does not define the present in terms of temporal interval 0, a present event that is not at temporal interval 0 poses no problem. So the objection, we see, rests on the account of the present the classical presentist gives and which the cone presentist believes must be supplanted by his own account in a Minkowski spacetime.

One might object that the cone presentist is no longer true to his school, that his view is no longer a view about *time*. This objector, however, seems not to be extending the same latitude and tolerance that we have come to expect elsewhere in the transition from classical to relativistic physics. Many of our ideas that we had thought were purely temporal or purely spatial turned out to be spatiotemporal in the setting of the special theory. If we are in sympathy with the idea famously expressed by Minkowski that “Henceforth space by itself, and time by itself, are doomed to fade away into mere shadows, and only a kind of union of the two will preserve an independent reality” (1923, 75), then we should also be in sympathy with the idea that henceforth presentism will no longer be a view about a mere shadow but a view about an independent reality, not about time but about spacetime.

There are two other objections to cone presentism which need to be addressed. The cone presentist must deny symmetry and transitivity for his notion of the present. It is not the case on the cone presentist’s model that if X is present for Y, Y is present for X. An event can be in my present and I not in its. In fact, if a light signal can reach me now from E, I cannot reach E by a light signal. Furthermore, it is not the case on the cone presentist’s model that if X is present for Y and Y is present for Z, then X is present for Z. An event E, timelike separated from me in my past light cone, can send a signal to F, which is lightlike separated from me on the surface of my past light cone. E is present for F, and F is present for me, but E is not present for me. It is not lightlike separated from me but timelike separated; E is “past” for me.

We can certainly see that the symmetry and the transitivity of the “present-for” relation hold in a pre-relativistic setting. If you are present for me, I am for you. And if I am present for you and you are for Savitt, then I am for Savitt. It is equally clear these principles do not hold on the cone presentist’s model. Are we to reject cone presentism for these reasons? It is not clear. I am inclined to think not.

The cone presentist ties in his notion of the present very closely with the nature of light. If light were an instantaneous signal, the present defined in terms of it would be symmetric and transitive. But because in the special theory of relativity light behaves in peculiar ways, the present de-

fined in terms of it does too. The problem is not the presentism; it is the light!¹

I am inclined to think cone presentism gives us a better fit between presentism and the special theory than point presentism does. And I am inclined to think cone presentism gives us a good enough fit to say presentism is compatible with the special theory.

6. The Surface Model. The models we have discussed so far, point and cone presentism, try to fit presentism into a relativistic setting. The view I am going to call “surface presentism” reverses the direction of fit, and tries to accommodate the special theory or a theory with its empirical consequences into a presentist picture. There are a variety of ways of trying to do this, and I will not even try to cover them all. What they all have in common, however, is a commitment to an absolute relation of simultaneity.

In “The Puzzle of Change,” I cited Prior 1970, in which Prior offers a hard-line version of this idea. Prior writes,

One possible reaction to this situation, which to my mind is perfectly respectable though it isn’t very fashionable, is to insist that all that physics has shown to be true or likely is that in some cases we can never know, we can never find out, whether something is actually happening or merely has happened or will happen. (247)

In Prior 1968, Prior expands a bit on the idea expressed in the passage just quoted:

I suspect that the infinity of ‘local proper times’ which figure in relativistic physics amount simply to what appears from various points of view, or in various ‘frames of reference’, to be the course of events. And given how the course of events appear from a certain point of view, your relativistic physicist will be able to calculate how it will appear from certain other points of view. He can also indicate what features of the course of events (what temporal orderings of those events) will be common to all points of view, and one can work out a “tense-logic” for that too. (It turns out to be slightly different in the special and the general theories of relativity.) What the relativistic physicists cannot calculate from how the course of events appears from certain points of view is how, in all its details, the course of events actually is. It is not clear to me that there is anything surprising or unacceptable in this conclusion, or that we should be driven by it

1. I owe this phrase to John Bigelow, who has expressed a related thought in these terms.

to renounce the use of forms like “It appears from such-and-such a point of view that p ,” which assume that there is also a plain p which is or is not the case. (133)

The sort of theory I think Prior has in mind is a fairly old and familiar one, going back to the period in physics preceding Einstein’s 1905 paper. If we assume that we are in a Newtonian spacetime with absolute space and a relation of absolute simultaneity and we assume that light travels at the same speed c in all directions in absolute space, then the speed of light in an inertial frame in absolute motion will not be c . But in such an inertial frame the speed is *measured* to be c . How can this be? An old answer is that clocks and rods in absolute motion undergo the familiar Lorentz-Fitzgerald contraction. The speed of light will then be *measured* to be the same in all inertial frames, even though it is not.

This “neo-Lorentzian” theory will, I believe, accommodate the same experimental results as the special theory, and it comes with a relation of absolute simultaneity. It is thus a way for us to fit the special theory—or a theory with the same experimental consequences—into a presentist setting. I think this is the sort of theory Prior had in mind, and I know it is the sort of theory other presentists have in mind. And though Michael Tooley is not a presentist (he thinks past *and* present are real), it is the sort of theory he defends (Tooley 1997) in the face of a similar challenge from relativity.

An obvious objection to this view is that it cannot be experimentally determined which inertial frames are at absolute rest. This point is often coupled with a verificationist principle of some kind to conclude that there is not as much spacetime structure as the neo-Lorentzian postulates.

I think the surface presentist is free to reject the verificationist principle and the conclusion following from it. On this matter, Prior writes,

I’m sure there *are* questions which are perfectly genuine and intelligible questions but which seem to be incapable of being answered. For instance, I know perfectly well what it would be for you to see what I would call purple wherever I see red, and for you to see what I would call blue wherever I see purple, and so on round the clock; but I cannot imagine any procedure which would conclusively show that our respective visual experiences are, or that they are not, related in this way. (1996, 50)

The surface presentist is still left, however, with the initial objection that no experiment can determine which frames are at absolute rest. Prior seems willing to live with this consequence. But Tooley (1997) and Timothy Maudlin (1994), who also is not a presentist, have each proposed that there might be experimentally determined facts which would reveal

the frames at absolute rest. Both Tooley and Maudlin mention the apparently instantaneous collapse of the wave packet in quantum mechanics as experimental grounds for positing a relation of absolute simultaneity. Some presentists also mention facts about the cosmic background microwave radiation as providing possible grounds for determining which frames are at absolute rest. I cannot do full justice to these claims here. I only mention them to indicate that the surface presentist perhaps can determine which frames are at absolute rest.

7. Conclusion. In summary, then, I think the presentist can meet the challenges posed by the special theory of relativity along the lines of either the cone or the surface models. Though we have seen that these responses are not without their problems, I think we have also seen there are no good reasons arising from the special theory for rejecting presentism. Presentism is tenable here and preferable elsewhere.

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