

The time-lag argument and simultaneity

Abstract

According to the time-lag argument, naïve realism implies that seeing must happen simultaneously with what is seen; meanwhile, it is an “empirical fact” that what is seen happened before seeing, because light takes time to transmit from distant objects to perceivers. So naïve realism must be rejected. I show that the conception of simultaneity is misunderstood. According to Special Relativity, simultaneity is a matter of convention rather than a matter of fact. In principle, we can stipulate a perceptual conception of simultaneity, according to which, what is seen is simultaneous with seeing. Second, I argue that naïve realism is compatible with the claim that the subject can perceive things as they were. This claim is rejected because a contingent notion of constitutive relation is presupposed, which is opposed to naïve realism. Third, I show that the time-lag argument presupposes several conceptual idealisations, which are inconsistent with ordinary perceptual cases.

Key words Simultaneity; Convention; The constitutive relation; Conceptual idealisations

Word count 9625

1. Introduction

Naïve realism about perception, as formulated, maintains that a (veridical) perceptual experience is constituted at least partly by the perceived environmental object, its sensible qualities, the event it partakes in, etc. (Allen, 2019; Campbell, 2002; Martin, 2004). The time-lag argument is an argument against naïve realism based on some alleged *empirical facts*, as Russell famously argued,

[Though] you see the sun now, the physical object to be inferred from your seeing existed eight minutes ago; if, in the intervening minutes, the sun had gone out, you would still be seeing exactly what you are seeing. We cannot therefore identify the physical sun with that you see; nevertheless what we see is our chief reason for believing in the physical sun. (Russell, 2009, p. 181)

For the sake of clarity, I reconstruct Russell's argument as follows:

- 1) You see the sun now.
- 2) The sun you see now is the one as it was eight minutes ago.
- 3) The sun might have gone out when you see it now.
- 4) So the sun you see now has different properties as the sun now.
- 5) The sun now is not qualitatively identical with the sun you see now.
- 6) Naïve realism requires that the sun now is qualitatively identical with the sun you see now.

Conclusion: Naïve realism is false.

According to Russell's argument, naïve realism is unable to accommodate two facts expressed respectively by premise 1 and premise 2. This is because Russell's argument has the following two presuppositions. (a) it is an “empirical fact” that light takes time to travel from distant objects to the subject. Only with (a), can one draw premise 2 and deem it as a fact. The second presupposition is (b) that naïve realism requires seeing to happen simultaneously with what is seen. Based on this presupposition, premise 1 implies that the sun you see now is the sun now according to naïve realism. Suppose the opposite of (b), namely that naïve realism is compatible with the claim that one can see things as they were. In Russell's example, one can see the sun now as it was eight minutes ago. It follows that premise 6 is irrelevant to naïve

realism, because naïve realists only care the seen sun, regardless of the sun now or the sun as it was eight minutes ago.

The alleged *empirical fact* in (a) and a controversial understanding of naïve realism expressed by (b) lead Russell and many others to firmly believe that something goes wrong with naïve realism. Hence, Russell claims:

The supposition of common sense and Naïve realism, that we see the actual physical object, is very hard to reconcile with the scientific view that our perception occurs somewhat later than the emission of light by the object... (Russell, 1927, p. 155)

Some philosophers (Robinson, 1994, pp. 80–81) even believe that the time-lag argument based on specific cases (e.g. seeing the sun; seeing an explosion of a star) can be extended to all perceptions. This is because a temporally extended causal process is supposed to be the essential feature of perception regardless the length of the process. So even those mundane cases—for example, I see the waving flowers in the wind outside the window—involve time lag. Hence, if such a generalized version of time-lag argument stands, naïve realism about perception would be false even regarding of mundane cases.

In this paper, I shall demonstrate that both presuppositions that Russell's argument relies on are groundless. In particular, I argue that whether or not light takes time to arrive from a distant object to a subject depends upon a prior stipulation or a definition of the concept of simultaneity from the Theory of Special Relativity (SR for short). I also argue that naïve realists need not hold that perceiving must happen simultaneously with what is perceived. The temporal order or causation only sets a physical constraint upon perception in the sense that a subject cannot perceive things as they will be, because backwards causation is implausible.¹ Naïve realism is consistent with the claim that a subject perceives things as they were or as they are.

¹ I assume that the backward causation is implausible. The discussion of its impossibility is beyond the scope of this paper. For the discussion, see Ben-Yami (2007, 2010).

The paper proceeds as follows. In section 2, following Einstein , Reichenbach (1927) and Ben-Yami (2006), I explain that simultaneity involves convention according to SR. In section 3, I use the conventional concept of simultaneity to argue that it is not a matter of fact that perception happens later than the perceived event. Furthermore, if perceptual simultaneity—the velocity of the light signal emitted from the distant object to the perceiver is infinite—is adopted, then perception will happen simultaneously with the distant event. Given perceptual simultaneity, naïve realism will stand even if the claim that a subject cannot perceive a thing as it was is granted. In section 4, I explore the concept of perceptual simultaneity and the ordinary concept of perception; I suggest that the concept of perception is more fundamental than the concepts of simultaneity and temporal order. Section 5 is concerned with a suspicion of the objection from SR, since SR is only concerned with light signal which is not causally relevant to hearing and smell. In section 6, I show that the generalized version of the time-lag argument presupposes several conceptual idealizations, such as perception and the perceived event are momentary in the mathematical sense, and “present” or “now” refers to an extensionless point; these idealizations are at odd with many daily perceptual cases. I offer a further objection to the time-lag argument in section 7, where I argue that temporal order only sets a constraint on perception in the sense that a subject cannot perceive future things. In other words, in principle she can perceive a thing as it was. Section 8 is my response to Houts’ objection against the claim that a subject could see a thing as it was.

