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ORIGINAL RESEARCH

Three Varieties of Growing Block Theory

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Abstract
Growing Block (GB) theorists are committed, roughly, to two theses: (1) that past and present events exist and that future events do not, and (2) that the present is dynamic and constantly changing. These two theses support a picture of the universe as growing, gaining in more and more things and events, as these recede into the past; but the two theses do not specify how the growth of the block is to be understood (Q1); what status the past is supposed to have compared to the present (Q2); and what should be taken to be the fundamental constituents of the spatio-temporal reality (Q3). In my paper I argue that getting clearer on these three questions—Q1, Q2, and Q3—will give us very different metaphysical pictures. I distinguish between three variants of the growing block theory: the *Fourdimensional Growing Block* which goes back to C.D. Broad; the *Dead Past Growing Block* which is currently defended by Forrest and Forbes; and the *Growing Events* theory, which draws on some of Whitehead's ideas on processes. I flesh out each of these variants of the GB view, examine the most urgent challenges to their respective metaphysical pictures, and offer suggestions as to how these challenges can be positively addressed.

1 Introduction

Growing Block (GB) theorists are committed, roughly, to the following two theses: (1) that past and present events exist and that future events do not, and (2) that the present is dynamic and constantly changing. Kristie Miller has referred to (1) as "the growing block ontological thesis" and to (2) as "the dynamical thesis" (Miller 2013, p. 348). The ontological thesis preserves our ordinary beliefs about what exists—a

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belief that future events have not yet happened, and thus do not yet exist; whereas the past and the present events have happened/are happening, and thus need to be treated as existent.[1] 2) preserves our ordinary beliefs about the present, namely that it is an ever-changing, elapsing sort of thing—what was present yesterday is now past, what is present now will soon be past, and so on.

Proponents of GB theory, such as Broad (1923), and more recently Tooley (1997), Forrest (2004), Button (2006), Correia and Rosenkranz (2013), Forbes (2016), and others, have been seduced by what they take to be GB's advantage over eternalism (in its commitment to an open future and a privileged and dynamic present) and its advantage over presentism (in its commitment to the existence of the past and not just the present). Opponents of GB theory, on the other hand, have found it to be an unseemly conglomerate of presentism and eternalism, and subject to an objection that threatens to unravel it. The objection is that the hybrid ontology gives rise to two incompatible uses of "now", thus leading to an insuperable problem for GB theorists (Bourne 2002; Braddon-Mitchell 2004).

But many have found themselves unable to weigh in for one simple reason: the growing block's ontological picture is still in many respects patchy and underdefined. The ontological and dynamic theses outlined above give us a sense of the universe as growing, gaining in more and more things and events, as these recede into the past. But the two theses are quite broad and leave it open how the GB theorist is to think about the way in which the growing of the universe is supposed to happen; the type of existence that the past enjoys (compared to the present); and what the fundamental ontological constituents of spatio-temporal reality are supposed to be. As we will see, depending on how these three aspects of growing block theory are specified, we get very different versions of the theory.

In this paper, I will focus the discussion on three main varieties of the growing block theory that are, at least to a degree, already present in the literature—I will refer to them as the *Fourdimensionalist Growing Block* (FGB), the *Dead Past Growing Block* (DPGB), and the *Growing Events* (GE) theory. I will sketch the distinct ontological pictures that each of these theories is committed to and I will make some suggestions as to how their proponents might go about strengthening and developing them further. In the same spirit, I will address the now–now objection presented by Bourne (2002) and Braddon-Mitchell (2004) to the FGB theorists, and show that it is less compelling than previously thought. I will also call attention to the ambiguity surrounding the concepts of *dynamicity* and *event* and propose disambiguations that might serve the growing block theorists' purposes better. The intended result is a better-defined playing field for growing block theorists and their opponents.

But first, let me say a little bit about the importance of the three questions that will help guide the discussion of different versions of the growing block view. The questions are:

Q1: How does the universe grow?

[1] See Tooley (1997), Forrest (2004), and Forbes (2016) for an explicit commitment to the ontological thesis.

Q2: What status does the past have compared to the present?
Q3: What are the fundamental ontological constituents of the spatio-temporal reality?

