

The time-lag argument and simultaneity

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Abstract

The time-lag argument seems to put some pressure on naïve realism to agree that seeing must happen simultaneously with what is seen; meanwhile, a wide-accepted *empirical fact* suggests that light takes time to transmit from objects at a distance to perceivers – which implies what is seen happened before seeing, and, accordingly, naïve realism must be false. In this paper, I will, first of all, show that the time-lag argument has in fact involves a misunderstanding concept of simultaneity: according to Special Relativity, simultaneity is a matter of convention rather than a matter of fact, so, in principle, we can stipulate a perceptual conception of simultaneity, according to which what is seen is simultaneous with seeing. Secondly, the generalized time-lag argument has a mistaken view on the perceived events and perceiving; it has a doubtful assumption that these events are momentary in the mathematical sense. Such idealization is the main reason why we have the intuition that the time-lag effect of perceiving is in conflict with our ordinary perceptual experiences. Finally, I argue that the naïve realist account of the perceptual relation is a nontemporal constitutive relation; and hence naïve realism is compatible with the claim that we can perceive things as they were, and it should not be weakened by the time-lag argument.

Keywords Simultaneity, Convention, Idealization, The constitutive relation

1. Introduction

The naïve realist theory of perception¹ 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). One famous challenge for this view is the time-lag argument. As Russell argued,

Moreover, 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 what we 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) If naïve realism is true, then the physical sun now is identical with the sun you see now.
- 3) The sun you see now is the sun as it was eight minutes ago.
- 4) (3) implies that the sun might have gone out by the time you see it now.
- 5) (4) implies that the sun you see now might have different properties to the physical sun as it is now.
- 6) Therefore, the physical sun as it is now is not identical with the sun you see now.

¹ Some philosophers prefer the term "Direct Realism" to the term "naïve realism" because "naïve" is supposed to be pejorative. However, if defending naïve realism is a process of finding a way back to our original view on perception, namely a naïve view, then the term "naïve realism" is preferable. I thank an anonymous reviewer for bringing up this terminological issue, which gives me the opportunity to briefly address it.

7) (6) is grounded in an empirical fact expressed by (3) and also the negation of (2)'s consequent.

Conclusion: Naïve realism is not true.

Russell's argument relies on the following two presuppositions: (a) it is an empirical fact that light takes time to travel from objects at a distance to the subject; (b) naïve realism implies that seeing happens simultaneously with what is seen. Only with (a) can he justify premise (3) and regard it as a fact, which finally leads to (6). Meanwhile, presupposition (b) justifies premise (2). Suppose (b) is false, namely that naïve realism is compatible with the claim that one can see things as they were. It would follow, in Russell's example, that naïve realism is compatible with the apparent fact that the sun you see now is identical with the sun eight minutes ago – which forces one to admit that premise (2) must be false. Hence, to retain the truthfulness of premise (2), those who propose the time-lag argument need to at first make sure presupposition (b) is plausible.

The alleged *empirical fact* and the controversial understanding of naïve realism lead Russell and many others to believe that something must be wrong with naïve realism. As 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 (for example, Robinson, 1994, pp. 80–81) would go further and generalize the time-lag argument, making it as a claim not only for specific cases involving distant objects (e.g., seeing the sun; seeing a star's explosion) but for all kinds of perceptions. They believe that a temporally extended causal process is the essential feature of perception regardless of the process's length. Even those mundane cases – for example, seeing the

flowers in the wind – involve a bit of a time lag. If such a generalized time-lag argument stands, naïve realism would be completely false regardless of what kinds of perceptions they are.

In this paper, I shall demonstrate that both (a) and (b) presupposed by the time-lag argument are groundless. The time-lag argument proponents assume a *factual* understanding of the concept of simultaneity, which leads them to hold it is an empirical fact that light takes time to arrive from a distant object to a subject. However, according to the Theory of Special Relativity (SR in short), simultaneity is a prior stipulation or definition (which I will explain in detail) that should not be understood as a fact among events at a distance. I also argue that naïve realists do not believe that perceiving must happen simultaneously with what is perceived. The temporal order or causation only imposes a physical constraint upon perception, in the sense that a subject cannot perceive things as they will be because backward causation is implausible.² Thus, naïve realism is consistent with the claim that a subject perceives things as they were.