2. Special Relativity and simultaneity

Russell asserts that naïve realism is “very hard to reconcile with the *scientific view* that our perception occurs somewhat later than the emission of light by the object” (1927, p. 155). Does science really teach us this? Presumably, what Russell had in mind is this: the velocity of light is finite (i.e. in the vacuum, it is c , approximately 300,000 km/s), and one necessary condition

for seeing a distant object O is that the light emitted from O hits the perceiver's retina. Therefore, the perception of O must occur somewhat later than the emission of the light from O.

I would not assert that Russell is completely wrong, but he overlooks a more fundamental theoretical hypothesis behind his reasoning, namely that simultaneity of distant events is a matter of convention. This misunderstanding is universal among the advocates of the time-lag argument, which is ironical given their scientific attitude towards the argument.

A correct understanding of the time-lag argument relies on a correct understanding of the concept of simultaneity. Einstein writes, "it is not possible to compare the time of an event at A with one at B without a further stipulation" (1923). How does he reach this unintuitive conclusion? Don't we always compare the time of an event at A with one at B, such as the sun as it was eight minutes ago and our seeing of it, without any further stipulation? In his famous article "On the Electrodynamics of Moving Bodies", he first explains why comparative judgements involving time are judgements about simultaneous events,

If we want to describe the motion of a particle, we give the values of its coordinates as functions of time. However, we must keep in mind that a mathematical description of this kind only has physical meaning if we are already clear as to what we understand here by "time". We have to bear in mind that all our judgments involving time are always judgments about simultaneous events. If, for example, I say that "the train arrives here at 7 o'clock," that means, more or less, "the pointing of the small hand of my watch to 7 and the arrival of the train are simultaneous events." (Einstein, 1923)

Einstein is concerned with the meaning of "time", because without a proper understanding of it the mathematical description of the motion of a particle would be physically meaningless. To understand the meaning of "time", one must understand the meaning of "simultaneity" or "simultaneous events", since all judgments involving time are judgements about simultaneous events, namely the evaluated event is simultaneous with the movement of the hands of the clock. The difficulty is how to determine simultaneity among events at a distance. Einstein

describes how we assign a temporal value t to an event with a local clock. For example, if there is a clock at point A in space, then an observer located at A can evaluate the time of events in the immediate vicinity of the clock. Through this method, we define the “A-time”. Similarly, we can define the “B-time” at point B. But we cannot derive a common “time” for A and B from A-time and B-time. So it is still not possible to compare the time of an event at A with one at B without a further stipulation. This issue was ignored before Einstein, since the dominant Newtonian physics as well as our common sense embraces an absolute conception of time. That is, in whichever frame of reference, with whichever accurate clock, time is the same. Given the absolute conception of time, there is no difficulty in determining the temporal order of events at a distance; i.e., the clock at B can be used to determine the time of an event at A, and *vice versa*. This is exactly the notion that Einstein challenges.

As quoted above, Einstein only grants that Clock-A can unproblematically tell the time in the immediate vicinity of A; it cannot tell the “time” of an event located at other points without a further stipulation. The further stipulation that Einstein mentioned is the standard synchronisation: the time that it takes light to travel from A to B (Δt_1 for short) and from B to A (Δt_2 for short) are equal. Only by a definition like this, could a common “time” for A and B be established. So Einstein does not think it is an empirical fact that $\Delta t_1 = \Delta t_2$; it is a stipulation, instead. In the standard synchronization, the velocity of light is stipulated as constant. But it is conceivable that $\Delta t_1 \neq \Delta t_2$, since Clock-A only records the light’s starting moment and the receiving moment, which means that we only know the average velocity of light. Therefore, we can in principle have infinitely many determinations of simultaneity (Winnie, 1970), and the standard synchronisation is widely adopted only because of pragmatic reasons.

Einstein, on another occasion, expounds the same point through another model (the distances AM and BM are given as equal):

That light requires the same time to traverse the path AM as for the path BM is in reality neither a supposition nor a hypothesis about the physical nature of light, but a *stipulation* which I can make of my own free will in order to arrive at a definition of simultaneity. (Einstein, 1920, VIII)

This passage describes a tentative way of measuring and comparing the time at A and B, and M is the location where the observer receives the light signals from A and B. It is supposed that if the observer receives the A-signal and the B-signal at the same time, then these signals were sent at the same time, and the simultaneity of distant events (e.g., A-signal and B-signal) thereby is determined. But Einstein points out that this way of arriving at the definition of simultaneity of distant events still involves a stipulation, namely the velocity of light is constant. In other words, the constancy of the velocity of one-direction light, according to Einstein, is “neither a supposition nor a hypothesis about the physical nature of light” (Einstein, 1920, VIII).

To put it in another way, suppose that we want to measure the velocity of light. We know the length of AM. To know the velocity, we then need to know the time that light traverses the path AM. There is no problem of knowing the time at M because M is the observer’s location. The observer needs to know the time when the A-signal was sent out at A so that she could know how much time that light traverses the path AM. But to know the sending out time, we need to establish the definition of simultaneity of distant events first.

Reichenbach (1927, §22) relates Einstein’s conventional concept of simultaneity to causality and temporal order. He argues that the objective temporal order can be determined by the causal chain, namely a cause is temporally earlier than its effect, while causally disconnected events are *indeterminate* with respect to temporal order. Simultaneous events are thus stipulated among indeterminate events. Hence, for Reichenbach, simultaneity excludes causality. Consider a round trip of a light signal between two distant objects O_1 and O_2 . Suppose e_1 represents the event of O_1 emitting a light signal at t_1 (Registered by O_1 ’s clock), e represents

