ARE EVENTS ONTOLOGICALLY BASIC?*

Sibel Kibar**

ABSTRACT

After Einstein presented his "special theory of relativity" with its marvelous principles, "principle of relativity" and "the constant speed of light", it led to bizarre implications, such as, time dilation, length contraction, energy-mass conversion, and invariance of the space-time interval, we had trouble to understand these stunning consequences with our very classical ontology, which can be regarded as Aristotelian ontology. Thus, both physicists and philosophers have required a new kind of ontology, capable of explaining the new phenomena. Hermann Minkovski proposed that Einstein's theory implies a "four-dimensional space-time", instead of a three-dimensional space with time passing over space. Accordingly, the universe consists of four-dimensional stuff such as events.

Event ontology goes together with "block universe argument". Accordingly, the universe looks like a block of ice or a loaf of bread and in which past, present and future take place together. Therefore, block universe argument makes impossible change, motion, and causal relations. Although they sound strange, "simultaneity of relativity", an outcome of special theory of relativity, supports event ontology and block universe argument. Nevertheless, there are plenty of difficulties come along with the event ontology. In this paper, I will discuss those handicaps of the argument that events are basic components of the universe.

Key Words: Object ontology, event ontology, special theory of relativity, block universe argument, presentism.

ÖZET

Einstein, "özel görelilik kuramını" ve olağanüstü iki ilkesini, "görelilik ilkesini" ve "ışık hızının sabitliğini", sunduktan sonra, bu kuramın Aristotelesci ontoloji olarak tabir edebileceğimiz klasik ontolojinin kavramlarıyla anlaşılması zor çıktıları oldu. Örneğin, zamanın genişlemesi, uzunluğun

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** Araştırma Görevlisi METU / Department of Philosophy
For Correspondance: skibar@metu.edu.tr

kısalması, enerji-kütle değişimi ve uzam-zaman aralığının değişmezliği gibi. Bu nedenle, hem fizikçiler hem de felsefeciler yeni keşfedilen olguları açıklayabilecek yeni bir ontolojinin gerekliliğini duydular. Hermann Minkovski proposed that(!) Einstein'ın kuramının; zamanın, uzamın dışında olduğu üç-boyutlu uzam yerine "dört-boyutlu bir uzam-zaman" içerdiğini iddia etti. Buna göre evren, "olaylar" gibi dört-boyutlu şeylerden ibaret.

Olay ontolojisi, "blok evren argümanı" ile uyuşur. Blok evren argümanına göre, evren bir buz kütlesine ya da bir somun ekmeğe benzer. Geçmiş, şimdi ve gelecek bu bloğun içinde aynı anda yer almaktadır. Bu nedenle blok evren argümanı; değişimi, hareketi ve nedensel ilişkileri imkansız kılar. Bu argüman tuhaf görünse de özel görelilik kuramının bir çıktısı olan "göreliliğin eş zamanlılığı", olay ontolojisini ve blok evren argümanını destekler. Yanı sıra olay ontolojisi pek çok zorluğu da beraberinde getirir. Bu makalede, olayların evrenin temel yapı taşları olduğu iddiasının zorluklarını tartışacağım.

Anahtar Sözcükler: Nesne ontolojisi, olay ontolojisi, özel görelilik kuramı, blok evren argümanı, şimdicilik.

I

INTRODUCTION

Whether events are basic or not is one of the major questions of twentieth century philosophy. After Einstein published his famous paper, on his special theory of relativity in 1905, it led to many discussions among physicists and philosophers. Although the special theory of relativity was built with the help of only two principles -one of them is "the principle of relativity"—and the other is "the constancy speed of light", it has several marvelous consequences, such as, time dilation, length contraction, energy-mass conversion, invariance of the space-time interval, and so on which upset the modern physics.(Kennedy, 2003, p. 71) Einstein and some other physicists proved evidently these stunning consequences that are compatible with the observation, but I do not discuss them here in detail. I want to dwell on the philosophical implications of the special theory of relativity, more precisely, its ontological implications, whose proof cannot be easily provided with the help of experiments. Since our minds work with the concepts of classical ontology—the Aristotelian one which I explain in the following part in detail—we had difficulties to imagine the outputs of special theory of relativity.

