Time

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How to explain the experience of the passage of time?

1. Introduction

Philosophical questions regarding the subjective »experience of time« in general are puzzling.[1] It is not even certain that it is possible to experience time, since time is not a sensory object that can be experienced by one (or a combination of) sensory organ(s): time cannot be seen, smelled, heard, touched or tasted. While our experiences are temporal and it is possible to temporally experience objects, at least as being present, it is not clear that one can experience time itself.[2]

However, it seems unproblematic to claim that we experience some elementary experiences of temporality, such as the experiences of (i) duration, (ii) non-simultaneity, (iii) order, (iv) past-present or (v) change, according to Ernst Pöppel's classification.[3] Still, even this classification and the definition of each of these elementary experiences are controversial. They have been subjects of vivid philosophical discussions for centuries. »Duration«, for instance, was intensely discussed by Augustine many centuries ago.[4] »Simultaneity« and »order« also raised numerous debates, which have been rekindled by Daniel Dennett based on Benjamin Libet's famous experience on »backwards time referral«.[5] Analyses on the so-called »specious present«[6] continuously question the »past-present« relation. However, for the different reasons I will now focus on, I consider that the last experience (v) raises the most challenging difficulties: the experience

[1] For a helpful overview see e.g. Dainton 2001 and Le Poidevin 2019.
[2] See e.g. Husserl 1991.
[3] See Pöppel 1978.
[4] See Augustine 1961.
[5] See Dennett 1991 and Libet 1993.
[6] On the very notion of »specious present« see e.g. Le Poidevin 2019 and Arstila 2018.

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of a temporal change, which includes the experience of the passage of time (E_{PT}) (if we trust Pöppel's previous classification).

What does the notion of »passage of time« mean? If we refer to our daily experiences and even to ordinary language (at least in English), we can admit that we spontaneously use many expressions that suggest that we happen to feel that time »passes,« at least more or less quickly. This is what expressions such »time flies,« »time went by too fast,« »time drags on,« »I found the time very long,« etc. testify. Without even referring to the idea of acceleration or deceleration, the ordinary notions of »flow« or »passage« as applied to »time« simply suggest the dynamic character of time. It remains to be seen to what extent those locutions are not mere metaphors.[7]

From a historical point of view, the so-called »retentionalists« and »extensionalists«[8] models have already supported the view that we can experience *temporally extended* phenomena. Even if it is true, this is not sufficient to support the recent »passage of time« hypothesis. The new idea regarding this old view is not so much that our present experiences have a duration (that they are »extended«) but that we can subjectively experience the present as being *dynamic*, i.e., as »passing« (from the past and towards the future). The »passage of time« locution is indeed essentially used to refer to this feeling that what we experience as present just arises from the future and is shifting to become past. This is why this experience is not to be considered in the »past-present« but in the »temporal change« category, at least if I refer to the previous classification.

The vast majority of the E_{PT} examples to be found in recent literature are therefore examples of experiences of a temporal change based on the perceptual experiences of a motion. The most quoted example is the experience of the motion of the second-hand of a clock.[9] Some prefer to refer to the perceptual experience of a falling

[7] See e.g. Lakoff & Johnson 2003.

[8] According to the »retentionalists," the contents of our experiences are temporally extended but not the experiences themselves. By contrast, according to the »extensionalists," the experiences are themselves temporally extended and structured by temporal parts (for this distinction, see Arstila 2018). As representatives of the retentionalist view, see e.g. Gallagher 2003 and Gallagher & Zahavi 2021. Gallagher & Zahavi are referring to Husserl 1991 and to Brentano 2009. Examples of extensionist positions can be found in Dainton 2000 or in Foster 1991 who refers to James 1890 and to Bergson 1910.

[9] See e.g. Le Poidevin 2007, Dainton 2001 or Prosser 2016.

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leaf (for reasons that I will later explain, see Section 4).[10] The examples work as follows: when I watch the movement of the second-hand of a clock or the fall of a leaf, simultaneously with the experience of these motions, I experience in first person not several temporal instants t_1, t_2… t_n but the dynamic passage from t_1 to t_2 to t_n: I feel that time is passing.

From an empirical point of view, as different as the clock or the leaf examples are from one another, they are all based on experiences of quick motions.[11] The motions that generate E_{PT} are indeed supposed to be relatively quick, for instance compared to the motion of the hour-hand of a clock or of a wilting leaf (Sattig's comparison) which, by contrast, do not provoke any feeling of the passage of time. Accordingly, E_{PT} would be somehow connected, in a way that I seek to define further, to direct non-inferential perceptual experiences of quick motion.