the event of O_2 receiving that light signal at t (Registered by O_2 's clock). The light signal is reflected immediately, and e_2 represents the event of the light signal arriving at O_1 again at t_2 (Registered by O_1 's clock). On Reichenbach's account, e_1 is objectively earlier than e , and e is objectively earlier than e_2 . But e' (representing any event between e_1 and e_2) and e are indeterminate with respect to temporal order, since no signal can reach one another; that is, no causal connection holds between them. Reichenbach concludes, this "result leads to a clarification of the problem of simultaneity. The definition of simultaneity ascribes equal time values to different points in space. It must not contradict our definition of time order..." (1927, §22), restricted by the mathematical formulated $t=t_i+\epsilon(t_2-t_1)$ ($0<\epsilon<1$). The value of ϵ reflects the kind of stipulation of simultaneity that we adopt. For instance, $\epsilon=1/2$ is the standard synchronisation which Einstein adopts for pragmatic simplicity. When $\epsilon=1/2$, the average velocity of light from O_1 to O_2 is equal to the average velocity from O_2 to O_1 . Reichenbach then defines simultaneity of distant events as indeterminacy with respect to temporal order. That is to say, simultaneity excludes causality since temporal order is determined by causality. Therefore, Reichenbach, on one hand, inherits Einstein's thought on simultaneity, namely simultaneity is a matter of stipulation; on the other hand, he justifies the restriction of stipulation given $t=t_i+\epsilon(t_2-t_1)$ ($0<\epsilon<1$).

Ben-Yami (2006) revises Reichenbach's restriction and allows ϵ to be 0 or 1, which means that the velocity of light in one direction can be infinite while in the other direction be $c/2$. In particular, if $\epsilon=0$, then the velocity of the incoming light (towards O_2) is infinite; if $\epsilon=1$, then the velocity of the leaving light (towards O_1) is infinite. Accordingly, the concept of temporal order is revised, since the revised restriction allows the cause to be either before its effect or at the same time as its effect. As such, simultaneity will cover two kinds of situations: (a) that the cause and its effect are causally connected by a light signal with the stipulation of infinite

velocity in one direction; and (b) that there is no causal connection among these distant events.

Both situations involve stipulation.

The problem is how to justify this revision. It is worth noting that Reichenbach does not provide a compelling argument against this revision. He only briefly mentions in the footnote of §22 that an infinite velocity implies that the first signal (light) would not be a signal at all but the limit of all signals. He seems to assume that to be a signal the velocity must be finite. In other words, the finiteness is conceptually contained by a signal. Yet this conceptual constraint is not obvious. Why can't the velocity of a signal be infinite? Why is it a problem to be the limit of all signals?

Ben-Yami (2006) appeals to Kant and Descartes to argue against Reichenbach's restricted condition. In Kant's cushion example. A ball presses a soft cushion and makes a depression in it (Kant, 1787, B248). Ben-Yami argues on behalf of Kant that the ball (the ball's hitting), as a cause, is simultaneous with the effect, namely the depression of the cushion. Descartes, on Ben-Yami account, also holds that causes can be simultaneous with effects. As he describes, the sun light extends its rays instantaneously from the heaven to the earth; the pressure on our retina as the effect exerted by the sun millions of miles away is felt immediately. In other words, Descartes believes that the initial exertion of the sun as the cause is simultaneous with the pressure on our retina we feel as the effect.

I am sympathetic to Ben-Yami's revision, but do not agree with his reasons. First, Kant's ball/cushion case does support the simultaneity between the cause (the ball's pressing the cushion) and the effect (the depression of the cushion). But in Kant's example, the cause and the effect occur at the same location or in the vicinity, while Reichenbach is only concerned with distant events. Hence, Kant's argument for the simultaneity between a cause and its effect does not respond to Reichenbach's concern.

Second, Descartes describes how light extends its rays *instantaneously* from the sun to us based on our experience. But perceptual evidence is insufficient for the infiniteness of the velocity of light, since vision is unable to distinguish infinite velocity from finite but large enough velocity. Descartes' example thereby cannot support his claim that light extends its rays instantaneously from the sun to us as a *fact*. Indeed, given the conventional nature of simultaneity, the justification of it must be a priori rather than merely empirical. Hence, I think that Ben-Yami's defences for the revision are not convincing.

Nevertheless, we should allow ϵ to be 0 or 1. First, Reichenbach's reason is insufficient. There is no conceptual constraint on the velocity of a signal, since it is not contradictory for the first signal to be a signal and at the same time to be the limit of all other signals. Perhaps what is in Reichenbach's mind is the concept of the largest natural number which does not have its extension. But unlike the concept of natural number, the concept of first signal can allow that signal to be infinite, and thereby naturally the limit of all other signals. Moreover, it is worth noting that the dispute of whether ϵ could be equal to 0 or 1 is conceptual. Empirically, we only know the average velocity of light, namely c . As to whether the velocity of incoming (leaving) light is *actually* c , it is not a matter of fact at all. Then why cannot $\epsilon=0$, i.e., the velocity of incoming light be infinite? So, Ben-Yami's revision is a reasonable extension of Reichenbach's restricted condition.

To sum up, the concept of simultaneity of distant events, as Einstein demonstrates, is a matter of stipulation or a definition rather than a matter of fact. Reichenbach relates the conventionality of simultaneity with causality, suggesting that the objective temporal order can be determined by causality, namely that a cause is temporally earlier than its effect, while causally disconnected events are *indeterminate* with respect to temporal order. Simultaneous events are thus stipulated among indeterminate events. Ben-Yami revises Reichenbach's view

and holds that a cause is no later than its effect. It amounts to the claim that simultaneity is restricted by the formulation of $t=t_1 + \varepsilon(t_2-t_1)$ ($0 \leq \varepsilon \leq 1$).

3. Simultaneity and the time-lag argument

Now I turn to demonstrate why the time-lag argument is inconsistent with SR. The time-lag argument appeals to an claimed *undisputed fact* that in some case perception takes place *after* that the perceived object has ceased to exist (Robinson, 1994, pp. 80–81). Indeed, whether in some case perception takes place after the perceived event relies on the definition of simultaneity. So, it is not a matter of fact at all, let alone an undisputed fact.

