Recovering simultaneity. A Compatibilist account of Presentism and Special Relativity

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This paper argues that the theory of special relativity is compatible with presentism and will outline a compatibilist view with a revised definition of simultaneity, showing that the challenge of making the two theories compatible might have been misguided due to the vagueness of definitions. In the first part of the paper, I will give a quick introduction to presentism and the few important features of the theory that ought to be preserved when discussing its compatibility with the special theory of relativity. Namely, the truth simpliciter is tensed, and there is an experience of passage, which is metaphysically significant. Then, I will look into the theory of special relativity and explain how the relativity of simultaneity poses difficulties for the presentist view. Thirdly, I examine the assumption that presentism and special relativity use the same notion of simultaneity. Then I demonstrate how the choice of definition provides completely different implications, which is the main focus of this paper. The tension between presentism and special relativity is rooted in their different claims about simultaneity: presentism holds that simultaneity is absolute, whereas special relativity claims it is relative. However, presentism is a metaphysical theory of time, while the special theory of relativity is a scientific model. Thus, it is worth investigating what exactly is meant by simultaneity in each theory. Moreover, both theories typically assume point-like events, which I argue is unphysical. To justify this, I provide an argument that space-time points are a modelling convention, and not ontologically real objects. Following this, events and objects are extended (4-dimensional), which opens up yet another definition of simultaneity. The events are simultaneous if one can influence or be influenced by the other. To be more exact, this is a symmetric relation between objects/events. Say, a ball is bouncing in the room that is being heated. Some of the kinetic energy of the ball can be converted to thermal energy and influence the rate of temperature increase in the room. Likewise, the temperature increase in the room can affect the kinetic energy of the ball. Thus, both events are simultaneous. This, as suggested by Ben-Yami, allows us to create a causal diamond structure between the two independent, extended events: the interval of causal symmetry. The result is a local causality (of maximum extension up to $ct/2$). I believe this suggestion requires us to reconsider the assumption that the present moment requires a slice of the entire Minkowski spacetime.

Since this proposal is still in agreement with the phenomenological character of presentism, we can assign truth values to the statements that are presently true to the limit of our epistemic accessibility (although this limit of epistemic accessibility is a physical limit).