Now, the difficult point concerning the phenomenological view that we are experiencing temporal phenomena in a dynamic way—which provides us the feeling of the passage of time—is that it seems at odds with the metaphysical reality of time.[12] More exactly the »passage of time« question manifests a conflict between (i) a metaphysical thesis and (ii) a phenomenal one that seem to be contradictory: (i) time is not (really) passing, (ii) we (subjectively) experience the passage of time.

The purpose of this chapter is to show that not only are both claims true (as I will argue), they are also consistent. In order to clarify why the contradiction between (i) and (ii) is only apparent, I will review the current representationalist models[13] that offer an explanatory model of E_{PT}. In Section 1, I will first focus on the first-order representationalist (FOR) strategy in order to show that it faces an

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10 See Sattig 2018.

11 There is no consensus, however, on the exact duration of the interval between the two beats of the hand-clock or two positions of the leaf. Some claim that it does not have to last more than a half-second (Dainton 2001), others no more than 2 seconds (Pöppel 1978). In any case, all claim that there is an empirical constraint.

12 For a list of the very good arguments against the reality of time passing, see Prosser 2016.

13 Note that I will exclusively focus, in what follows, on representationalist models rather than on other influential empiricist models (such as the global workspace theory) because I am not entirely convinced that they can explain the phenomenality of our experience. More exactly, it would be a different agenda to show how the global workspace theory can explain the experience of time.

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unsatisfactory alternative: either FOR accepts that the experience of time passing is a perceptual illusion or it accepts that it is not an experience at all (that it is a cognitive illusion). In Section 2, I will focus on the first option and argue that it is difficult to explain E_{PT} as a perceptual illusion, particularly if E_{PT} relies on the non-illusory perception of a movement. In Section 3, I will explain why E_{PT} cannot convincingly be considered a cognitive illusion, even if it is a powerful explanatory model. None of these objections are definitive. However, to avoid the reductivist and eliminativist implications of these first-order solutions, I will suggest theoretical alternatives. In particular, I will explain (Section 4) why I consider that higher-order representationalist (HOR) views on E_{PT} have some explanatory advantages over FOR. Eventually, I will focus (Section 5) on Giuliano Torrengo 2017's view, who argues convincingly that E_{PT} should be seen as a *phenomenal modifier*.

2. E_{PT} as a Major Challenge for the Representational Theories of Consciousness

From a metaphysical point of view, there are good reasons to doubt that time is *really* passing. The *locus classicus* of the metaphysical discussion on the reality of the passage of time (and on the reality of time in general) is John McTaggart's distinction between the »A-theory« and the »B-theory« of time.[14] According to the A-theory, only one time *t* is really present. All other times are either past or future, to some degrees (»distant past,« »near future,« etc.), compared to the real present. If you are an »A-theorist« (i.e. a »presentist«), you hold that time is continually *passing* from one present to another present and you can logically claim that there is indeed a »passage of time.« By contrast, if you are a »B-theorist« (i.e., an »eternalist«) you do not believe that there are any »A properties« (such as »being past« or »being present«). There are just »B properties« (such as »earlier,« »later«), which are relative to the context of your utterance. Then, a specific time, say t_1, can be considered »present« but only relative to a specific context. Against that background, it does not make sense to claim that time is passing, for instance from the near future to the

[14] See McTaggart 1908 and McTaggart 1909. Note that Taggart himself intended to show that the A-theory was self-contradictory.

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present or from the present to the near past, since *time is not passing at all*.

Simon Prosser, among many others, has convincingly shown that there are good arguments in favour of the B-theory, which derive from progresses in physics (partly from the Growing Block Theory and from the Albert Einstein's 1905 Special Theory of Relativity, STR) as well as from empirical experiences (in particular on phi phenomena, see Section 2). Accordingly, I rely on the overwhelming majority of commentators to postulate, as a starting point, the plausibility of the B-Theory.

If it is true, one direct upshot of the B-theory is that time is not really passing. Hence, the passage of time is nothing real in the block universe and the so-called flow of time does not correspond to any physical fact. This is the (meta)physical claim on the passage of time.