Q1 requires us to get clearer on the *way* that the universe is supposed to grow for the growing block theorist. It is one thing to conceptualize growth as an addition of fourdimensional slices and another to think of it as accumulation of ongoing events. In this context, it also seems important to get clear on how committed the GB theorist is to the existence of the block—that is, can one be a GB theorist without being committed to the conception of block-universe? Furthermore, when one talks about growth or expansion should we also assume that such an expansion is happening *within* space–time or should space and time rather be viewed as abstractions from the assumed expansion of the universe? And does talk of expansion and growth commit one to the existence of such a thing as "the universe", the *one* all-encompassing entity, or might one do without such a commitment within the GB framework? Of course, one may not be able to answer all of these questions, but it is clear that a crucial aspect of the GB theorist's metaphysical picture will depend upon how Q1 and surrounding questions are addressed.

Q2, on the other hand, might strike some as odd; if the GB theorist's ontological thesis simply states that both present and past exist, why insinuate a possible difference in status? But the reason to ask Q2 is precisely because there seems to be some space for disagreement among philosophers who are committed to (1) and (2) about whether present and past should be treated in exactly the same way. GB theorists with presentist leanings might find that present objects and events should be treated as privileged in some sense. At the same time, GB theorists might think that past events and objects, because they *did* exist, should not be treated as a clear case of non-existence, on a par with growing blockist's open future. The difficulty of making both of these intuitions work, without appealing to degrees of existence, will become apparent in our discussion of *Dead Past Growing Block* theory below.

Finally, Q3 challenges the GB theorist to be explicit about what they take to be the metaphysically primary inhabitants of the spatio-temporal universe. This question is closely related to Q1 since answering the question about *how* the block grows goes hand in hand with getting clear on what sort of entity is the main contributor to such growth. What I mean by metaphysical priority and fundamentality in this context is not meant to refer to "constitutive fundamentality"; i.e. I am not looking to determine what the smallest possible constituents of spatio-temporal reality are, according to the given theory. Rather, I am after the explanatory sense of fundamentality; according to this sense, one entity e_1 is considered *explanatorily* more fundamental than another entity e_2 if the definition and characterization of e_2's ontological role cannot be given without reference to e_1, whereas e_1 is either taken as an explanatory primitive or it can be characterized independently from e_2. These different senses of fundamentality are often run together, making it seem as if the entity that is constitutively "smaller" must also be explanatorily more fundamental; but this need not be the case at all. When applied to growing block and talk of slices and events, different possibilities are available: (1) one could take it that there *are* indeed such things as instantaneous slices and that these should be taken as explanatory

building blocks of one's theory; (2) one could take it that instantaneous slices are indeed *constitutively* most fundamental entities but that *explanatorily* events are more fundamental; (3) one might decide that there are no such things as instants at all and that it is misleading to talk in terms that seem to refer to instantaneous slices of spatio-temporal reality; this view might then prefer to appeal to events as *constitutively* and *explanatorily* more primitive; and there are more possibilities still. What matters for my purposes is that we be attuned to this distinction and its different repercussions for the metaphysics of time.

2 Fourdimensional Growing Block Theory

2.1 FGB's Metaphysical Picture

Fourdimensionalist Growing Block (FGB) is the growing block view which takes cues from Broad (1923). In addition to the apparent commitment to ontological and dynamic theses (1) and (2) above, this view addresses question Q2 by treating the past and present things in exactly the same way—as temporal slices in a fourdimensional block. This view addresses Q1 by clarifying that the fourdimensional block-universe grows through continuous addition of slices and events. With respect to Q3, however, Broad is not terribly clear. In the context of his discussion of time and change, he makes frequent reference to events as well as slices of events; however, he never really engages the question whether one or the other should be considered as more fundamental, and which sense of fundamentality should be employed.[2]

We can see Broad's interchangeable use of "slices" and "events" in his characterization of the FGB view below:

> [P]resent of mine is just the last thin slice that has joined up to my life-history. When it ceases to be present and becomes past this does not mean that it has changed its relations to anything to which it was related when it was present. It will simply mean that other slices have been tacked on to my life-history, and, with their existence, relations have begun to hold, which could not hold before these slices existed to be terms to these relations. To put the matter in another way: When an event, which was present, becomes past, it does not change or lose any of the relations which it had before; it simply acquires in addition new relations which it *could* not have before, because the terms to which it now has these relations were then simply non-entities. […] Nothing has happened to the present by becoming past except that fresh slices of existence have been added to the total history of the world (Broad 1923, p. 66).