In the presence of the trouble, incompatibility between our classical way of thinking and bizarre consequences of Einstein's theory, Hermann Minkovski proposed in 1908 that Einstein's special relativity theory implies a "four-dimensional space-time" for our universe, instead of a three-dimensional space with time passing over space. In other words, before Minkovski's declaration, we believed that there is a three-dimensional space and there are three-dimensional objects in it; besides, there is a flowing time, which was considered as external to both space and objects.(ibid, p.50) Nevertheless, after Minkovski argues that "time is the fourth dimension", time becomes internal to space and objects. Then, there arise a few questions: "How does time become internal to objects?", "Do objects have special times?", "Can we still call an object an object, if it has a time process?" After these questions concerning the consequences of four-dimensional space-time, physicists and especially philosophers, such as Whitehead, defended the idea that objects in four-dimensional space-time "are not to be distinguished from events or … processes". Russell and Broad claim, "objects and events are completely different entities, and events can be seen not only as constituents in the world but as the only constituents". (Quoted in P. M. S. Hacker, 1982, p. 4) What they defend is called "event ontology", in contrast to so-called "object ontology".

Although Minkovski, Russell, Quine and Whitehead believe that Einstein's theory of special relativity is coherent with the event ontology, the new understanding of ontology lead to a few logical contradictions; for instance, the future is present now. In this paper, I will analyze both object ontology and event ontology, and assess which one is coherent with Einstein's special theory of relativity. However, I want to look at another interpretation of special theory of relativity in order to determine which ontology is the answer to the question.

II

OBJECT ONTOLOGY

Objects can roughly be defined as three-dimensional entities occupying space. However, an objection can be raised against this claim P. M. S. Hacker states that there are some objects not occupying space, such as shadows, rainbows, and patches of light. To avoid this problem, Hacker makes a distinction between "material" and "immaterial objects"[1]. Hence, whereas material objects are spatial, immaterial objects are not. Then, Hacker adds that there are two principles common to all material objects; the first, an object cannot occupy two places at the same time, and the second, two objects cannot occupy the same place at the same time. (Hacker, *op. cit.*, p. 1)

In fact, what Hacker entitles as "material objects" correspond to our commonsensical understanding of objects. We observe lots of objects in our surroundings, such as, pencils, tables, computers, buildings, sun, earth, air, water and so on. While some of them persist for a long time, some of them stay alive for a fraction of a second. Besides, some of them are very huge, whereas some of them are so small that we cannot see them. Nevertheless, whether they are small or huge, all objects obey the two principles, presented by Hacker above. This understanding about objects is called "object ontology".

Actually, Aristotle is regarded as the first philosopher formulating and defending object ontology, despite the fact that 'object ontology' is a recently used term, I mean, after event ontology formulated. Although Aristotle does not use the term "object ontology", he claims that the universe consists of objects. That is, objects are the basic entities filling up the universe. Our commonsensical view also defends this idea that there are objects persisting through a certain time in the world, which is itself an object, too. (Quinton, 1979, p. 197)

Until the promotion of event ontology, object ontology had been usually assumed. However, after formulated as an alternative ontology, the object ontology has been not only articulated but also questioned since then.

[1] Hacker does not state directly that they are "immaterial" objects; rather, he claims that they are "not material".