The paper proceeds as follows. In section 2, following Einstein (1923), Reichenbach (1927), and Ben-Yami (2006), I explain that the concept of simultaneity involves a convention according to SR. In section 3, I use the well-accepted 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 is adopted – namely that light’s velocity emitted from a distant object at a distance to a perceiver is stipulated to be infinite – then there will be no confusion to agree that seeing is happening simultaneously with the seen event at a distance. Given perceptual simultaneity, even (b) is consistent with naïve realism. Section 4 turns to a possible objection to my argument due to a concern that SR only talks about the light signal,

² 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).

which is not causally relevant to hearing and smell. In section 5, I show that the generalized time-lag argument presupposes several idealizations. For example, seeing and the events seen are momentary in the mathematical sense; concepts such as ‘present’ and ‘now’ refer to an extensionless point. These idealizations are at odds with many cases in our daily perceptual experiences. I offer a further objection to the time-lag argument in section 6, where I argue that temporal order only imposes 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 7 is my response to Houts’s objection to the claim that a subject could see a thing as it was.

2. Special Relativity and Simultaneity³

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 teach us this? Presumably, what Russell says is this: the velocity of light is finite (i.e., in a vacuum, it is c , approximately 300,000 km/s), and one necessary condition for seeing an object O is that the light emitted from O hits the perceiver’s retina. Therefore, seeing O must occur somewhat later than the emission of the light from O .

Russell is not entirely wrong about certain scientific facts; but still, he does overlook a more fundamental theoretical hypothesis that simultaneity of events at a distance is a matter of convention – which leads to the collapse of the entire reasoning. Sadly, a correct understanding of the time-lag argument must rely on an accurate understanding of the concept of simultaneity. And it becomes a little ironic to see that Russell and other advocates who have a scientific attitude to the time-lag argument fail to have a properly scientific understanding of the concept of simultaneity.

³ I’m indebted to Hanoah Ben-Yami for helping me to develop my argument based on special relativity.

As Einstein puts it clearly, “it is not possible to compare the time of an event at A with one at B without a further stipulation” (1923). But don’t we always compare the time of an event at A with another at B without any further stipulation? For example, we say that a star’s explosion happened four years earlier than our seeing it on earth. In his famous article “On the Electrodynamics of Moving Bodies”, Einstein first explains why comparative judgments involving time are judgments 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 a particle’s motion would be physically meaningless. To understand the meaning of “time”, one must understand the concept of simultaneity, because all judgments involving time are also judgments about simultaneous events between the evaluated event and the movement of a clock’s hand.

The difficulty is how to determine the 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, an observer located at A can evaluate the time of events in the clock’s immediate vicinity. We thus determine A-time at point A. Similarly, we can determine B-time at point B. But we cannot derive a standard time for A and B from A-time and B-time. Accordingly, it is still impossible to compare the time of an event at A with one at B without a further stipulation.

Scientists and philosophers before Einstein failed to acknowledge this problem. Both the dominant Newtonian physics and common sense embraced an absolute conception of time.⁴ Hence, there is no difficulty in determining the temporal order of events at a distance, i.e., the clock at B can determine the time of an event at A and *vice versa*. The notion of absolute time is precisely what 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 synchronization: the amount of time for light to travel from A to B (Δt_1 for short) and from B to A (Δt_2 for short) are equal. Only with a definition like this could a standard “time” for A and B be established. Einstein shows that $\Delta t_1 = \Delta t_2$ is a stipulation rather than an empirical fact. In standard synchronization, the velocity of light is constant as stipulated, while it can be stipulated otherwise but with the same average velocity. After all, Clock-A only records the time of light’s being emitted and arriving, which only warrants the average velocity of light but not light’s instantaneous velocity. This means that $\Delta t_1 \neq \Delta t_2$ is possible; we can, in principle, have infinitely many determinations of simultaneity (Winnie, 1970), and the standard synchronization is widely adopted only for pragmatic reasons.

Einstein, on another occasion, expounds the same point through another model:

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. M is the middle point where the observer receives the light signals from A and B. It is supposed

⁴ The assumption of an absolute time might also be a stipulation (or a convention).

that if the observer receives A-signal and B-signal simultaneously, these signals were sent simultaneously, and the simultaneity of events at a distance (e.g., their emissions) thereby is determined. But Einstein also points out that this way of arriving at the definition of simultaneity still involves a stipulation: that the velocity of light is constant.

To put it in another way, suppose that the observer wants to measure the velocity of light. She knows AM's length. She then needs to know how much time that light traverses the path AM. There is no problem with determining the time at M because M is the observer's location. The observer then needs to determine when A-signal was sent out at A so that she could know how much time that light traverses the path AM. But she cannot determine the sending out time unless the definition of simultaneity of events at a distance is to be established first. Therefore, a stipulation is unavoidable in arriving at a definition of simultaneity.

Reichenbach (1927, §22) relates Einstein's conventional concept of simultaneity to causality and temporal order. He argues that the causal structure determines the objective temporal order: a cause is temporally earlier than its effect, and 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 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 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 from one to the other; that is, no causal connection holds between them. Reichenbach thus concludes that 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). The corresponding restriction is stated by the formula $t=t_1 + \epsilon(t_2-t_1)$ ($0 < \epsilon < 1$).