On the one hand, Broad's talk of "thin slices" paired with his rejection of any intrinsic qualitative difference between present slices and past slices, makes him

[2] Tooley (1997) is quite interesting in this respect. He talks of "instantaneous states of affairs" and events interchangeably, as if there is not even constitutive difference to be had between instantaneous entities such as slices and events, which are typically seen as occupying a longer temporal interval.

sound like a fourdimensionalist. Fourdimensionalists too believe that present and past slices[3] exist and that they harbor no intrinsic qualitative differences. The only distinctions to be made are external in kind—for a fourdimensionalist, the present temporal slices are preceded by the earlier slices and succeeded by the later ones, whereas for the FGB theorist, the present temporal slices are preceded by the earlier ones and not succeeded by any further slices, for there simply aren't any in existence. As Broad puts it: "the essence of a present event is not that it precedes future events, but that there is quite literally *nothing* to which it has the relation of precedence" (Broad 1923, p. 66). (We find a similar formulation by Tooley: "the present, at a given time, consists of those states of affairs that are actual as of that time, and which are such that there are no later states of affairs that are actual as of that time" (Tooley 1997, p. 194).)

On the other hand, Broad's talk of present slices "being added" and "joining" his life-history and then "ceasing to be present" and "becoming past" shows a clear commitment to a version of the A-theoretical notion of passage. The passage, for him, is nothing more than a continuous addition of slices.[4] This then raises questions about where the constant supply of newly present slices is meant to come from; how such slices are added to the growing fourdimensional block; and how they come to pass from present to past. Broad's discussion does not do enough to help get clearer on any of these aspects. While he does stress the importance of *becoming* as the most fundamental sort of change, one that is presupposed by two other sorts of change (qualitative change in things and relational change of events from presentness to pastness), he says little about it. *Becoming*, for Broad, is "the coming into existence of events"; it is the most massive sort of change that can happen—it's a change from non-existence to existence. In fact, he even says that talk of "change" might be misleading when we are talking about becoming, since change usually indicates some sort of dissimilarity in characteristics in an existent thing or event. With *becoming* we don't get a change in a slice or in an event from it having a property of non-existence to having a property of existence. Existence must not be treated as a property, according to Broad; thus, "when an event becomes, it *comes into existence*; and it was not anything at all until it had become" (Broad 1923, p. 68).

Becoming has the air of a primitive in Broad's version of FGB theory. Asked "where do the new present slices come from?", he would most likely say that they just *become*. Asked about how they are added to the growing fourdimensional block,

[3] Fourdimensionalists tend to be either committed to temporal parts (e.g. Lewis 1986) or to temporal stages (e.g. Hawley 2001; Sider 2001). I am here using "slices" to refer neutrally to either one.

[4] Broad is quite explicit about the fact that he does not want to analyze the change in events' passage from present to past in the same way that change of things is analyzed. For him, the change of events is a change "of" time, whereas the change of things, is a change "in" time. He then adds that "we can hardly expect to reduce changes of Time to changes in Time, since Time would then need another Time to change in, and so on to infinity" (Broad 1923, p. 65). Here we see that Broad simply rejects the idea that there is passage of time that is somehow independent from the process of accumulation of events; the latter simply *is* the passage of time. The alternative which would treat time as something *in* which events pass, while it itself also changes, might lead one to adopt hypertime with respect to which the time passes. This is something that Broad is wisely trying to avoid.

he would probably say that they just come to be right there at the edge of the block. Asked about how slices come to pass from present to past, Broad would likely just say that the *becoming* of new slices makes it so that the previous present slices become past and the ones that were past recede further into the past.

The natural worry with this sort of response is that *becoming*, as it stands, is too murky a primitive. It is one thing to treat as primitive a notion which is difficult to define because it is familiar (maybe even too familiar), well described, and whose ontological role is reasonably clear. It is a different matter entirely to call "primitive" a concept which is neither of those things and which is charged with the power to produce something rather magical—the creation of a something out of nothing at the edge of being, with an effect of creating more existents and with it temporal passage. Thus, it seems to me that the FGB theorist would do well to at least try to develop Broad's notion of *becoming* a bit more.