Admittedly, on Reichenbach's account, temporal order is determined by causal structure: a cause must be earlier than its effect. Given the causal connection between the perceived event and its perceiving, perception would take place after the perceived event. This is also an empirical fact since Reichenbach admits that causal structure is the fundamental fact about reality, and it determines the temporal order.

However, as I argued, Reichenbach's restricted condition on the velocity of light is flawed. It is not contradictory to allow ε to be equal to 0 or 1. This means that the velocity of the incoming (leaving) light can be infinite. Suppose $\varepsilon=0$. This means that the perceived event and its perceiving are causally connected by a signal with infinite velocity. In other words, they are simultaneous. This stipulation of simultaneity is not the standard one, which Einstein adopted for pragmatic reasons. Yet $\varepsilon=0$ is not contradictory to any observable fact, since the measured average velocity of light is still c . Recall the round-trip experiment. Given the stipulation of $\varepsilon=0$, the incoming velocity of light—from O_1 to O_2 —becomes infinite. Hence, the emitting light immediately arrives at O_2 . In other words, $t=t_1$, namely e is simultaneous with e_1 .

The above stipulation can be generalized as follows:

Perceptual simultaneity: for any two distant events e_1 and e_2 , they are simultaneous iff the velocity of the incoming light signal from e_1 to e_2 is infinite.

This definition of simultaneity is called perceptual simultaneity, since it can apply to our vision, in which we conceive the velocity of the light signal emitted from the physical object to the perceiver to be infinite. In short, the most salient feature of simultaneity that Einstein proposed is its conventionality; stipulation is unavoidable in arriving to any definition of simultaneity. The proponents of the time-lag argument wrongly take it as an *undisputed fact* that in some cases perception takes place *after* the perceived event.

I will use an example to illustrate the above point. Suppose there is a star which is 4 light-years away from me, and I am observing its explosion right now. The proponents of the argument claim that the explosion happened 4 years ago, while my observation occurs right now. Because perception must be simultaneous with the content of the perception, what I am observing must not be the explosion itself. Therefore, naïve realism is false.

I do not deny that the explosion causes my perceiving of it. Nevertheless, the fact that there is a causal connection between the explosion and my observation of it does not imply that the explosion precedes my observation of the explosion. It only implies that the explosion is *not after* my observation of it. As I argued, simultaneity of distant events is not an undisputed fact; it is not even a fact at all. It is true that if we stipulate $\epsilon \neq 0$, the explosion precedes my observation of it. But ϵ *could* be stipulated to be 0 when perceptual simultaneity is adopted.

To sum up, the insight from SR reveals the confusion involved in the time-lag argument. It is not an *undisputed fact* that in some case perception takes place after the existence of the perceived event, which is *not even a fact* at all. For according to one stipulation of simultaneity—perceptual simultaneity—the perceived event is simultaneous with its perceiving. Moreover, if perceptual simultaneity is adopted, the causation involved in seeing will not be temporally extended; this means that the proponents cannot generalize the argument

based on specific cases to all perceptions. Hence, the time-lag argument would not get off the ground if the proponents understood simultaneity correctly.

4. More about perceptual simultaneity

So far, I have argued that the concept of simultaneity of distant events in SR is conventional, and accordingly what I call the perceptual concept of simultaneity, is in principle possible. In this section, I shall examine the concept of perceptual simultaneity from the perspective of daily life, which indicates that our concept of temporal order is built up by perception. The time-lag argument rather implies that our concept of perception built upon the concept of temporal order.

What do we mean by expressions like “a is simultaneous with b”, “a happens at the same time with b”, or “a happened after (before) b” in ordinary language usage? It seems that there is an objective and factual order among events, and perception provides evidence for judgements about temporal order. Imagine an ancient Greek 100-metre dash. The referee stood at the terminal point, staring at the finishing line. He judged who won, who was second, third, etc. by looking. In our daily life, we get used to judging temporal order by perception. For instance, I saw my parents stepping into the house at the same time; Joe heard people screaming immediately after the gunshots; etc. These examples indicate that the concept of temporal order is closely related to perception, or even established by our perception.

The invention of timers, clocks and other time measuring devices only enriches and refines our ways of measuring time. An improved technology can tell us that Usain Bolt was one-tenth of a second ahead over Justin Gatlin in a 100-metre dash, which we cannot tell only by looking. But these time-measuring devices do not change our concepts of simultaneity and temporal order. Note I do not claim that the concepts of simultaneity and temporal order are subjective. They are objective, or at least we perceive them as objective.

The time-lag argument presupposes that perceiving must be simultaneous with the perceived event. This presupposition indicates that the proponents of the argument hold that the concept of simultaneity is built into the concept of perception, namely that the latter depends on the former. However, as I demonstrated, our concepts of simultaneity and temporal order are established by perception, not *vice versa*; the proponents of the time-lag argument seem to put the cart before the horse.

One might contend that the concept of simultaneity has nothing to do with perception, and simultaneity is purely objective. Newtonian physics tells us time is absolute and objective. We can perceive the world in the way as I described above because the order of those events happens in this way. I do not deny this. My point is that the concept of simultaneity that we have depends on perception. Perception is so fundamental that, without it or with a different perceptual system, our concepts of temporal order (if we would still have them) would become very different. Imagine a possible wild world that the laws of nature are different from ours. The creatures in that wild world think that time does not lapse but rotates. This is presumably because they perceive everything as rotating. For example, all transportation rotates; information transmits by rotating. In that world, creatures might not have the concepts of simultaneity and temporal order, but they might have the similar naïve realist's concept of perception, namely that they believe that visual experience is constituted by the perceived rotating environmental objects. This shows that the concept of time need not be built into the concept of perception.

I do not mean to argue that perceptual simultaneity should be adopted in scientific practices because it will bring about impractical complexity. But perceptual simultaneity is conceptually consistent with our ordinary understanding of simultaneity and temporal order; and our daily life also suggests that the concept of perception is more fundamental than the concepts of

simultaneity and temporal order, which means that the latter should not be built into the former as the time-lag argument implies.