The problem is that such a metaphysical theory seems to contradict directly the phenomenal claim that I introduced to begin with: from a first-person point of view we are frequently experiencing the passage of time, at least if we trust the numerous philosophers who believe that we do experience the passage of time[15] as well as phenomenal reports.[16]

My first objective is to show that this apparent contradiction is indeed a challenging difficulty, at least for today's standard philosophical explanatory model of phenomenal consciousness: representationalism. In that respect, I will first investigate whether first-order representationalism (FOR) provides a satisfactory explanation of E_{PT}.

The FOR view, made popular by Gilbert Harman, Fred Dretske and Michael Tye in the 1990's,[17] holds that any conscious experience, including its phenomenal character, can be entirely »exhausted« in its representational »content« (the view is also called the »content view«),[18] provided that the (first order) representational content has some specific properties. For instance, according to Michael Tye's last

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15 I already mention the so-called »retentionalist« and »extensionalist« philosophers. Prosser (2016) also provides a substantial list of philosophers who do think that there is an experience of the passage of time.

16 For an interesting survey on people subjective reports about the phenomenology of time passing, see Hoerl et al. 2021. According to the survey, a majority of the participants (although not all of them) reports that they already experienced the passage of time.

17 See Harman 1990, Tye 1995 and Dretske 1995.

18 See e.g. Brewer 2006.

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model—called PANIC –, an experience has a phenomenal character in virtue of being about a representational content that is a Poised, Abstract, Non-conceptual and Intentional Content. The phenomenality of the experience would be entirely explained by the different properties of such a PANIC content.[19] Accordingly, E_{PT}—as any other phenomenal experience—would be fully explained by some specific features of its representational content (i.e., that time is passing).

A first naive objection is to say that the experience of the passage of time has no representational content because (according to B-theory) there is no such thing as a worldly PT that could explain E_{PT}. This is of course not a definitive objection since FOR has more than one string to its bow. In particular, there is no reason for FOR to postulate that each of the properties of the representational contents are necessarily mundane properties: they can be non-mundane intentional properties. Consequently, E_{PT} could be entirely explained as an *illusory* experience, more exactly as an experience built on a *perceptual illusion*.

3. E_{PT} as a Perceptual Illusion

Accordingly, the most influential strategy, which is consistent with FOR and which is widespread nowadays, considers E_{PT} a perceptual illusion.[20] More exactly, the view holds that E_{PT} is grounded on the perceptual experience of a moving object (for instance, the second-hand of a clock), which is illusory. This perceptual experience would be illusory as it would provide the non-veridical representational content that there is an objective flow (that the second-hand is flowing) and then that there is a subjective flow (that the time itself is flowing) although there are neither an objective nor a subjective flow: the positions of the second-hand, just like the positions in time, are discrete.

Making the view plausible requires proving that it is at least possible to experience an objective or a subjective flow (or a passage) where there is none. The supporters of the view that E_{PT} is a perceptual illusion thus pay specific attention to empirical phenomena that can be used to prove the very possibility of an illusory perceptual experi-

[19] Tye 2000.

[20] See e.g. Prosser 2007, Prosser 2016, Paul 2010, Dainton 2011 and Dainton 2012.

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ence of a »passage.« In that respect, »phi phenomena« appear to be good candidates.

»Phi phenomenon« experiments have indeed shown that it is possible to create the illusion of an objective passage, for instance of the passage of a dot, in presenting nearby optical stimuli, which alternate with a rapid frequency. Interestingly, the stimuli that are provoked by the light flashes are static and their position does not change but the observers experience a dot as passing from a position to another.[21] Even if the experiment is initially not meant to tell anything about the »passage of time,« it convincingly demonstrates how a dynamic experience (in that case: the experience of the passage of the dot) can be created by static stimuli. The experiment at least shows that our mind may create an illusion of an objective passage even if nothing is passing.

Another interesting example provides similar theoretical outcomes. It is famously known as »the waterfall illusion« (or the »motion after-effect«). This is a classical example of optical illusion, which was brought up to the current debates by Tim Crane,[22] and which today raises numerous discussions among the philosophers of perception and of time.[23] The experience goes as follows: after watching the flow of the water in a waterfall, I look at a motionless scene, for instance at a rock close to the waterfall. I will then experience the rock as if it was flowing. Just as in the previous case, it is an illusion of flow.[24]

Consequently, some experiments provide good reasons to think that it is at least possible that our consciousness fools us to the point that we believe that we perceive a passage where there is none. If we are to believe L.A. Paul, this idea is even supported by recent results from cognitive science:

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21 See Wertheimer 1912 and Kolers 1976 for the empirical work. See e.g. Dennett 1991 or Paul 2010 for the philosophical investigations. Note that the study of »beta movements« presents similar theoretical conclusions (see also Wertheimer's »Experimentelle Studien«).