One way this might be done is to explore the possibility of new slices being caused by the slices that immediately precede it.[5] (This would seem a bit more plausible than, say, having a divine being creating each and every new slice of being and placing it seamlessly at the very edge of the block). Another possibility is to think of slices as not brought into existence through *becoming*, but rather as already in existence. On this picture, future slices could be thought of as open possibilities, only some of which would become present, by being placed (or placing themselves) at the edge of the block while others continue to exist as unactualized possibilities only. *Becoming*, in this context, would then not have to do with the generation of new things and events but rather with the process of making merely possible slices *actual*. It must be said that this way of thinking of future slices and their actualization is certainly not what Broad had in mind,[6] but it is one direction in which a contemporary FGB theorist might wish to take the view. *Becoming* would then be replaced with the concept of *actualization*, and then the latter would have to be elucidated further. Doing so, would require spelling out whether one should think of "mere possibilities" as existent in some sense or not. The former might be thought of as branches in McCall's (1994) branching universe model, in which the

[5] This is how Tooley (1997) develops the view.

[6] In a chapter on time and change in *Scientific Thought* (1923), Broad repeatedly denies that the future has any reality whatsoever. Given that there are no future existents of any sort to help act as truthmakers for statements about the future, Broad spends a fair amount of space in that chapter attempting to solve the truthmaker problem in some other way. He distinguishes between the reference of statements about the future and the content of such statements. The content of such statements should be treated in analogy with statements about fictional characters, according to Broad. So, for instance, "Puck exists" is to be understood as being about a set of characteristics that we associate with "Puck". Such a set of characteristics are themselves "real", says Broad, despite the fact that Puck is not. He then adds: "Similarly, the judgment, "To-morrow will be wet", which is grammatically about "to-morrow", is logically about the characteristic of wetness. The non-existence of to-morrow is therefore consistent with the fact that the judgment is about something" (Broad 1923, p.72). So, although judgments about how things will be in the future are indeed *about* something (they are about the properties), they do not *refer* to anything: "Thus judgments which profess to be about the future do not refer to any fact, whether positive or negative, at the time when they are made. They are therefore at that time neither true nor false. They will become true or false when there is a fact for them to refer to; and after this they will remain true or false, as the case may be, for ever and ever" (Broad 1923, p.73).

actualization involves a "falling off" of the alternative branches; but the worry in such a case would be that the FGB theorist would then just be replacing one metaphor (addition of slices) with another (existent but unactualized branches "falling off"), without getting clearer on either one.

2.2 Putting Pressure on the FGB Theorist's Answer to Q2: The Now–Now Objection

We have seen above some difficulties that arise in providing a plausible answer to question Q1 about the growth of the block. It is now time to look into the objection that puts pressure on the FGB theorist's answer to question Q2— i.e., to their claim that past and present slices exist in the same way, enjoy the same ontological standing, without any intrinsic difference between them. I will first briefly present the gist of the objection, then proceed to question the assumptions that it rests upon in my responses 1 and 2, and finally, in my response 3, outline the minimizing strategy that is available to the FGB theorist.

The "now–now" objection was presented forcefully by Bourne (2002) and subsequently by Braddon-Mitchell (2004). Bourne (2002) calls this objection "The Present Problem" and presents it as a challenge to Tooley's (1997) version of FGB theory as well as to McCall's (1994) branching model of the universe. Both Bourne and Braddon-Mitchell believe that this objection delivers a devastating blow to GB theory and that as a result, the theory should be abandoned.

Bourne puts the problem to GB theorists as follows: "Although we know by immediate acquaintance which time is our own, how can we know that our time is *present*?" (Bourne 2002, p. 360). Here *present* is supposed to refer to the privileged present that both presentists and the GB theorists are committed to. Or, following Braddon-Mitchell's formulation: If the growing block theory is true, how do we know that it is now now?

Both formulations express the same epistemic worry about our ability to determine whether we are in the past or in the present slice of the fourdimensional growing block. Say, I am thinking to myself, "I am now writing a paper about GB theories". According to this objection, it is much more likely that I am wrong about this than not. Given that present slices are constantly being replaced by new ones, and given that there is a large number of past slices of me which are writing, it would be an incredible coincidence if I were located in the single present slice, rather than in some of the many past ones. Thus, according to Bourne and Braddon-Mitchell, when I am thinking to myself "I am now writing a paper about GB theories", I am almost certainly wrong. A theory that postulates an objective present and yet at the same time commits us to being almost certainly wrong about whether or not we are in that objective present, is, according to objectors, a hopeless one.