5. One suspicion

The proponents of the time-lag argument might protest that SR is only concerned with the light signal, so the objection based on the concept of simultaneity is only relevant to sight, and the argument still stands against naïve realism when construed to the other senses.

This doubt is legitimate. SR does not support that hearing is simultaneous with the event heard; we do not have perceptual simultaneity with respect to hearing or any of the other senses except for sight. For instance, we cannot claim that my hearing of the thunder is simultaneous with the occurrence of the thunder; the thunder occurs *before* I hear the sound of the thunder. This is an empirical fact. Therefore, there is still room for a restricted time-lag argument which is only concerned with hearing and smelling. Such a restricted time-lag argument, even if what I say about the velocity of light in the previous sections is sounds, could nevertheless demonstrate that naïve realism about hearing and smelling is false.

Naïve realists may concede that the heard event and its hearing are not simultaneous but deny that any mental representation is involved in hearing and smelling. They may argue that we do smell or hear the object by smelling the scents or hearing the sounds generated by the object. This concession sounds as if naïve realists hold that, unlike seeing objects, hearing objects and smelling objects are *indirect*. This difference consists in the following fact. The colour or any other qualities of a seen object is in the object or a part of it. In contrast to visual qualities, sounds or scents are not in the object or parts of it; they are rather produced by the object. In this sense, I indirectly hear and smell an object, but directly see an object. However, the indirectness involved in hearing and smelling is not the one associated with mental representations, since scents and sounds are not mental.

The proponents of the time-lag argument may not be convinced by the above response and may continue to contend that naïve realism cannot explain why we still smell a flower which has already been crushed and hear an explosion which has already been over. The presupposition behind this contention is that perception is a relation, and the perceived thing as a *relatum* must exist simultaneously with its perceiving.

To rebut this presupposition, the further objection against the time-lag argument should go beyond the concept of simultaneity. I shall argue in the next section that the generalized version of the time-lag argument involving conceptual idealizations which does not fit with many actual perceptions.

6. Conceptual idealizations in the generalized version

The present section covers several related arguments and will proceed as follows. First, I point out that there are conceptual idealizations assumed by the generalized version of the time-lag argument. These conceptual idealizations conflict with the perceived event and their perceptions discussed in daily life contexts since they have intervals, and in many cases they temporally overlap. This means that perception does not always take place *after* the perceived.

Let's start with the conceptual idealizations. The generalized version of the time-lag argument claims that all perceptions take place after the perceived events because all perceptions involve a temporally extended causal process. I argue that the generalized version presupposes that both a perceived event and its perception are idealized in the sense that they are not intervals but extensionless moments. Otherwise, it would be false to claim that a perceived event is always before its perception because many perceived events and their perceptions temporally overlap.

The argument involves an event E with a specific duration. It begins at a time t_1 and ends at a time t_2 . An example of such an event is the explosion of a star. The explosion takes a period of time. Maybe it happens very fast yet still takes time. A subject's perception of E (P for short) also has a duration. She sees the beginning of E at t_3 and the end of E at t_4 . The generalized version states that P always happens after the existence of E, which implies that $t_3 > t_2$. This is implausible. There are indefinitely many examples in everyday life in which t_3 is before or simultaneous with t_2 .

Take vision for example. The velocity of light is very fast and the distance between the subject and the object may not be huge. Because of this, in many cases, E does not cease to exist when P happens. Thus, at least we have $t_1 < t_3 \leq t_2$. For example, I was watching a live football match Argentina vs. France. I saw Messi stopping the ball in the corner area, observing the defender and seeking to pass him in the next moment. In such a scenario, we may say that Messi's series of activities happened 'in a moment'. When I stared at Messi, he was holding the ball and observing the defender without moving an inch. What I saw and my seeing temporally overlap in this example, because Messi's series of activities (stopping the ball, holding the ball and observing the defender) take time, so does my perceiving of them. It is not the case that Messi had already passed the defender, but my seeing of his activities still stayed at his stopping the ball and observing the defender. Instead, my seeing of his holding the ball temporally overlaps with his holding the ball. Hence, my seeing of his activities does not happen after his activities. This shows that the generalized version is inconsistent with many actual perceptions in which the perceiving and the perceived event have intervals. To avoid this inconsistency, the proponents of the generalized version must assume that the perceiving and the perceived event are extensionless moments, connected by finite light signal, to avoid the temporally overlap between the perceiving and the perceived.

Moreover, the vagueness of event of affairs also conflicts with the generalized version. Both events and states are vague in the sense that they do not have a precise beginning or ending moment; the temporal border of events and states is not precisely determined. Because of this, when we assume that E begins at t_1 and ends at t_2 , and P begins at t_3 and ends at t_4 , we are assuming an ideal notion. In reality, the beginning and ending time of E and P are always *around* t_1 , t_2 , t_3 and t_4 . When Messi stopped the ball and held it at t_1 , did it begin at the time when he touched the ball or when the ball stopped moving on the ground? When did his touch happen precisely? If you watch the touch through a high-speed camera, you will see that the touch is also a process, and you cannot pick out a precise moment when it started or ended. If vagueness of states and events is granted, then the following situation is possible: an event begins around t_1 and the perceiver begins to perceive it around t_3 , but t_1 and t_3 are quite proximate. For example, if an event happens 10 meters away from the perceiver, then the temporal distance between the perceiving and the beginning of the event is around $1/3 \times 10^7$ seconds. Because both the event and the perceiving are vague, the temporal difference between them will be ‘absorbed’ into the vague area. That is to say, the area of ‘around t_1 ’ can coincide with the area of ‘around t_3 ’. Hence, it is reasonable to say that in such cases the perceiving and the perceived are simultaneous. In other words, the generalized version is false unless both the event and the perceiving are assumed to be momentary.