The value of ϵ reflects the kind of stipulation of simultaneity that we adopt. For instance, $\epsilon=1/2$ is the standard synchronization 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 the simultaneity of events at a distance in terms of causally disconnected events. Therefore, Reichenbach inherits Einstein’s thought on the conventional nature of simultaneity; but he also justifies the restriction of the stipulation in virtue of causal connection.

Ben-Yami (2006) revises Reichenbach’s restriction and allows ϵ to be equal to 0 or 1, which means that the velocity of light in one direction can be infinite while in the other direction, it becomes $c/2$. 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; the revised restriction allows a cause to be either before its effect or simultaneous with its effect. As such, simultaneity will cover two kinds of situations: (1) when a light signal causally connects a cause and its effect with the stipulation of an infinite velocity in one direction; and (2) when there is no causal connection among these events at a distance. Both situations involve a 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 contends in the footnote of §22 (1927) that the supposition of an infinite velocity implies that the first signal (light) would not be a signal at all but the limit of all signals. Here Reichenbach seems to assume

that a signal's velocity must be finite. Yet this constraint is not evident. Why can't the velocity of a signal be infinite? Why is there a problem for it to be the limit of all signals?

Ben-Yami (2006) takes insights from Kant and Descartes and argues against Reichenbach's constraint. 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 pressing the cushion), as a cause, is simultaneous with the effect, the depression of the cushion. Descartes, on Ben-Yami's account, also holds that causes can be concurrent with effects. As he describes it, the sunlight extends its rays instantaneously from heaven to the earth; we immediately feel the pressure on our retina of the sun's effect exerted millions of miles away. In other words, Descartes believes that the initial exertion of the sun as the cause is simultaneous with the pressure we feel on our retina.

I am sympathetic to Ben-Yami's revision but do not entirely agree with his reasons. First of all, Kant's example indeed supports the simultaneity between a cause (the ball's pressing the cushion) and an effect (the depression of the cushion). The problem is that the cause and the effect occur at the exact location or in the vicinity, which is out of Reichenbach's original concern about events at a distance. Hence, Kant's argument for the simultaneity between a cause and its effect does not pertain to Reichenbach's concerns.

Secondly, Descartes' theory of the infinite speed of light propagation is derived from his physical theory. According to Descartes' physics, the universe is full of bodies, and there is no void space separate from bodies. Hence, he defines motion in terms of a change of the neighborhood of contiguous bodies. The definition implies that bodies can move only simultaneously and in a closed curve or path. This physical theory suggests that light extends its rays instantaneously from the sun to us because the media are also bodies, and they move

together as if moving one end of a stick would instantaneously involve a motion transmission to the other end of it (cf. Descartes et al., 1983; Slowik, 2008).

Ben-Yami writes, “We would need a good reason to accuse Kant, Descartes and others of a conceptual blunder” (2006, p. 462). Descartes’ conceptual blunder is within his physics. For example, it is simply false that motion is a change of the neighborhood of contiguous bodies, and that all bodies must move simultaneously and in a closed curve or path. Hence, naturally, Descartes’ views on the infinite speed of light propagation are ill-grounded. Furthermore, Descartes’ physics implies that the speed of light propagation is *constantly* infinite, not restricted by $t=t_1+\varepsilon(t_2-t_1)$ ($0\leq\varepsilon\leq 1$).⁵

Nevertheless, we should allow ε to be equal to 0 or 1 since Reichenbach’s reason for rejecting this is insufficient. There is no conceptual constraint on the velocity of a signal to be infinite, since it is not contradictory for the first signal to be both a signal and the limit of all other signals. Perhaps what is in Reichenbach’s mind is the concept of the largest natural number. There is no largest natural number because the natural numbers stretch to infinite. But unlike the concept of the largest natural number, the concept of the first signal is not empty; it is light. When the candidate has been fixed, there is no reason not to allow that signal to be infinite and thereby to be the limit of all other signals. Moreover, it is worth noting that the dispute as to whether ε could be equal to 0 or 1 is conceptual. Empirically, we only know the average velocity of light, namely c . Whether the velocity of the incoming (or leaving) light is c , this is not a matter of fact at all. There seems no reason why ε can’t be equal to 0, i.e., the velocity of the incoming light is stipulated to be infinite. Therefore, Ben-Yami’s revision is a reasonable extension of Reichenbach’s constraint.

⁵ I thank an anonymous reviewer for reminding me that Descartes’ view on the propagation of light is derived from his physics.