Braddon-Mitchell believes that what gives rise to this objection is growing blockist's ambiguous use of "now". He finds that GB theorists oscillate between two incompatible senses of "now": the "now" of the presentist and the "now" of the fourdimensionalist. The presentist's "now" is meant to be objective and absolute,

whereas the fourdimensionalist's "now" is meant to be an indexical "now", relative to the subject's reference frame. Thus, according to him:

> The growing salami view has the costs of both and the benefits of neither. Like fourdimensionalism it countenances volumes of space–time in which individuals are located at different times thinking that they are in the present. Unlike four dimensionalisms with an indexical now, thinking it is not a reason for believing it. Like presentism it has an objective now; but unlike presentism the existence of past agents undermines any reason those who are present might have for believing they are present (Braddon-Mitchell 2004, pp. 202–203).

Let's take a closer look at what drives the objection. Braddon-Mitchell says that the crux of the problem for FGB theorists is their ambiguous use of "now". However, this is certainly not something that either C.D. Broad or Tooley thought they were being ambiguous about. In their writing, they are explicit about there being only one present, the dynamic and changing one at the very edge of the block.

So it must be that Braddon-Mitchell is thinking that it is the FGB theorist's commitment to the fourdimensional past that introduces the debilitating ambiguity. It is because, just like fourdimensionalists, the FGB theorists are committed to "volumes of space–time in which individuals are located", that they run into trouble. And yet this can't be the full story either, for one could postulate volumes of past space–time in which things are located, without the problem arising in quite the way that Bourne and Braddon-Mitchell intend it to. For what would be so problematic with there being abandoned, frozen, dead entities in the past? The growing block theorist could call those times past and existent but dead, while at the same time privileging the present time at the edge of the block, as the time that allows for life, activity, and thinkers. (As we will see in Sect. 3 below, this is indeed the view that Dead Past Growing Block theorists such as Forrest (2004) and Forbes (2016) have in mind).

What appears to be doing the heavy lifting in the "now–now" objection is not just the assumption that there are individuals located in the past but the assumption that such individuals are located in the past *and* that they enjoy the same sort of existence as the individuals that are located at the edge of being—namely, that those past individuals are *walking*, *talking*, *writing*, *thinking,* etc. Given that individuals in the past are imagined as being able to undergo various dynamic processes, they are also imagined as *thinking*—wrongly, as it turns out—that they are in the objective present.

Response 1: The Past is Static and Does Not Allow for Dynamic Processes, so the Now–Now objection can't get off the ground. From this diagnosis of the problem, it follows that the first way to undermine the force of the now–now objection is to question whether the static universe of fourdimensionalists and the static past of FGB theorists can indeed allow for all of the various dynamic activities. Fourdimensionalists are traditionally committed to a static view of the universe and its inhabitants. Thin slices that constitute the fourdimensional block are best thought of as static snapshots of reality, rather than anything long enough and dynamic enough to allow for *walking*, *talking*, *writing*, or *thinking*. *Caesar's crossing of the Rubicon* (Braddon-Mitchell's example) is not something that can happen in an instantaneous

or thin slice; *Plato's believing that he is teaching Aristotle* (Bourne's example) is not something that can happen in an instantaneous or thin slice; and *my thinking that I am located in the objective present* is also not something that can happen in an instantaneous slice. Why can't any of these activities happen within thin or instantaneous slices? Because, simply, it takes time to cross the Rubicon, and it takes time for Plato to have a belief that he is teaching Aristotle, as it takes time for me to think about my spatio-temporal location. All of these dynamic processes take time to unfold, and they can't accurately be presented as happening either at an instantaneous or at a very slim slice of the fourdimensional block.

