

Review of: "Zeno and Einstein"

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It is rather difficult for me to review this paper, since its claims are very exacting and require you to be an expert on very difficult topics. I am not sure I understand the argument that is proposed. There are two exacting issues: Zeno's paradoxes and Einstein's conception of simultaneity. The basic idea is that in both cases, there is a mistake consisting in "the same overreliance on abstraction". "The mathematical concept of a point-instant follows entirely from its convenience in making calculations, not its real-world applicability. Rather than being based on observation, the ideal instant is just that, an ideal generated in human thought". This strategy is defended also concerning Einstein's theory. The author's claim is that "the relativity of simultaneity is falsely associated with the proven phenomenon of time dilation", "relative simultaneity provides no means of verification". "Once it has been decoupled from time dilation, Einstein's principle of relative simultaneity is relegated to the status of Zeno's denial of the reality of motion, an intellectually stimulating but vacuous claim".

Two first objections (or better, demands for elucidation). 1) If the principle of relative simultaneity provides no means of verification, is its possible contrary, the principle of non-relative simultaneity (or whatever other alternatives), in a better position? 2) Is it possible to hold (on purely conceptual terms) that the dilation of time is true, but the relativity of simultaneity is false? Does not the former imply some version of the second one?

For the author, "Whereas time dilation is an objective effect (...), the relativity of simultaneity seems to be a mere clash of viewpoints": "Surely the projection of the observer's plane of simultaneity onto the train (see the text, p. 6) is subjective, in which case Einstein's principle belongs not to physics but to psychology". If we accept the principle of non-relative simultaneity, there is still a "clash" of viewpoints, even if the result is different (it is "without" relativity). But there are not in both cases "means of verification". Empirically, two different points of view cannot be in principle subject to verification at the same time.

My main objection, however, concerns the main underlying philosophical assumption. The author implicitly holds that we can speak about reality even if our conceptual frames do not coincide with it. It's implicit that we can substitute e.g. Zeno's conceptualization with another one. But it seems to me that the problem is that the new concepts seem counter-intuitive too. Can we conceive a single "unit" of time, with a sort of stuff, avoiding to reduce it to a simple "zero," without admitting (in our thought) that some further division (in thought) is possible? If we cannot do this, is it not following that thought and reality are divorcing? Isn't this a paradox? When we talk about reality, we necessarily use "our" thoughts.

I appreciate the paper because its attempt is to show that Einstein's theory entails philosophical problems that are urgent. However, my direction of thought is different. Maybe a radical empiricism of the "points of view" can be used to deal with

these issues, and a relational conception of spacetime could be a trace to follow. My invitation is to consider Piaget's theory. If space and time are constructions of the child's mind, the requirement that (the basic units constituting the notion of) an event must occupy "a certain duration" (and place) is satisfied in an empiricistic sense, reducing them to more elementary phenomenological units. (Maybe the author's opinion will be that this is a form of psychologism.)

Finally, I wish to observe that there are interpretations of Parmenides (and thus of Zeno) that seem able to avoid the paradoxical character of their positions on space and time. Mario Untersteiner (relying on philological arguments) held that Parmenides' "absolute" being is not conceived by him in contradiction with plurality, but only with becoming.