To sum up, the concept of simultaneity of events at a distance, as Einstein demonstrates, is a matter of stipulation rather than a matter of fact. Reichenbach relates the conventionality of simultaneity to causality. He suggests that causality determines the objective temporal order: a cause is temporally earlier than its effect, and causally disconnected events are *indeterminate* concerning temporal order. Simultaneous events are thus stipulated to be 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 a demonstration of why the time-lag argument is inconsistent with SR. The time-lag argument presupposes (a) that it is an *empirical fact* that light takes time to travel from objects at a distance to the subject. However, whether seeing takes place after the seen event is a question whose answer relies on the definition of simultaneity itself. Since now we have a clearer understanding of the concept of simultaneity, it is safe to say that presupposition (a) is not a matter of fact at all.

Admittedly, according to Reichenbach's account, temporal order must be understood in terms of the causal structure of reality: a cause must come prior to its effect. Given the causal connection between a seen event and the event of seeing it, it follows that a seen event must have already happened before it is seen. This is the empirical fact that Reichenbach assumes in his account, since he has the view that the causal structure is the fundamental fact about reality, and it essentially determines the reality of temporal order and how we understand it.

However, as I argued, Reichenbach's constraint on the velocity of light is flawed; it is by no means contradictory to allow ε to be equal to 0 or 1. It follows that the velocity of the incoming (or leaving) light can be infinite. Suppose that $\varepsilon=0$. It means that a signal with an

infinite velocity causally connects the seen event and the event of seeing it. In other words, they are simultaneous. This stipulation of simultaneity is not the standard one that was adopted by Einstein for pragmatic reasons. Yet $\epsilon=0$ 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 $\epsilon=0$, 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, $t=t_1$; e is simultaneous with e_1 .

The above stipulation can be generalized as follows:

Perceptual simultaneity: for any two events at a distance, e_1 and e_2 , they are simultaneous if and only if the incoming light signal's velocity from e_1 to e_2 is infinite.

I call it perceptual simultaneity since it can apply to our vision. When perceptual simultaneity applies to our vision, the light signal's velocity emitted from the physical object to the perceiver is stipulated to be infinite. Perceptual simultaneity is consistent with Einstein's thought on the conventional nature of simultaneity. The proponents of the time-lag argument have wrongly taken it as an *empirical fact* that a seen event must have taken place *prior to* the actual seeing.

I will use an example to illustrate the above point. Suppose a star is four light-years away from me, and I see its explosion right now. The time-lag argument's advocates claim that the explosion happened four years ago, while my observation occurs right now. They also believe that seeing must be simultaneous with its content; it follows that what I see now cannot be the explosion itself. Therefore, naïve realism is false.

I do not deny that the explosion causes my seeing of it. Nevertheless, the causal connection does not entail that the explosion precedes my observation of it. It only imposes that the explosion is *not after* my observing it. As I argued, the simultaneity of events at a distance is

not an empirical fact. Suppose we stipulate that $\epsilon \neq 0$, the explosion indeed precedes my observation of it. But we can adopt perceptual simultaneity, i.e., ϵ is stipulated to be 0; then the explosion and my observing it are simultaneous.

To sum up, the insights from SR reveal the confusion involved in the time-lag argument. It is not an *empirical fact* that seeing must take place after the seen event. In principle, we can have perceptual simultaneity, which does not conflict with any observable fact. According to perceptual simultaneity, the seen event is simultaneous with the event of seeing it, and the causation involved in seeing is not temporally extended. The time-lag argument is supposed to be grounded in some empirical facts. But it indeed relies on a misunderstanding of the concept of simultaneity instead. The argument would not get off the ground if the advocates understood simultaneity correctly.

4. One potential objection

The time-lag argument advocates might protest that SR is only concerned with the light signal, so it does not support perceptual simultaneity for hearing or smell. It is indeed an empirical fact that hearing (smelling) occurs later than the event heard (smelled). For example, we may hear a rumble of thunder that has already been over and smell a flower that has already been crushed – which seems to imply that my objection based on the concept of simultaneity can only apply to sight. Hence, there still seems room for a restricted time-lag argument against naïve realism about other senses.

Naïve realists concede that smelling (hearing) and the event smelled (heard) are not simultaneous and that people smell or hear objects by smelling the emitted scents or hearing the produced sounds. However, they deny any mental representation involved in smelling (hearing); the time-lag argument does not demonstrate that scents and sounds are mental.

There, to begin with, seems to be a potential confusion implied by the use of the preposition “by”. The “by” locution may indicate the apparent indirectness of smelling and hearing, while such linguistic expression does not apply to seeing. For example, we rarely say that people see an object by seeing its color. The difference in using the preposition “by” may pertain to the following facts: colors are at least phenomenologically not separate from the object,⁶ while sounds or scents are spatially separate from objects (sounds are produced, and scents are emitted). It seems that the separation explains why the use of the preposition “by” is suitable for smelling and hearing but not suitable for seeing.