22 See Crane 1988.

23 See e.g. Le Poidevin 2007, Mather 1998 and Arstila 2018.

24 The »waterfall illusion« is also used to investigate the nature of the perceptual content of perception. For instance, it has been used to show that one can perceive contradictory states of affairs while knowing that there are no such states. Consequently, it has been used to support the view that the content of perception is non-conceptual (see Crane 1988).

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> The idea is that, just as the cognitive science suggests, the brain processes the series of inputs and produces a mental representation or experience as of O changing in some suitably animated or flowing way from being P into being Q. [...] Thus, according to the reductionist, there is no real flow or animation in changes that occur across time. Rather, a stage of one's brain creates the illusion of such flow, as the causal effect of prior stages on (this stage of) one's brain.[25]

Then, it is at least formally possible to explain in the same way the experience of the passage of time as a perceptual illusion: we would be deceived the same way when we experience the passage of the dot and when we experience the passage of a second-hand (and then the passage of time). Consequently, it is theoretically possible that although it seems that time is passing, it does not pass at all.

Even if it is true, in order to build a complete explanatory model, one should also explain at least *how* the illusion of an objective (and then of a subjective) passage is generated. This is all the more important since the experience of the passage of time cannot be considered a localized and revisable error of judgement, but rather a *systematic* illusion, if we take for granted that (almost) everyone has already subjectively experienced the passage of time?[26]

Here again, it may help to start from the explanation of the »phi motion« illusion. Prosser provides further clarifications on how the illusion of a passage could be explained based on the phenomenal properties of perceptual experiences.[27] Using David Velleman 2006's distinction between »enduring« and »perduring« properties,[28] Prosser postulates that an illusory experience of passage consists in misrepresenting a moving object (say a static dot) as enduring (to be present at each moment through change) instead of perduring (to have different temporal parts at different times). Hence, an illusory experience of passage would consist in attributing wrongly incompatible attributes (being present through temporal change) to a representational content.

By analogy, the subjective experience of the passage of time would consist in misrepresenting an object, say the second-hand of a clock, as »enduring« instead of »perduring.« Accordingly, the illusion of E_{PT} could be entirely explained within a FOR model based on

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25 Paul 2010, 352.
26 See again Hoerl et al. 2021.
27 See Prosser 2016: Chapter 6.
28 Velleman 2006.

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the analysis of the intentional content of the perceptual representation of an objective motion.

Such an explanation comes up against several objections, however. First, the explanation presupposes that the illusory experience rests on an illusory perception. But most of the perceptual experiences the experiences of the passage of time are based on are not themselves illusory.[29] Whereas in the phi motion case, the movement of the dot appears to be continuous (although it is not), the movement of the second-hand appears to be discontinuous. Strictly speaking, I do not have the illusion that the second-hand is flowing.

We can imagine, however, that an experience of time passing is sometimes based on a perceptual illusion. Let's consider for instance (Sattig's example, see Section 4), an experience of passage generated by the perceptual representation of a falling leaf. In this specific case, E_{PT} is indeed based on the illusory perception of a continuous movement (a flow). But, even in this case, how to explain E_{PT} by solely referring to the content of the perceptual experience of a motion? How could the perceptual content of an object enduring in time (the leaf) generate the content of a subjective temporal flow? I do not think FOR can answer this question.

As a first result, even if I agree that some of our E_{PT} are based on perceptual illusions, I believe that looking at the content of the perceptual experience and its properties alone (as FOR requires) does not explain why the perceptual content of a motion generates the illusion that the leaf, the second-hand and also time itself are flowing.

Interestingly, there is a radical alternative to FOR that avoids the delicate task of explaining how the conscious experience of some perceptual representations raises the illusory phenomenal reports that we experience time as passing. FOR can indeed radically postulate that the illusion of the passage of time is not phenomenal in nature. The passage of time would rest on a double illusion: the cognitive illusion that time passes and the illusion that I subjectively experience it as passing. In other words, the »passage of time« would be a mere cognitive illusion and there would be no E_{PT} at all.