So far, I have demonstrated that without the assumption of idealization the generalized version of the time-lag argument cannot conclude that in general perceiving happens *after* the perceived event. In many cases, the perceiving and the perceived are simultaneous, especially those in which the objects seen are nearby.

Paradoxically, our ordinary concept of perception has nothing to do with these idealizations, since perception only concerns non-idealized events, states and objects. Consider the following

example. I am witnessing a traffic accident on Nador Street right now. Suppose that I am standing 10 meters away from the accident and pinpointing the clashing moment as an idealized event. Because of the ‘time-lag’, I should not tell my friend on the phone “I am witnessing a traffic accident on Nador Street right now”. Instead, I should say “I am witnessing a traffic accident on Nador Street which happened $1/3 \times 10^7$ seconds ago given the speed of light.” In real life, I will not mention this tiny interval. Otherwise I would be accused of lacking common sense since our ordinary concept “now” is not idealized. ‘Now’ has an indeterminate interval, and its length depends on particular contexts. In the above example, $1/3 \times 10^7$ seconds would not make ‘now’ into the past. What I witness is simultaneous with my witnessing; both are happening right now. In other words, perception is not what the proponents of the generalized time-lag argument suppose: that a temporally extensionless event (the perceived) causes another temporally extensionless event (the perceiving), and the latter follows the former. Therefore, their argument does not discuss the perception which interests naïve realism, let alone rebut naïve realism.

I have demonstrated that idealizations are assumed by the generalized version of the time-lag argument. However, idealizations conflict with our ordinary use of concepts such as event, state, now, simultaneity, etc. If our everyday discourses were paraphrased by idealized concepts, those discourses would become clumsy and even ridiculous. More important, naïve realism is concerned with actual perception rather than idealized perception.

7. Can we see things as they were?

The above objection to the generalized version does not apply to the specific time-lag argument based on cases such as seeing a remote star. Indeed, temporal order only puts a constraint on

perception in the sense that we cannot perceive future things unless the implausible backward causation is possible.² That is, we can see a thing as it was.

Le Morvan writes, “the claim ‘if something no longer exists, we cannot now perceive it’ can be at least interpreted in two ways: (a) if something no longer exists, we cannot now perceive it as it presently is, or (b) if something no longer exists, we cannot now perceive it as it used to be” (Le Morvan, 2004). (a) is true, while (b) is false. For why couldn’t we now see something as it was which no longer exists? Le Morvan thinks that if we take the (b) interpretation, then there is no problem holding that we can perceive a thing as it was.

Sense-datum theorists (or representationalists) might challenge Le Morvan’s view as follows. It is a fact that a perceptual experience occurs *now*; if a seen event constitutes the perceptual experience as naïve realists claim, then the seen event must also happen *now*. Thus, the seen event must happen now. This argument relies on a presupposition that the constituent and the constituted must temporally overlap. That is, given an event e happening during an interval Δt and an event f happening during an interval Δt_i , if e is constituted by f, then necessarily $t_i \subseteq t$. For example, the Anglo-Chinese War happened in 1840 and lasted for 3 years. The war was comprised of many battles. A battle that happened between Great Britain and the Qing Dynasty in 1856 cannot be a constituent of the Anglo-Chinese War. To be a constituent of the war, the event must have happened between 1840 and 1842. Sense-datum theorists want to apply this notion of constitution to perception. If the seen event is a constituent of the seeing of it, then they must also temporally overlap as a battle of a war constituting the war.³

I think that there are at least two notions of constitutive relation, and sense-datum theorists hold one while naïve realists hold the other. The first notion of constitutive relation (of an event)

² The discussion of the impossibility of the backward causation can be seen in Ben-Yami (2007, 2010).

³ I’m indebted to Howard Robinson who put forward this objection in a private conversation. Sean Enda Power (2010) mentioned a similar objection.

refers to a temporal part-and-whole relation. The constituent and the constituted temporally overlap, and their relationship is contingent. Specifically, a constituent is a stage of the whole event; or it is an event among a series of events, where the series constitutes the whole event (e.g. the Anglo-Chinese War is made up of a series of military events and political events). Moreover, the constituent is contingent to the whole event. It means that even if the constitutive event did not happen the whole event would still happen. For example, if the battle of Humen had not happened, the course of the Anglo-Chinese war would have slightly differed, but it would still have been the Anglo-Chinese War.

The second notion of constitutive relation refers to a relation in which the constituent is a necessary component of the constituted. In particular, the constituents as *relata* constitute the corresponding event. If the constituent differs, necessarily the constituted differs. For example, a father-and-son relationship is such a constitutive relation. Any actual pair of a father and his son constitute a particular father-and-son relationship. If a father or his son were replaced by another person, that particular relationship would not hold. Moreover, the constituents need not be simultaneous with each other or with the constituted. In some cases, the relation between them is even atemporal. For example, Peter Strawson is Galen Strawson's father. Their relationship holds despite the fact that Peter Strawson has passed away.

Naïve realists hold the second notion of constitutive relation: in seeing the event seen as a necessary component constitutes the seeing of it, but they *need not be* simultaneous. Why is a subject's seeing an event not of the first notion of constitutive relation? Because in a particular visual perception if the seen thing became another thing this particular visual perception would not happen. For example, I am seeing a narcissus outside my window. If the narcissus were a tulip, I of course would not see a narcissus. The first notion of constitutive relation only requires

the seen event and the seeing of it to temporally overlap with each other; their relationship is contingent.

The proponents of the argument might further contend that even though the constitutive relation is the one that I argued for, the distant event in question still fails to be the *relatum*. For a subject's seeing an event is essentially a visual experience, which is a pure subjective episode and occurs where the subject is, while a distant event (e.g. a star's explosion) does not occur where the subject is. Thus, the distant event cannot constitute the visual experience.