However, the difference in using the “by” expression does not mean that hearing and smelling are indirect while seeing is direct. The concepts of ‘direct’ and ‘indirect’ imply a possible alternative route or a possible intermediary. But the “by” expression that has been used here does not have this implication. For example, I smell a tulip by smelling its unique odor. This is what smelling a tulip is; what else could it be? I would not smell a tulip if I did not smell the tulip’s odor. Hence, the concept of ‘direct’ or ‘indirect’ does not apply here.⁷

Furthermore, the restricted time-lag argument does not show that hearing sounds and smelling scents involve mental representations. There is indeed some time lag in *smelling objects*. For example, when we smell a tulip’s odor, the tulip might have been crushed. But the time lag in smelling an object does not mean that we need to posit something mental to explain why we smell an object. Naïve realists can argue that we smell an object by smelling its emitted scents; meanwhile, they deny any involvement of mental representation in smelling. The time-lag argument indeed has no grounds for the claim that the scents we smell

⁶ Here I do not commit myself to any substantial theory of color. I use the term “phenomenologically” to indicate my neutrality.

⁷ I thank an anonymous reviewer for reminding me that there is no real directness or indirectness implied in using the preposition “by” here.

are mental, for there is even no time lag with respect to *smelling scents*, though there is some time lag in smelling objects emitting scents. Suppose I am smelling a tulip's odor now, and the tulip was crushed a while ago. In this case, the tulip's odor did not disappear as the tulip was crushed. Hence, the restricted time-lag argument does not apply to smelling scents because smelling is simultaneous with the smelled odor; the smelling will cease when the odor disappears. A similar argument applies to hearing sounds. For this reason, the time-lag argument advocates need additional arguments to demonstrate that sounds and scents are mental.

The above response may not convince the time-lag argument advocates. They may continue to contend that naïve realism cannot explain why we still smell a crushed flower and still hear an explosion that has ceased. Their contention presupposes that the perceived thing as a *relatum* must coexist with the perceiving. In the following three sections, I shall offer more general objections to the time-lag argument. I shall argue in the next section that the generalized time-lag argument idealizes perceiving and perceived events as momentary events – the idealization conflicts with actual perceptual cases. I shall also demonstrate in sections 6 and 7 that naïve realism is compatible with the claim that we can perceive things as they were.

5. Idealizations in the generalized time-lag argument

The present section covers two related arguments against the generalized time-lag argument. Some advocates (Robinson, 1994, pp. 80–81) claim that all perceptions occur after the perceived events since they believe that every perception involves a temporally extended causal process. My aim is to show that the generalized time-lag argument involves some idealizations. For example, seeing and the seen events are momentary in the mathematical sense, “present” or “now” refers to an extensionless point, etc. These idealizations conflict

with ordinary perceptual cases that have intervals. In many cases, seeing and what is seen temporally overlap, so it is not sensible to claim that seeing always occurs *after* what is seen.

Ordinarily, an event, say E, has a duration. It begins at a time t_1 and ends at a time t_2 . For example, there is a duration in a star's explosion. It may happen very quickly, and yet it still takes time. The event of perceiving E (P for short) also has a duration. The subject sees the beginning of E at t_3 and the end of E at t_4 . The generalized time-lag argument states that P always happens after E, which also implies that $t_3 > t_2$. However, there are indefinitely many daily examples in which t_3 is before or simultaneous with t_2 . For example, suppose I was watching a live football match, Argentina against France. I saw Messi trapping the ball in the corner area, observing the defender, and then seeking to go past him. In such a scenario, we may say that Messi's series of actions 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 actions (trapping the ball, holding the ball, and observing the defender) take time, so does my seeing them. It is not the case that Messi had already gone past the defender, while my seeing his actions still stayed at his stopping the ball and observing the defender. Instead, seeing him holding the ball temporally overlaps with his holding the ball, so seeing his actions does not happen after his actions. Hence, the example is inconsistent with the generalized time-lag argument. Such examples are everywhere.

Moreover, the generalized time-lag argument also conflicts with the vagueness of events and states of affairs. Both events and states are vague in the sense that there is no precise moment when they begin or end; the temporal border of events and states is not precisely determined. 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 assume an ideal notion. In reality, E's and P's beginning and end times are always *around* t_1 ,

t_2 , t_3 , and t_4 . Suppose that Messi trapped the ball and held it at t_1 . Did his action begin when he touched the ball, or did it begin when the ball stopped moving? 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. The vagueness of events and states implies the following possibility. An event begins around t_1 , and the perceiver starts to perceive it at around t_3 , but t_1 and t_3 are extremely close. For example, if an event happens 10 meters away from the perceiver, then the time distance between seeing and the beginning of the event is around $1/3 \cdot 10^7$ s. The short time difference will be ‘absorbed’ into the fuzzy areas of t_1 and t_3 . Hence, it is reasonable to say that in such cases perceiving and what is perceived are simultaneous. The generalized time-lag argument thereby is false.