[29] See also Hoerl 2014.

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4. E_{PT} as a Cognitive Illusion

One may consider that E_{PT} is indeed an illusion, but a cognitive one.[30] According to this eliminativist view, we do not experience the passage of time at all. We just misinterpret our perceptual experiences of motion and wrongly infer from some perceptual content that we are experiencing time as passing. For instance, we wrongly infer from the perception of the motion of the second-hand the *belief* that we are indeed experiencing the passage of time. The illusion is to believe that we are even experiencing anything. To quote Christof Hoerl, it would just »seem« to us that we are experiencing the passage of time: there would be no phenomenology of the passage of time.

The rhetoric of this view is very close to the recent illusionist explanatory models on consciousness, which postulate that phenomenal experience (in general) is an illusion artificially generated by our phenomenal reports.[31] According to Keith Frankish, for example, it just »seems« to us that we experience phenomenal experiences although the very idea of a phenomenal experience is illusory. Hoerl's position is of course much less radical in that it is localized. It is not aimed at experience in general but just at the quasi-phenomenal experience (to use the illusionist terminology) of the passage of time. One can however postulate that Hoerl's proposal presents some of the virtues and limitations of the illusionist position in general.[32]

In particular, this eliminativist model presents the great advantage of being parsimonious and consistent with the naturalistic requirements. It does not postulate anything beyond perceptual experiences and non-phenomenal cognitive inferences. Accordingly, this explanatory model is perfectly consistent with FOR: it explains entirely the illusion of E_{PT} by the representational content of our beliefs inferred from perceptual representations. The sole task of supporters of such a view would be to explain the inferential errors at work, which seems less »hard« (to use Chalmers' terminology) as a task than explaining the spontaneous genesis of a phenomenal experience.

Even if I do not exclude that the view is correct, I think it is not entirely satisfactory to claim that E_{PT} is a cognitive illusion. First, even

30 See e.g. Braddon-Mitchell 2014 and Hoerl 2014.

31 See e.g. Frankish 2016.

32 On the virtues and limitations of illusionism about phenomenal consciousness, see Gauvry 2023.

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if the view is able to explain the so-called cognitive illusional inferences (and I guess it can),[33] I am not sure it would be enough for the view to be convincing. A convincing explanatory model of the E_{PT} illusion must not only explain the cognitive inferences that generate the belief (that we are experiencing the passage of time) but also the reasons why the illusion seems to be subjective: why it »seems« to us that we are *experiencing* time passing although we do not experience it. In other words, the explanatory model must both explain why we believe that time is passing and why we believe that we experience time as passing. I am not sure, however, that the advocates of the »cognitive illusion« hypothesis, who cannot refer, by definition, to the evidence of the experience itself, can offer such an explanation.

Second, even if the passage of time is just the intentional content of a false belief, it also has to be proven that this false belief is not itself phenomenal. As the literature made obvious, cognitive phenomenology is a plausible option and it is not unlikely that there is a »what it is like« to (wrongly) think that time is passing.[34] Even if E_{PT} is a cognitive illusion, there would still be a (cognitive) experience of the passage of time.

For all that, I think that the eliminativist strategy on E_{PT} is intriguing and that everything is indeed much simpler and less contradictory if there is no E_{PT}. I even believe that anyone without phenomenological intuition about the experience of the passage of time should favor this model. On the other hand, I also consider from a first person perspective that it is not entirely satisfactory to just deny the reality of the phenomenal experience of the passage of time. This is the reason why I will now seek to find out alternative views to the standard first-order content view that could account for the phenomenology of the passage of time.

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[33] Hoerl, for instance, has investigated on the role of »episodic memory« to clarify the status of the wrong inferences. See e.g., Hoerl 2014.

[34] See e.g. Chudnoff 2015 and Bayne 2017. However, representatives of the idea of cognitive illusion would be entitled to answer, just like Frankish, that: »it is essential to [their] approach that the posited introspective [mis-]representations are not themselves phenomenally conscious ones« (Frankish 2016, 15).

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5. A Higher-order Account of E_{PT}?