The worry that I am expressing here has been recently developed in more detail in Perovic (2018), where it is argued that fourdimensionalists have a difficult time accounting for *temporally extended properties* (TEPs) and relations—properties and relations that take time to be had, that are instantiated *through* an interval rather than *at* an instant. Examples of such properties and relations are numerous and varied: cognitive relations such as *thinking*, *meditating* and *understanding* take time to obtain, as do various biological, chemical, and physical properties and relations such as *absorbing* of the sunlight, *freezing* of the water, *decaying* of an atom, and so on and so forth. There are, of course, various strategies open to fourdimensionalists for accommodating such properties and relations and Perovic discusses the four main ones—(a) making bearers of such properties and relations more "chunky"; (b) making a series of objects bearers of *TEPs*; (c) taking *TEPs* to be literally extended in time; (d) taking the exemplification relation itself to be temporally extended. Discussion of these various options would take us too far afield, as it is not the focus of this paper. The main point I wish to raise here is that the assumption that fourdimensionalists can easily and unproblematically account for there being cognitive and other processes in their static universe, is not to be taken for granted. FGB theorists, to the degree that they borrow the fourdimensionalist's static past, tend to take this assumption for granted, as do the proponents of the now–now objection.

So where does this leave the FGB theorist? If she wishes to maintain her commitment to the fourdimensionalist's past and to the possibility of there being dynamic processes and cognitive states in such a past, she will need to take the above criticism on board and do some work to show how such activity is to emerge from the static instantaneous slices and their instantaneous properties. But then the better job she does with this account, the stronger the now–now objection will get—for, the FGB theorist will have succeeded in holding on to the assumed symmetry between the past and the present, and will have seemingly allowed for the possibility of all those thinkers in the past wrongly thinking that they are in the objective present. If, on the other hand, the FGB theorist decides to give up on the idea of the static past being able to generate any kind of activity, by treating it as entirely inert and devoid of life, then she will have given up the foundational assumption of her view—the assumption that the past and the present are ontologically on a par. She will, at that point, have crossed over to some version of the Dead Past Growing Block view, a view discussed in more detail in Sect. 3.

Response 2: The Past is Static and it allows for Dynamic Processes, so the Now–Now objection remains an issue. As we saw in the previous paragraph, the first way that the FGB theorists might wish to defend their commitment to a

fourdimensionalist past, is by conceding that although it is not, strictly speaking, true that there can be *thinking* in an instantaneous slice, the slice can certainly *contribute* to what we describe with our dynamic language as "thinking". Perhaps "thinking" could be treated as an emergent process that a number of instantaneous or thin thinker-slices with their instantaneous cognitive properties and relations give rise to.

But, I worry, a further problem for this account will then be to explain how it is that even the indexical use of "now" would hit its mark. Take our thinker, constituted out of several fourdimensional slices, each of which are contributing to the thought "it is now_i now_i". (I am here using now_i to refer to an indexical use of "now", a use which in this context should be trivially true for fourdimensionalists and FGB theorists alike). Since it takes some time to have such a thought, even the first use of "now_i" will end up not hitting its intended mark, because by the time that that part of the thought is complete, the moment that one intended to refer to would already be gone. This will also be the case with the second use of "now_i"—because of the similar delay, it will end up referring not to the intended original moment—"now_{i0}", nor to the "now" which was uttered/thought—"now_{i1}", but it will end up referring to a subsequent "now_{i2}", thus making the entire statement "it is now_i now_i" that was supposed to be trivially true, in fact false.

One way out of this difficulty might be to make the present more temporally extended than an instant, and to make sure that it extends enough—to include the moments now_{i1} and now_{i2} that succeed the initial intended now_{i0}—so that the temporally extended thinker is able to have thoughts about "now_i" that indexically hit their mark. This answer, though it might suit a classic fourdimensionalist, who at her disposal has *all* of the past, present, and future slices of the block, would not work for the FGB theorist who is not committed to the existence of future slices. Thus, the FGB theorist would have to have an interval-focused account of indexical use of "now_i" when used in the past stretch of the block, and then have a different instant-focused account of the indexical use of "now_i" when used at the edge of reality, where the later slices of the block are just coming into being. This strategy would re-introduce the asymmetry between the present and the past that FGB theorists would not want and it would leave the indexical problem intact. And note that all this would have to be dealt with *before* even arriving at the main challenge that the now–now objection raises, the problem to which I now turn in more detail.

