

Comments and Response

A GROWING BLOCK CONCEPTION OF THE NATURE OF TIME: A COMMENT ON SAULSON

Peter Saulson's discussion of my contention that a growing block conception of the nature of time is compatible with a defensible modification of Einstein's Special Theory of Relativity is limited to the observation that my acceptance of absolute space is incompatible with Einstein's view that simultaneity is relative to a frame of reference. Saulson, however, says *nothing at all* about my *defense* of absolute simultaneity, so let me sketch my approach.¹

First, I argue that the concept of absolute simultaneity is definable within modified versions of Einstein's Special Theory of Relativity that meet two conditions. The first is that space-time points are *basic entities* in one's ontology, rather than being viewed as reducible to spatiotemporal *relations* between events. The second is that the theory incorporates the relation of causation.

The first question, then, is whether one can construct a theory, very closely related to Einstein's Special Theory of Relativity, that both satisfies those two conditions, and also entails that events stand in relations of absolute simultaneity.

My answer to this first question involves what is known as an ϵ -Lorentz formulation of the Special Theory of Relativity, in which Einstein's assumption that the *one-way* speed of light is the same in all inertial frames is jettisoned in favor of the weaker assumption that the *average round-trip* speed of light is the same in all inertial systems. I then add additional postulates that entail, among other things, that the relation of being *in the same location at different times*, and the *relation of absolute simultaneity*, do exist in our world, and that light has a fixed velocity relative to absolute space. It then follows that, given those postulates, one no longer needs the *assumption* that the measured, average round-trip speed of light is the same in all directions within all inertial systems, as this is entailed by the rest of the theory.

The next question is whether, given such a modified theory, there are any reasons for preferring the modified theory to the Special Theory of Relativity, and thus for thinking that our world really is one where events can stand in the relation of absolute simultaneity.

My answer is that the modified theory is superior in at least three ways. First, if a realist view of space-time is correct, then there are states of affairs for which the Special Theory of Relativity specifies *no causes*, but the modified theory does. The predictive and explanatory power of the modified theory is, accordingly, greater than that of Einstein's Special Theory of Relativity.

Second, the modified theory avoids the assumption made by Einstein's Special Theory of Relativity, but for which there is *no experimental support*, and which may even be untestable in principle—namely, the assumption that the one-way speed of light is a constant in all directions in all inertial frames.

Third, experimental results connected with Bell's Theorem in quantum mechanics, and, more generally, an issue posed by the idea of the collapse of wave

packets, provide grounds for holding that the Special Theory of Relativity is incomplete, and that, specifically, the world must involve a relation of absolute simultaneity.

NOTE

1. Interested readers can then find a detailed account and defense in Tooley (1997, 335–71).

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REFERENCE

Tooley, Michael. 1997. *Time, Tense, and Causation*. Oxford: Clarendon Press.