As explained above, if the first-order representationalist theories are generally considered to have a strong explanatory power for our phenomenal experiences, I believe that they cannot explain the phenomenology of E_{PT}. At least, I have shown that it is difficult to offer a reductive reading of E_{PT} by referring to a single perceptual content. The difficulty is to explain within a FOR framework how the (non-illusory) representation of some properties necessarily generates the illusion that we are experiencing other properties. In particular, it is not clear how the sole content of a perceptual representation (say, that the second-hand is perduring through change) can exhaust another experience (E_{PT}), which seems to have its proper content (that the time is passing). Consequently, I think that the sole explanatory option within a FOR program is to present E_{PT} as a cognitive illusion. But, as I just suggested, this eliminativist proposal also presents some limitations from a phenomenal and explanatory perspective.

Fortunately, there are representationalist alternatives to FOR and to eliminativism. A first one is offered by the higher-order representationalist (HOR) models. According to HOR, a conscious experience cannot be exhausted into one but into *two* contents of representation that are not necessarily identical. Contrary to FOR, HOR postulates that an experience is subjectively conscious by virtue of a higher-order representation directed towards a first-order representation. Then, HOR views present the advantage to attribute a different content to first-order and higher-order representations which proves beneficial in explaining an illusion.

Against that background, it is possible to consider the representation of the passage of time a higher-order representation directed towards a first-order perceptual representation. More exactly, E_{PT} would be conscious by virtue of a third-order representation of the second-order representation of the passage of time based on the first-order perception of a movement. This is for instance Sattig 2019's proposal. I use his example as an illustration.[35] Let's imagine the perception of a leaf falling from a tree. Such perception is directed towards the properties of a perceptual content: I see the colour, the shape, the trajectory and the movement of the leaf. As previously mentioned, when I pay attention to its movement, I do not perceive a succession

[35] See Sattig 2019.

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of different discontinuous positions but a continuous movement of fall. The perception of this continuity can be explained (Sattig's proposal) by the introduction of the concept of »objective replacement:« what I perceive is a leaf that is continuously replaced by itself. Now, it is clear that the sole notion of »objective replacement,« which is a property of the first-order perceptual content, is not sufficient to explain the non-objective »replacement« of time. The interesting idea of HOR, however, is that we do not have to assume that the perceptual representation of the leaf and the representation of time passing share the same content. As the second-order representation is not essentially linked to the first-order representational content of a moving object (the leaf), it can be a purely subjective representation of a »subjective replacement,« decorrelated from any specific object, which seems satisfactory to explain the passage of time. Accordingly, the representation of time passing would be a second-order representation of a (non-objective) replacement and E_{PT} would be constituted by a third-order representation of the second-order representation of this subjective replacement.

I think that this explanatory model is satisfactory for various reasons. The HOR view presents the advantage that it explains the singularity of the E_{PT} content without being eliminativist or reductionist: it does not even have to reconduct the content of E_{PT} to some first-order perceptual properties. One of the main virtues of the view is also that it can explain why it is theoretically possible that E_{PT}, although a (higher-order) experience, is illusory, i.e. why its content does not coincide with the perceptual content of the falling leaf. Finally, postulating that E_{PT} ultimately (but not reductively) rests on the representation of certain formal properties (such as »replacement«) of a first-order representational content is nothing else than to provide an explanation of the genesis of E_{PT}.

I am not convinced that the explanation is complete, however. In particular, the view does not entirely explain how the representation of the passage of time simply arises from the higher-order representation of a subjective replacement. In addition, it is not clear how systematic the explanation could be. Even if one considers that the model works quite well for describing the motion of the falling leaf, not all E_{PT} are based on the perceptual representation of such replacement. For example, as explained in Section 2, it is dubious that I perceive any continuous replacement when I perceive the second-hand of a clock.

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More generally, one may wonder whether it is really possible to explain a phenomenal experience by referring only to the different properties of its (first, second and third) representational *contents* (whether these contents are the contents of perceptions or of thoughts). This is the reason why, as a last hypothesis, I will now focus on a non-standard view that claims that the properties of E_{PT} cannot be explained as properties of our representational contents but as properties of our intentional *attitudes*.[36]

6. E_{PT} as a Phenomenal Modifier

The previous analyzes aimed to show the virtues but also some of the limits of the most common versions of different representationalist models on E_{PT}. I will now turn to an alternative proposal that considers E_{PT} to be a »phenomenal modifier«. This is Giuliano Torrengo's position.