So far, I have demonstrated that the generalized time-lag argument is at odds with many ordinary perceptual cases. Unlike what the advocates conclude, in many cases, perceiving does not happen after what is perceived; they are simultaneous instead. What is in the advocates’ mind is the idealization of the events of perceiving and what is perceived. They conceive these events as momentary in the mathematical sense. Only with this assumption can they refute the overlap between perceiving and what is perceived.

Paradoxically, our ordinary concept of perception has nothing to do with the idealizations in the advocates’ mind 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. Following the time-lag argument advocates, 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 $1/3 \cdot 10^7$ seconds ago given the speed of light.” In real life, I

will not mention this small interval. Otherwise, she would accuse me 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, $1/3 \cdot 10^7$ seconds would not make ‘now’ into the past. It means that the accident is simultaneous with my seeing it; both are happening right now. If our everyday discourse about perception were translated into idealized concepts, this discourse would become clumsy and even ridiculous. More importantly, perception is not what the time-lag argument advocates suppose: a temporally extended causal process connecting two temporally extensionless events. Naïve realism is concerned with actual perception rather than idealized perception.

6. Can we see things as they were?

In the last section, I have examined some arguments against the generalized time-lag argument. In this section, I shift my focus to the claim that we can perceive a thing as it was. The temporal order between perceiving and what is perceived only imposes the constraint that we cannot perceive future things.⁸

Now, what does it mean that we can perceive a thing as it was? Le Morvan writes, “‘if something no longer exists, we cannot now perceive it’ can be interpreted in at least two distinct 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” (2004, p. 224). (a) is trivially true because the presently non-existent object cannot present its current status to us. Yet (a) does not conflict with the claim that we can perceive a thing as it was, though it conflicts with the claim that we can perceive a non-existent thing as it presently is. Le Morvan thinks that (b) is far from obviously true. Seeing a non-existent remote star is an

⁸ I assume that backward causation is impossible, so we cannot perceive future things. The discussion of the impossibility of backward causation can be seen in Ben-Yami (2007, 2010).

exact counterexample to (b).⁹ Here I hold the same view that we can actually perceive a thing as it was.

Sense-datum theorists (or representationalists) might challenge Le Morvan's view as follows. A perceptual experience occurs *now*. If a seen event constitutes the perceptual experience as what naïve realists claim, then the seen event must also happen *now*. And it leads to a rather trivial implication that the seen event must happen now. The argument presupposes that the constituent and the constituted must temporally overlap. Namely, given an event e happening during an interval Δt and an event f happening during an interval Δt_1 , if f constitutes e , then necessarily $t_1 \subseteq t$. For example, the Anglo-Chinese War happened in 1840 and lasted for three years. The war was comprised of many battles. A battle between Great Britain and the Qing Dynasty in 1856, however, cannot be a constituent of the Anglo-Chinese War. For an event to qualify as a constituent of the Anglo-Chinese War, it must have happened between 1840 and 1842. Sense-datum theorists want to apply this constitutive relation to perception. If a seen event is a constituent of the event of seeing it, they must also temporally overlap as a battle of a war overlaps with the war.¹⁰

There are at least two kinds of constitutive relations. The first is a temporal part-and-whole relation. The constituent and the constituted temporally overlap. The constituent is a stage of the whole event, or it is an event among a series of events, and the series constitutes the whole event (e.g., a series of military events and political events constitute the Anglo-Chinese War). Moreover, the constituent is contingent to the whole event, meaning that the whole event would still happen even if the constitutive event did not happen. For example, if

⁹ Le Morvan does not consider the conventional nature of simultaneity. But if we adopt the standard synchronization, then we do see a star as it used to be.

¹⁰ I'm indebted to Howard Robinson who put forward this objection in a private conversation. Sean Enda Power (2010) mentioned a similar objection.

Humen's battle had not occurred, the course of the Anglo-Chinese war would have slightly differed, but it would still have been the Anglo-Chinese War.

In the second kind of constitutive relation, the constituent is a necessary component of the constituted. In particular, the constituent as a *relatum* makes up the corresponding event. If the constituent differs, necessarily the constituted differs. Moreover, the constituents need not be simultaneous with each other or with the constituted. A father-and-son relationship is such a constitutive relation. Any actual pair of a father and a son constitute a special father-and-son relationship. If another person replaced a father or a son, that specific relationship would not hold. In some cases, the relation between them is even nontemporal (Peter Strawson is Galen Strawson's father. Their relationship holds even though Peter Strawson has passed away).