III

EVENT ONTOLOGY

As a rival for object ontology, event ontology is a view that simply defends the idea that events are basic and the universe consists of events. The world has some kind of fundamental components, which are not objects, but events, or processes. Wittgenstein states that the world has fundamental components, which are not objects, but events, or processes. Besides, objects—which are not, but if we suppose that they are—in states of affairs cannot be distinguished from those processes. Therefore, objects are not basic, but events are basic and they cannot be reduced to objects.(ibid, p.197) Moreover, "events are not made up of persisting objects". (Kennedy, *op. cit.,* p. 51) For example, "the death of Socrates" is an event. Advocators of the object ontology defend the claim that "Socrates" is an object, which is basic and "the death of Socrates" is an event but it can be reduced to Socrates, so to an object. However, the advocators of event ontology state that "Socrates" cannot be separated from "the death of Socrates". We can find Socrates in other events, such as "the birth of Socrates", "Socrates is walking", "Socrates is talking", and so on. They are all processes, which cannot be broken down into pieces. That is, the defenders of event ontology deny the idea that Socrates is an object or object-like person involved in all those events. On the contrary, Socrates is also a process, more precisely, sequence of events.

Just as objects are regarded in object ontology, events in event ontology are held to be enduring for a certain time. Nevertheless, we cannot claim that events do exist; instead, they take place. Hacker claims, "A volcano exists, but an eruption of a volcano cannot exist. It may have happened, be happening, or be about to happen." (Hacker, *op. cit.,* p. 3) Therefore, it is legitimate to claim that an object exists but an event takes place, in other words, an event does not exist, and an object does not take place.

It is also reasonable to claim that according to event ontology what we observe as movement and change do not exist; they are illusions as a result of our presumed object ontology. Since we are accustomed to think that an object is moving from one place to another, we observe motion as real. However, for the advocates of the event ontology, we cannot derive motion, change, and other relations among objects such as causality from our direct experience. According to event ontology,

there are fixed sequences of events; that is why we perceive that an object persists through several events. Kennedy explains this approach with cinematographic frames of image resembling unchanging sequence of events. In a film, there is a fixed sequence of photographs, which are not changing. Similarly, there are unchanging events and their fixed sequences. (Kennedy, *op.cit.,* p. 51-2)

To relate event ontology with special theory of relativity, I should introduce first the concept "relativity of simultaneity" and then the "block universe argument" with its rival argument, "presentism". Then, it would be possible to explain the relation between event ontology and special relativity.

IV

RELATIVITY OF SIMULTANEITY

With the help of the principle that the speed of light is constant, Einstein proves that time does not flow at the same rate everywhere. According to special relativity, if a moving body comes close to the speed of light, which is approximately 300.000 km/s with respect to an observer, then its time will dilate compared to another body which does not move close to the speed of light with respect to that observer. Nevertheless, that moving body will observe that the other one is moving approximately 300.000 km/s and its time dilates, too. That is, time will never be simultaneous for the two reference frames. (ibid, p. 19) Simultaneity is relative.

V

BLOCK UNIVERSE VERSUS PRESENTISM

In this paper, when I mention a scientific fact, afterwards I introduce its non-factual philosophical implications. Relativity of simultaneity is a scientific fact proved by Einstein, but it directs the "block universe argument", which is only a theory. If simultaneity is relative, then there is no simultaneous present for all reference frames. Clearly, a reference frame's present can be another's past or future. This conclusion is entailed by the block universe argument.

According to the block universe argument, past, present and future co-exist "like a giant block of ice". Besides, past and future are as real as present. However, according to our commonsensical view, past and future can neither exist nor be real, and only present exists and is real, which is called presentism. (ibid, p. 53) Therefore, block universe and presentism are rival theories. Nevertheless, relativity of simultaneity derived from the principle of constant speed of light is coherent with the block universe argument. Gödel claims, "…if simultaneity is relative, reality cannot be split up into such layers in an objectively determined way. Each observer has his own set of 'nows'…"(quoted in Kennedy, ibid, p. 61) Thus, we can claim without hesitating that the block universe argument, in contrast to presentism, is consistent with the relativity of simultaneity of the special theory of relativity. Then I look into whether block universe is consistent with event ontology, or not.