For the sake of his demonstration, Torrengo himself is first referring to what he considers the most »sophisticated« version of representationalism (as a content view),[37] which explains the phenomenal character of E_{PT} by the »tensed properties« of some perceptual contents.[38] According to Torrengo, however, even if our perceptual contents were constituted by such »tensed properties,« it is not clear that they could explain the *dynamic* features of E_{PT}. One should at least introduce a distinction between two meanings of »tense:« a *perspectival* one and a *dynamic* one. Although it seems possible to provide a representational account of the perspectival properties of an experience (for instance based on the semantic uses of some indexicals), it is very unlikely that the dynamic features of E_{PT} could be exhausted in a »tensed« content. Torrengo even offers an interesting argument by comparing the perspectival representation of time and of space. Just as it is not because we have a perspectival representation of space, for example by using an indexical (e.g., »this« place), that we think that space is dynamic, it is not because we have a perspectival repre-

[36] Even if the next view is non-standard, it is closed to the adverbialist proposal. For a review and defense of adverbialist theory, see Kriegel 2011.

[37] See Torrengo 2018.

[38] The influential debates on »indexicality« have indeed convincingly shown that our representations have a »tensed format«. See e.g., Perry 1979, Mellor 1998 and Torre 2009.

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sentation of time (in using »today,« »tomorrow,« etc.) that we infer that time is somehow dynamic. Consequently, at best, sophisticated representationalism can grasp the perspectival dimension of $E_{PT,}$ in terms of »tensed properties« of a »tensed content,« but not the dynamic feeling that constitutes »time passing.«

Torrengo's conclusion is that no content view, however sophisticated, is capable of explaining the dynamic features of E_{PT} in terms of representational content. As an alternative model, he proposes that the dynamic features of E_{PT} are not to be found in the properties of its representational content but in the dynamic way our perceptual contents are represented. Although there are no dynamic contents« there would be »dynamic *attitudes*.«

Such a view is very close to the one presented under the label »attitudinalism« by Uriah Kriegel.[39] Kriegel indeed believes that what he calls the »temporal orientation« of an experience is explainable as an *attitude* towards a representational content. For instance, the »orientation towards the present« is a constitutive feature of our attitudes towards *perceptual* content. By contrast, the »orientation towards the past« is a constitutive feature of our attitudes towards the contents of our *memories*. Consequently, an act of perception distinguishes itself from an act of memory or imagination by virtue of its attitude whose definitional feature is precisely the temporal orientation.

One of the most interesting assumptions of this proposal is that our attitudes have an essential link with our representational contents. The next step is to believe that our attitudes condition and potentially modify our representational contents. This is precisely Torrengo's strategy. According to his 2017 proposal, the dynamic characters of E_{PT} are indeed the constitutive elements of some of our phenomenal attitudes that modify our perceptual contents and the way we experience them. This is what he calls the »phenomenal modifier view.«

In order to both explain some limitations of standard representationalism and to provide an illustration of a »phenomenal modification« of a representational content Torrengo first focuses on the interesting example of »blurred vision,« using Boghossian and Velleman's helpful description.[40] If we follow Boghossian and Velleman, in a case of blurred vision, the objects are not represented »as being

39 See Kriegel 2015.

40 See Boghossian & Velleman 1989.

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blurry.« I experience them »blurrily« and I potentially believe that they are »blurry.« Accordingly »blurriness« is not a property of a representational content but a feature of an attitude that modifies the way I experience some representational contents.

The »blurriness« case can be used by analogy to explain the passage of time experience, at least a deceleration of the passage of time. Let's imagine that time has suddenly slowed down facing a dangerous animal, say a ferocious tiger.[41] In this case, even though time has not really slowed down, this is the way I experience the situation. While some of the temporal and spatial perspectival properties of my representation of how the tiger moves—the fact that the tiger is here now—may contribute to explain some other features of my experience, they will certainly not explain my feeling that time slows down. Conversely, Torrengo suggests that it is possible to explain my representation of the tiger (for instance as being in slow motion) by my attitude of which E_{PT} is a constitutive character. In other words, perceptual contents do not generate E_{PT}; on the contrary, E_{PT} modifies perceptual contents. Hence, when I experience the passage of time, the dynamic aspect of the felt passage of time cannot be explained as a property, not even as a tensed property, of any representational content but as a feature of my phenomenal attitudes towards some perceptual contents.