Naïve realists hold the second constitutive relation. The event seen is a necessary component constituting the event of seeing it, but they *need not be* simultaneous. Why doesn't seeing fit with the contingent constitutive relation? Because in a particular visual perception, if the seen thing became another thing, this specific visual perception would not happen. Say I see a narcissus outside my window; if the narcissus were a tulip, I, of course, would not see a narcissus. The first kind of constitutive relation only requires the seen event and the event of seeing it to be temporally overlapping; their relationship is thus contingent.

The time-lag argument advocates might further contend that even though the constitutive relation is the one that I argued for, the event in question still fails to be the *relatum*. They may claim that seeing an event is essentially a visual experience, which is a purely subjective episode and occurs in the subject's mind. An event at a distance (e.g., a star's explosion) does not occur in the subject's mind. The event, thus, cannot constitute the visual experience of it.

This contention goes even further than the original assumption that seeing must be simultaneous with what is seen. The original assumption does not directly exclude the logical possibility that we can see an event at a distance without a mental representation. On the contrary, the new contention straightforwardly rules out this possibility since it asserts that a visual experience is purely subjective.

I want to consider two problematic assumptions involved in this new contention. First of all, the advocates reduce seeing to a subjective visual experience with a proper causal process.¹¹ Secondly, a visual experience cannot reach an event at a distance without a mental representation.¹²

The first assumption will 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 that a visual experience is supposed to be entirely subjective and that no event or object at a distance constitutes it.

In everyday life, we usually use transitive perceptual verbs such as ‘see’, ‘hear’, etc., to report what we perceive (or perceptual experiences). For example, I see a bald man sitting in the corner; I hear my mom’s screaming, etc. Sometimes we also use perceptual verbs with a that-clause. For instance, I see that a bald man is sitting in the corner; I hear that my mom is screaming, etc. The term “perceptual experience” rarely appears in the daily discourse; it is rather 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 literature. One explanation is related to the empiricist tradition. Empiricists proposed that what a subject is directly aware

¹¹ See Grice (1961).

¹² C.D. Broad (1952) describes vision as ‘saltatory’: it seems to leap the spatial gap between the perceiver and the perceived.

of are impressions, ideas, sense-data, etc. These perceptual objects are not the ordinary objects of seeing, hearing, smelling, etc. I surmise that the Empiricists' invention of perceptual objects boosted the use of philosophical idioms such as "perceptual experience", "be aware of", and so forth, because perceptual verbs are not suitable for Empiricists' perceptual objects.

Besides, philosophers may mean to emphasize the subjective aspect of perception. They may think that there is a common factor among subjectively indiscriminable perceptions, illusions, and hallucinations (Martin, 2004; McDowell, 2009). Awareness or experience thus becomes the candidate of the supposed common factor.

Note that reducing seeing to a subjective visual experience is not only a terminological problem. Instead, it leads to a substantive view of perception. The assumption of a purely subjective visual experience may beg the question against naïve realism. The time-lag argument aims to support the sense-datum theory or representationalism, according to which a visual experience is purely subjective and differs from the naïve realist account of seeing. Now the conclusion of the time-lag argument is implicitly assumed. Therefore, the new contention begs the question against naïve realism.

We can see the problem of begging the question against naïve realism from another perspective. The new assumption that a visual experience cannot reach an event at a distance seems parallel to the original one that one's visual experience cannot reach out to a *temporally* distant event (e.g., a past event). However, the new assumption is more implausible. It *conceptually* rules out naïve realism because if it is adopted, the event at a distance, in principle, cannot constitute the visual experience of it. By contrast, the requirement of the simultaneity between what is seen and seeing does not conceptually rule out naïve realism; the original time-lag argument advocates reject naïve realism based on the

alleged empirical facts. Therefore, the new assumption is stronger; it involves the purely subjective conception of visual experience discussed above, and hence it begs the question against naïve realism.

In conclusion, temporal order only imposes the constraint that we cannot perceive future things. It is consistent with the claim that we can perceive a thing as it was. On the naïve realist account, the constitutive relation in perception is nontemporal; the perceived event necessarily constitutes its perceiving. Hence, the perceived event can cease to exist but still be the *relatum* of perception.

7. Houts's argument

Ronald 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”, some unacceptable consequences will follow (Houts, 1980, p. 155). The current section addresses Houts's argument and consolidates the claim that we can perceive things as they were.