This contention goes even further than the original assumption that what is seen must be simultaneous with the subject's seeing it. For the original assumption does not directly exclude the logical possibility that a distant event can be seen without a representation or any mental mediator, while the new contention straightforwardly rules out this possibility since it asserts that a visual experience is essentially subjective and occurs where the subject is.

I shall discuss two problematic assumptions involved in this response. First, the proponents assume that seeing can be reduced to a subjective visual experience with a proper causal process.⁴ Second, a visual experience cannot reach a distant event without a mental representation or other mental mediators.⁵

The first assumption would be innocuous if we understand a visual experience correctly. It becomes implausible only if a visual experience is understood in a way leading to the second assumption. Namely, a visual experience is supposed to be completely subjective, and no distant event or object constitutes it.

⁴ See Grice (1961).

⁵ C.D. Broad (1952) describes vision as ‘saltatory’: it seems to leap the spatial gap between the perceiver and the perceived.

In everyday life we usually use transitive perceptual verbs (e.g. 'see', 'hear' etc.) to report what we perceive (or the perceptual experience). For example, I see a bald man sitting in the corner; I hear the screaming of my mom; etc. Sometimes we also use perceptual verbs with that-clause. For instance, I see that a bald man sits in the corner; I hear that my mom is screaming; etc. The term "perceptual experience" rarely appears in the daily discourse; it is indeed a philosophical idiom. Similar philosophical idioms include "be (visually) aware of", "have a (visual) experience of".

It is not clear why these philosophical idioms prevail in the philosophical literature. One explanation is related to the empiricist tradition. Empiricists propose that what a subject is directly aware of are impressions, ideas, sense-data, etc. These perceptual objects are not the usual objects for seeing, hearing, smelling, etc. Accordingly, these philosophical idioms enter the picture when the new perceptual objects were invented.

In addition, philosophers may mean to emphasize the subjective aspect of perception. In the philosophy of perception, philosophers think that there is a common factor among subjective indistinguishable perception, illusion and hallucination. Thus, to consolidate the notion of common factor, it seems that a new category other than seeing, hearing, etc. is needed (e.g. awareness or experience). If this is the case, to reduce seeing to a subjective visual experience in a non-relational sense is not only a terminological problem, rather, it leads to a substantive view about perception. If so, the assumption may beg the question against the time-lag argument. For the aim of the argument is to argue for a sense-datum view or a representational view, namely a visual experience will be treated as a new category other than seeing. Now the assumption that a visual experience is totally subjective presupposes the conclusion of the argument.

The second assumption—that a visual experience cannot reach to a *spatially* distant event—seems parallel to the original assumption that one's visual experience cannot reach out to a *temporally* distant event (e.g. a past event). However, this new assumption is more implausible since it conceptually excludes the possibility of naïve realism. The requirement of the simultaneity between what is seen and a subject's seeing does not conceptually rule out the possibility of naïve realism, because it only claims that distant events or objects cannot be seen directly due to some empirical reason. In this sense, the new assumption is stronger because it *conceptually* rules out the possibility that distant events or objects could constitute one's visual experience. To assume that visual experience cannot reach a distant event stipulates a special conception of visual experience, namely it is totally subjective. This is what the time-lag argument is initially meant to establish. The proponents now appeal to the new assumption involved a new conception of visual experience to demonstrate the initial aim of the time-lag argument. This is again begging the question. Therefore, a distance event is not conceptually ruled out to constitute a visual experience.

In conclusion, temporal order only sets a constraint on perception in the sense that a subject cannot perceive a thing in the future. We can perceive a thing as it was. The objection to this claim is based on a contingent notion of constitutive relation which is not the one which naïve realists hold. The notion of constitutive relation in perception refers to a relation that the perceived event necessarily constitutes its perceiving; the contingent feature of the constituent—ceasing to exist—does not affect its constitutive role.

8. Houts' argument

Houts argues that if philosophers attempt to avoid the time-lag argument by insisting that “we see really physical things, properties, and events...but we see them late” (Houts, 1980, p. 155), three more unacceptable consequences follow:

(a) At time t, we are not at any spatial distance from events and stages we perceive at t.

(b) It is not the case that all the spatially non-contiguous events and stages we perceive at a time are or were at some spatial distance from one another.

(c) We never perceive at a time events and stages which are or were in a three-dimensional array. (1980, *ibid*)

(a) is unacceptable because we usually think that when one sees an event at t, one stands in spatial relation to the event seen at t. For instance, when I witness a traffic accident at 15:00, I am standing around 10 meters away from the accident. (b) seems also to be at odds with our common knowledge, since it seems obvious that if I see three events at the same time, then those events must be at some spatial distance from one another. (c) can be inferred from (b) because if those events at t are not at any spatial distance from one another, then they are not in a three-dimensional array at t.

I have argued that the concept of temporal order is not involved in the naïve realist concept of perception. Usually we see things as they are, but we might also see things as they were. Temporal order only sets a physical constraint on perception in the sense that we cannot perceive future things. In this section, I criticize Houts' argument by showing why it is not objectionable to concede what a subject now sees happened in the past, or what a subject now sees existed but does not exist anymore.

Here is my reconstruction of Houts' argument:

1. If two physical things have a spatial distance from each other, then they must coexist.

2. If naïve realists concede that events or stages that a perceiver perceives were only in the past, then they do not exist now.

3. Given that the event of a perceiver's perceiving happens at present, this event does not coexist with what the perceiver perceives.

4. Therefore, if naïve realists concede that what a perceiver perceives was only in the past, then a perceiver's perceiving and the perceived have no spatial distance, that is to say, at t, the perceiver is never at any spatial distance from the physical things she perceives at t.

The argument creates a tension that if naïve realism is true the unpleasant consequence (a) follows. That is, at a time t , we are not at any spatial distance from events and stages we perceive at t .