Let me mention another example to tentatively corroborate this explanation: boredom. Imagine that I am bored and that I find that time drags on or »seems long.«[42] When I am deeply bored, no matter what representational contents I experience (interestingly, even if they become objectively more exciting), I will boringly experience them. The same could probably be true of other moods.[43] If I am in a happy mood, for instance, it is likely that I will feel like that time flies and it will also modify the contents of my representations. Consequently, it seems possible to describe those experiences (and the cor-

41 The example is quoted by Torrengo 2017.

42 One could of course wonder if the »boredom« example is an example of »time passing.«. Some people consider this is a case of interminable »duration.« Even if it is the case, it makes sense to say that the experience of extended duration can be considered, by contrast, as an illustration that we normally experience the time as passing, since what happens in boredom is precisely that time no longer passes.

43 Note that moods are borderlines cases from a representational point of view because their intentional character is controversial. See Searle 1983.

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related experience of time passing) in terms of attitudes that phenomenally modify our representational contents.

My point is that this »phenomenal modifier view« presents all the advantages of the precedent views without their limitations. First, just as the eliminatist model, the view is parsimonious as it does not even pretend that E_{PT} has its own content. Strictly speaking, the experience of the passage of time would not be the experience »that times is passing« but the »time(ly) passing(ly)« representation of some perceptual content. Just as a hermit crab, the experience of the passage of time would appropriate the content of other intentional experiences to modify it.

Second, as the HOR proposal, the »phenomenal modifier view« is well-equipped to explain why the experience of the passage of time does not correspond to the reality of time. If E_{PT} does not have any content, the mismatch between its hypothetical content and the content of first-order representations is indeed dissolved.

It is true, however, that the »phenomenal modifier view« raises a new objection: if E_{PT} has no content of its own it is no longer possible to refer to any content to *explain* E_{PT}. One could then say that it becomes very difficult to offer an explanation of E_{PT} within the »phenomenal modifier« model.[44] According to such a model, one could at best use E_{PT} as an *explanans* to explain the modification of our perceptual contents but E_{PT} itself would not be explained.

As a partial answer to the objection, it can be argued that the model is compatible with a certain type of naturalistic explanation: evolutionary explanations. Torrengo quotes for instance Ian Phillips 2013's explanation of the evolutionary reasons why the brain generates E_{PT}:

> Imagine that you are a caveman or—woman on the veldt. Scanning the horizon, you spot a saber-toothed tiger heading your way. Then suddenly the world around you seems to slow down and the tiger appears to be running more slowly. How is this helpful? The tiger is not actually running any more slowly. And the illusion of time being drawn out gives you no extra seconds in which to flee. We get a much more satisfactory explanation of what is going on if we consider how things look on a mental activity picture. Here the effect of the fear-based dopamine

[44] See Kriegel 2011.

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> spike is to speed mental activity. That, in and of itself, is an adaptive response.[45]

Hence, there would be an explanation of the experience of time slowing down in terms of »adaptative response.« Interestingly, this adaptative response can be described as an experience that modifies, just as »the fear-based dopamine,« the perceptual content of the movement of the saber-tooth tiger in order to »speed our mental activity.« Accordingly, the experience of the slowing down of time, i.e. an experience of a temporal flow, could be explained, on the basis of adaptative explanations, as a phenomenal modifier. Thus, the »phenomenal modifier« model, coupled with an evolutionary explanation, would make it possible both to explain the illusory nature of the experience of passing time (in terms of modification of external contents) and its systematic nature (in evolutionary terms).

I do not believe, however, that this model is not problematic at all. In particular, I am not sure that the »phenomenal modifier view« is valid for explaining all the E_{PT} cases. However, I hold that it is today the most convincing explanatory model that is consistent with our phenomenal reports.

7. Conclusion

The ambition of this chapter was both to offer a review of the representationalist models that are available today to explain the experience of the passage of time and to propose a non-eliminativist model in order to explain the phenomenology of E_{PT}. From this review, I draw two conclusions.

The eliminativist model, which postulates that there is simply no E_{PT} at all and that E_{PT} is a cognitive illusion is a parsimonious model with great explanatory power. Consequently, I suggest to anyone who does not have a phenomenal intuition about E_{PT} and who does not believe that the eliminativist model contradicts her own experience to favor it without hesitation. On the other hand, I believe that the only model that is compatible with our phenomenal reports on the passage of time and that also has real explanatory power is the »phenomenal modifier« model.

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[45] Phillips 2013, 246 (my emphasis).

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