The Complex Present: Reconciling Presentism with Special Relativity
Ben Backus – December 1, 2019

In this paper, I will explain why one might think that Special Relativity implies that presentism must be false. Particularly, I will discuss how the relativity of simultaneity forces presentists into the contradiction that some event can both exist and not exist if they are in the present with respect to one frame of reference but in the future with respect to another frame of reference. Then, I will show that a presentist could respond by defining the Complex Present: a model of the present that can be reconciled with Special Relativity and discerns presentism from eternalism. I will then discuss some problems with this claim and show that there may be solutions to these problems. By the end of this paper, I will have given an argument for why Special Relativity does not imply that presentism is false.

Before I start, I will clarify how I will use the term, "frame of reference." In this paper, I will assume that every frame of reference is defined with respect to some piece of matter. Therefore, when I refer to a frame of reference, I am referring to some real body of matter that is moving (at various speeds depending on whatever frame of reference its speed is being evaluated from). Essentially, 'frame of reference' implies a relative location and a relative speed.

According to Special Relativity, whether or not two events are simultaneous is relative to one's frame of reference. More specifically, given two frames of reference and a pair of events, it is possible that the pair of events are simultaneous to one frame of reference and sequential to the other frame of reference.

I'll illustrate this with a simple hypothetical. Consider two people, Alice and Bob. Alice is on a rocket ship passing through the solar system and traveling at half the speed of light with respect to Bob who is on earth, stationary with respect to the planet. Imagine that two stars explode equidistant from the two of them. With respect to Alice, they explode simultaneously. With respect to Bob, the stars explode at different times, such that the star that Bob is moving towards explodes first and the star that he is moving away from explodes second. This is because the speed of light is constant with respect to every frame of reference, and in order for the speed of the light traveling from the star to remain constant with respect to Bob, who is traveling at half the speed of light, time itself must change.

Special Relativity suggests that there is no absolute fact about what events are simultaneous with the present, since that can vary depending on one's frame of reference due to time dilation. An event E that is present to frame of reference R may be future to frame of reference R' and past to frame of reference R". According to Metaphysician, Alyssa Ney, this causes problems for presentists, particularly because this suggests that what is in the present is relative.

To be a presentist is to believe that ontology is comprised only of those objects and events that are in the present, and that objects and events in the past or the future do not exist. However, according to Special Relativity, whether an event is in the past, present, or future is relative based on different frames of reference. Since presentists believe that only events in the present exist Special Relativity suggests that presentists must believe an event can both exist with respect to one frame of reference and not exist with respect to another frame of reference. This is a contradiction, as something cannot both exist and not exist.

My claim is that the presentist can respond to this problem by defining a model of the present that I will refer to as "the Complex Present." The complex present is derived from a set of all existing frames of reference, S. With S, we create another set, R, which is a set of relative

states of the universe. Every relative state of the universe R_F in R is a set of events that are simultaneous with each other with respect to some frame of reference F in S. The Complex Present is the set of events obtained by applying the logical OR function to R. If we use the Complex Present to define the present and say that every event in the Complex Present exists, then we can reconcile presentism with Special relativity.

Now, one might argue that the Complex Present model cannot distinguish presentism from eternalism. Supposedly, if for every pair of events there exists a point in space with a corresponding frame of reference from which those two events are simultaneous, then the Complex Present contains every event from the Big Bang to the last star death. If this were the case, then the Complex Present would indeed suggest that the present encompasses every event in the history of the universe. However, since I said earlier that every frame of reference must correspond to a piece of matter, and there is a finite amount of matter in the universe, then there are a finite number of reference frames. Given this assumption, it follows that there are probably many pairs of events for which there is no frame of reference from which the two events are simultaneous. Take for example the birth and death of a star. There may be a point and speed in space that the birth and death of a star appear simultaneously at that point and at that speed. However, if there is no matter at that point in space and traveling at that speed, then we will not say that there is a frame of reference there. Considering the vast emptiness of space, it seems very possible that no such matter exists and so the birth and death of the star are not simultaneous. Essentially, if there does not exist a piece of matter with a corresponding frame of reference from which two events appear simultaneous, then we will say that those two events are not simultaneous. This suggests that there is a boundary that differentiates the Complex Present from the past and future. So, the Complex Present can distinguish presentism from eternalism.

Another counterargument is to say that one could use the Complex Present to construct a connected graph where each event in the Complex Present is a node in the graph, and two nodes are connected if the nodes are simultaneous with respect to any frame of reference which is to say that there would be a path from every node in the graph to every other node. One might argue that this suggests that all events in the Complex Present are simultaneous since a path of nodes suggests that every event in that path is simultaneous with every other event in that path. If we take every event ever to be simultaneous with an event in the present via some such path, then it is not clear what differentiates the Complex Present from a set of all events ever, and it is not clear what differentiates the presentism from eternalism.

I would dispute this counterargument by reiterating that it is very unlikely that the Complex Present is a set of all events ever since such paths probably do not exist. For example, a path connecting reference frames from the Big Bang all the way up to today would either be extremely long and contain an incredibly large number of reference frames (only one of which can break the chain if it doesn't exist) or extremely improbable since it would rely on reference frames traveling at extreme speeds and in far out places in space. I suppose such paths aren't impossible but the burden of proof is not on the presentist to show that such paths exist.

However, I have not addressed the major attack on my claim which is that even if we can show that there is a set of graphs in which none of the graphs in the set are connected to any other graphs in the set, we still do not have a way to discern which graph is privileged. Actually, we have no method of determining which of these graphs is the Complex Present. However, this concern is irrelevant to the problem of whether or not special relativity implies that presentism is false. The problem of determining what makes the present privileged does not need to be addressed in order to solve the problem of whether or not only the present exists. I say that the

present is one of the graphs, but I don't have to say which graph corresponds to the present in order to say that only one of the graphs contains events that exist. As a presentist, I can say that if and only if an event is present it exists, and assuming that there is a graph in which every event exists, then there is a graph corresponding to the present.

To reiterate what I did in this paper: I presented a potential presentist argument for why Special Relativity does not imply presentism is false. Specifically, that a presentist could define the present in such a way that accounts for time dilation by compiling all simultaneous events into a set. I then acknowledged the potential counterargument that one could create a graph out of this set and show that such a set would imply that every event ever exists, which would support externalism rather than presentism. I countered this by claiming that simultaneity is not necessarily transitive because there is no standardly defined duration of an event. Finally, I acknowledged that the problem of determining which part of this unconnected graph is the MFO, which is to say that I haven't said what makes the present privileged, but I showed that even though I accept this shortcoming I don't need to have an answer to it in order to reconcile presentism with Special Relativity.