Houts seeks to demonstrate that if naïve realists admit that we can perceive things as they were, the following three statements will become false:

- (1) At time t , we (or our bodies) are at some spatial distance from events and stages we perceive at t .
- (2) All the spatially non-contiguous events and stages we perceive at a time are or were at some spatial distance from one another.
- (3) We sometimes perceive at a time events and stages which are or were in a three-dimensional array. (1980, p. 156)

(1) is true 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, if I witness a traffic accident at 15:00, I may be standing around 10 meters away from the accident. The denial of (2) is at odds with our common knowledge since if I see three events simultaneously, those events must be at some

spatial distance. (3) can be inferred from (2) because if those events at t are not in a three-dimensional array, they are not at any spatial distance at t .

Here is my reconstruction of Houts's argument:

- i. If two physical items have a spatial distance, then they must coexist.
- ii. If naïve realists hold that what is perceived were in the past, they do not exist now.
- iii. Naïve realists hold that what a perceiver perceives were in the past.
- iv. Given that the event of perceiving happens at present, it does not coexist with what is perceived.
- v. Therefore, naïve realism implies that a perceiver's perceiving and what is perceived have no spatial distance.

It is easy to draw the conclusion that (1) is false from the argument. We only need to replace "at present" in the argument with "at time t ". According to the argument, at time t , we are not at any spatial distance from events and stages we perceive at t .

Worse still, the argument implies that (2) is also false. We sometimes see different events and stages at time t . For example, I raise my head on a clear night and see a bright star, the moon, and my raised hand. In short, I simultaneously see a particular stage of those three objects. It also seems to be true that events and stages at a larger distance (e.g., the star) are temporally more distant than those at a lesser distance (e.g., my raised hand) because light takes longer to reach the perceiver from the thing at a larger distance.¹³ Hence, the star's stage, the moon's stage, and my raised hand that I see at t were at different times in the past. According to the argument, those temporally distant stages are not coexistent, and they do not therefore have

¹³ Here, I follow the majority to stipulate that the incoming light's speed is finite.

spatial distance when I see them. (2) is thereby false: not all the spatially non-contiguous events and stages we perceive at a time are or were at some spatial distance from one another.

If (2) is false, it follows that (3) is also false. 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 indeed never perceive them in a three-dimensional array.

Note that when we talk about a spatial distance between two events, we talk about the spatial distance between two physical entities which are involved in the two events. And it also seems true that the spatial distance between two physical entities is identical to their locations' spatial distance. If this is admitted, then Houts's first premise is not as solid as it appears to be. For no matter whether the physical entity exists or not, its location is always there. Even though a physical entity no longer exists, it is still sensible to talk about the spatial distance between this physical entity and another. For instance, Epang Palace was 15km west of Xi'an. It still makes sense to say it this way, even though Epang Palace was destroyed by Xiang Yu about 2000 years ago. We also talk about the spatial distance between a star and the earth, although we know the star no longer exists relative to us now. The concept of spatial distance is not as narrow as the argument assumes. We can sensibly talk about the spatial distance between two non-existent physical objects.

If my response makes sense, then all the unacceptable consequences that Houts claims are not as decisive as they appear to be. (1) is true because, at any time t , we are at some spatial distance from events and stages we perceive at t . The distance is determined by the perceiver's location and the events and stages' locations (an event or a stage occupies a location through the physical entity involved). (2) and (3) are then easily inferred from (1).

Conclusion

I have begun 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 travel from objects at a distance to the subject; (b) naïve realism implies that seeing happens simultaneously with what is seen.

I have refuted (a) based on insights from SR, in particular, by criticizing the time-lag argument advocates' misunderstanding of simultaneity and temporal order: the simultaneity among events at a distance is a matter of convention or stipulation instead of a matter of fact; seeing and the seen event are simultaneous if we adopt perceptual simultaneity. Hence, (a) is false.

However, the objection from SR cannot apply to hearing and smelling because the speed of sound and the propagation of scent are far lower than the speed of light. The temporal order of hearing (smelling) and the event heard (smelled) is a matter of fact. But I have argued that the restricted time-lag argument for other senses does not prove that hearing or smelling objects involve mental representations. Moreover, the restricted argument does not apply to hearing sounds and smelling scents.

I have further demonstrated that the generalized time-lag argument idealizes the relevant perceptual events into momentary events in the mathematical sense. These idealizations conflict with actual perceptual cases that interest philosophers of perception.

In the last two sections, I have refuted (b) and explained why we could perceive things as they were. The naïve realist account of perceptual relation is a nontemporal constitutive relation. Hence, a past event, or even a non-existent event, can be the *relatum* of a perceptual experience. My objection to Houts's argument further showed why it is not objectionable to hold that we can perceive things as they were.

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