VI

BLOCK UNIVERSE AND EVENT ONTOLOGY

As will be recalled, according to event ontology change and motion are illusions. There are no change and motion in block universe, either. We can imagine block universe as a block of ice or a loaf of bread. If we cut that block into slices, any slice includes past, present, and future. That is why there is no motion and change. Someone's future has already taken place somewhere in the block universe. Obviously, this idea is very similar to event ontology. While the defenders of object ontology believe that objects change through time, the defenders of event ontology assume that events are fixed. (ibid, p. 53-4)

As a result, the block universe view and event ontology are consistent with each other. Relativity of simultaneity supports event ontology, too. Nevertheless, I cannot state that special relativity definitely implies event ontology, because there is another issue to consider before making a hasty inference about the relation between event ontology and special relativity.

VII

EITHER EVENT ONTOLOGY OR OBJECT ONTOLOGY

It might seem that special theory of relativity evidently implies the block universe view and event ontology. However, this is not true, since special theory of relativity has several interpretations and not all interpretations, like Lorentz's interpretation, accept relativity of simultaneity. Therefore, the true claim is that relativity of simultaneity, which is defended by Einstein, implies block universe argument and event ontology. (ibid, p. 60)

I spoke of the special theory of relativity being based on the constant speed of light. Lorentz, who is a contemporary physicist friend of Einstein, denies the first principle of special theory of relativity. According to Lorentz, the speed of light is not constant but only appears to be constant to the moving body, but it is in fact relative to the observer. Lorentz explains the relative speed of light with the very surprising claim that light like other waves moves in ether. (ibid, p. 28)

Although Lorentz's explanation was not accepted widely during his lifetime, recent experiments indicating that there are some effects faster than light provide some support for Lorentz by refuting Einstein's argument. If Einstein's main principle of the constant speed of light is refuted, then relativity of simultaneity will also vanish. Then the block universe argument and event ontology lose their main support. Therefore, the alternative theory proposed by Lorentz wins approval. (ibid, p. 182)

Once more, Lorentz explains the mysterious movement of light with his "ether theory". "According to this, the relativity of simultaneity is mere appearance; in reality, only clocks at rest in the ether show true time and can be used to judge which events are really simultaneous." (ibid, p. 65) As Kennedy tells us, ether is the only reference for simultaneity, so, there is a definite time for the whole universe. That is, according to Lorentz, past, present, and future do not co-exist, but only present exists. Accordingly, events are not fixed because the future does not yet occur. Instead, there are changing objects moving through time and space. Thus, we can claim that Lorentz interpretation of special theory of relativity implies presentism and object ontology.

VIII

PROBLEM OF UNDERDETERMINATION: FACTS AND THEORIES

We see that there are two incompatible interpretations of special theory of relativity. Both Einstein's and Lorentz's interpretations present a coherent explanation for the phenomena. Besides, their observations and experiments provide the same empirical results. However, they offer different ontologies: While Einstein suggests an event ontology Lorentz proposes an object ontology. More accurately, event ontology is the outcome of Einstein's interpretation, whereas object ontology is that of Lorentz's one. Then, we still have our question whether special theory of relativity vindicates event ontology.

This dilemma is called "the problem of underdetermination by evidence". That is, there are two rival theories like Einstein's and Lorentz, and even though their explanations are completely different from each other, they give the same empirical results. This led to a dilemma because we cannot choose between them by looking at the evidence.

Throughout the history of philosophy of science, philosophers and scientists have tried to find a criterion in order to choose between two rival theories. Some thinkers offer "simplicity" as the criterion. Regarding our problem, we see that Einstein's interpretation is definitely simpler than Lorentz's, since Lorentz' theory includes a metaphysical term, 'ether'. Then, according to this criterion, Einstein's theory is valid so that special theory of relativity vindicates event ontology. Nevertheless, the recent experiments about some influences faster than light weaken Einstein's theory, so Lorentz's explanation is superior. Accordingly, special theory of relativity fails to vindicate event ontology.

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