Worse still, (b) will also follow if this argument stands. It is a fact that we sometimes see different events or stages at time t . For example, on a clear night, I raise my hand and see a bright star, the moon and my raised hand. Namely, I simultaneously see a particular stage of those three objects. But it seems also true that the event or stage at a larger distance (e.g. the star) is temporally more distant than those at a lesser distance (e.g. my raised hand) because light takes longer to get to the perceiver if the thing that the event happened to is at a larger distance. So the stages of the star, the moon and my raised hand that I see at t happened at different times (past). Therefore, those temporally distant stages are not coexistent. According to (1), those stages do not have spatial distance from each other when I see them. So (b) follows.

(c) is easily derived from (b), since if the bright star, the moon and my raised hand are or were not at any spatial distance when I see them at t , then I certainly never perceive them in a three-dimensional array.

Note that when we talk about a spatial distance between two events, we are actually talking about a spatial distance between two physical things to which the two events happen. And it also seems true that the spatial distance between two physical things is identical to the spatial distance between the locations that these two physical things occupy. If this is admitted, then Hout's first premise is not as solid as it appears to be. For a location that a physical thing occupied is still there no matter whether the physical thing exists or not. So it seems still sensible to talk about the spatial distance between two physical things, even though one or both of them do not exist but existed. For instance, Epang Palace was 15km west of Xi'an. It makes sense to talk in this way even though Epang Palace was destroyed by XiangYu about 2000

years ago. We also talk about the spatial distance between a star and the earth, though we know the star does not exist anymore. Therefore, the concept of spatial distance is not as narrow as the argument assumes. It can be applied to physical objects which do not exist but existed.

If my response makes sense, then all the unacceptable consequences that Houts argued for are not as objectionable as they appear to be. (a) does not hold because at any time t , we are at some spatial distance from events and stages we perceive at t . The distance is only determined by the locations the perceiver and the events or stages occupy (an event or a stage occupies a location in virtue of the location the physical thing involved occupies). (b) does not hold either. All the spatially non-contiguous events and stages we perceive at a time are or were at some spatial distance from one another. When I look at my raised hand, the moon, and that bright star at a night, they have or had a distance from one another. (c) is also false, since my raised hand, the moon and that bright star, at least their locations, do form a three-dimensional array.

Conclusion

I began the paper by pointing out that the success of Russell's argument relies on two claims: (a) It is an "empirical fact" that light takes time to be transmitted from a perceived thing to the subject; and (b) naïve realists hold that perception must happen simultaneously with what is perceived.

Based on the insight from SR, I refute (a); I criticized the proponents' confused use of the concepts of simultaneity and temporal order. The concept of simultaneity of distant events is a matter of convention or stipulation, not a matter of fact. A seen state and its seeing are simultaneous given perceptual simultaneity. Therefore, (a) is false.

However, the objection from SR cannot apply to hearing and smelling because the velocity of sound and propagation of scent is far smaller than the velocity of light. Temporal order of hearing and the heard state is matter of fact.

To deal with this limitation, I further argued against (b). The proponents of the time-lag argument wrongly ascribed (b) to naïve realism. I deployed two arguments to defend the view that temporal order only sets a constraint on perception in the sense that a subject cannot perceive future things. In other words, a subject can perceive things as they are or as they were. I first demonstrated that the idealizations assumed by the time-lag argument conflict with our ordinary language practice and are even irrelevant to understanding actual perception. Second, I argued that perception is a relation in which what is perceived necessarily constitutes the perception. The proponents' reason for why perception must be simultaneous with what is perceived is untenable, since their reason is based on a contingent constitutive relation.

References

- Allen, K. (2019). The Value of Perception. *Philosophy and Phenomenological Research*.
- Ben-Yami, H. (2006). Causality and temporal order in special relativity. *British Journal for the Philosophy of Science*, 57(3), 459–479.
- Ben-Yami, H. (2007). The impossibility of backwards causation. *Philosophical Quarterly*, 57(228), 439–455.
- Ben-Yami, H. (2010). Backwards causation still impossible. *Analysis*, 70(1), 89–92.
- Broad, C. D. (1952). Some elementary reflexions on sense-perception. *Philosophy*, 27(January), 3–17.
- Campbell, J. (2002). *Reference and Consciousness* (Vol. 72). Oxford University Press.
- Einstein, A. (1920). *Relativity: The Special and General Theory*. Routledge.

- Einstein, A. (1923). On the electrodynamics of moving bodies. In *The Principle of Relativity* (pp. 35–65). Dover Publications.
- Grice, H. P. (1961). The causal theory of perception, part I. *Proceedings of the Aristotelian Society*, 121, 121–152.
- Houts, R. W. (1980). Some implications of the time-lag argument. *Philosophy and Phenomenological Research*, 41(1/2), 150–157.
- Kant, I. (1787). *Critique of Pure Reason*. Cambridge University Press.
- Le Morvan, P. (2004). Arguments against Direct Realism and How to Counter Them. *American Philosophical Quarterly*, 41(3), 221–234.
- Martin, M. G. F. (2004). The Limits of Self-Awareness. *Philosophical Studies*, 120(1–3), 37–89.
<https://doi.org/10.1023/B:PHIL.0000033751.66949.97>
- Power, S. E. (2010). Perceiving External Things and the Time-Lag Argument. *European Journal of Philosophy*, 21(1), 94–117.
- Reichenbach, H. (1927). *The Philosophy of Space and Time*. Dover Publications.
https://books.google.hu/books?id=E_DDAgAAQBAJ
- Robinson, H. (1994). *Perception*. Routledge.
- Russell, B. (1927). *The Analysis of Matter* (Vol. 37, Issue 4, pp. 382–385). Kegan Paul.
- Russell, B. (2009). *Human Knowledge: Its Scope and Limits* (Issue 90). Routledge.
- Winnie, J. A. (1970). Special relativity without one-way velocity assumptions: Part I. *Philosophy of Science*, 37(1), 81–99.