Response 3: The Minimizing Strategy. Responses 1 and 2 above brought out the problematic ontological assumptions which have gone overlooked in the literature surrounding the now–now objection. For the most part,[7] defenders of the FGB theory such as Button (2006, 2007), and Correia and Rosenkranz (2013), have replied to the now–now objection by, essentially, stipulating it away. Button (2006, 2007) does so by allowing the FGB theorist to exclusively speak the tensed language, thus ruling out the very possibility of the two usages of "now"—the indexical one, "now_i", and the boundary one, "now_b"—and the subsequent puzzle that such

[7] With the exception of Cameron (2015) and Miller (2018) who engage extensively with the epistemological assumptions involved in the now-now objection.

double-speak appears to give rise to. Correia and Rosenkranz (2013), on the other hand, are more sympathetic when it comes to quantifying over, in a tense-neutral way, the past existents. What they do not allow, however, is tense-neutral *predication*—they argue that it makes no sense to ask of past existents what they are like and what they are up to, tenselessly.

I find both of these strategies dissatisfying for the same reason that was, in different ways, brought out by Tallant (2007) in his reply to Button, and by Forbes (2016) in his discussion of Correia and Rosenkranz. Namely, both strategies get things wrong insofar as they underestimate the metaphysical problem that the now–now objection raises for the FGB theorist. The metaphysical problem refuses to go away because the FGB theorist is explicitly committed to the existence of the past and present entities, and because the status of the two types of entities is supposed to be the same. The two uses of "now" that give rise to Braddon-Mitchell's puzzle are, I take it, merely the product of this confused ontological picture, and cannot be dealt with by merely disallowing the hybrid way of speaking. For even if we were to disallow such a way of speaking, the hybrid ontology pushes the puzzle back to the surface.

That said, I do agree with the general spirit in which Button, and subsequently, Correia and Rosenkranz, wish to disambiguate between different *uses* of "now" and between tensed and tenseless language. Where I disagree, is in their insistence that they can have the static past of the tenseless B-theorist, and the dynamic and tensed present of the A-theorist, without these different ontological commitments making their way into the hybrid of tensed and tenseless language.

Thus, rather than artificially stipulating away the tenseless way of talking in order to rule out the now–now objection, I suggest to the FGB theorists that they stay faithful to their ontology and embrace the hybrid semantics. As it turns out, the now–now problem does not disappear, but it is significantly diminished once different possibilities of the use of "now" are taken into account. Here is what I have in mind.

As you recall, for the now–now objection to have its intended bite, the growing block theorist would have to be implicitly (ontologically) or explicitly (ontologically *and* semantically) committed to two distinct uses of "now". As mentioned before, the first use of "now" is an indexical one—"now_i", and it refers to one's temporal location, while the second "now" is meant to pick out the objective present, at the boundary of the growing block—"now_b".[8] With these two uses of "now" available to her, when entertaining the sentence "It is now now", the FGB theorist might mean one of the following four statements:

(1) "It is now_i now_i."
(2) "It is now_i now_b."
(3) "It is now_b now_i."
(4) "It is now_b now_b."

[8] With "now_i" and "now_b" I am following Forrest's (2004) terminology, which I find to be most helpful.

Assuming that the FGB theorist can somehow satisfactorily address the background metaphysical worries concerning the successful use of the indexical "now_i" discussed in *Response 2* above (perhaps by assuming the possibility of instantaneous thinkers instantaneously entertaining these sentences), statement (1) will always come out true. That is, when the individual entertains this sentence while located in the past, the two indexical uses of "now_i" would coincide and make the answer trivially true. If the individual is located at the boundary of the block, the two indexical uses of "now_i" will give the same result, thus rendering the statement trivially true.

Similarly, (4) will come out trivially true, whether the individual entertaining the statement is located at the boundary of the block or in the past. The reason is, simply, because "now_b" is referring to the edge of the block, wherever that edge of the block is relative to our individual, and the statement (4) states that the edge of the block it is the edge of the block—a statement that is trivially true, wherever it is uttered or entertained.

It is with statements (2) and (3)[9] where the now–now objection is supposed to come into play. The objectors' thought is that when an individual entertains (2), while located in the past chunk of the block, the statement will have to be false (the now_i and now_b will come apart), whereas in the odd case of the individual entertaining this sentence at the boundary slice (with now_i and now_b coinciding), it will indeed be true. The objectors add that the chance of the two uses of "now" coinciding are slim, because there are many more slices located in the past than in the objective present, at the edge of the block, which makes (2) false in the great majority of its uses.

But this assessment of falsehood of statement (2) is too hasty. It fails to take into account two factors: first, there are two perspectives that need to be kept separate when evaluating the truth of these statements; and second, the "now_b", though it does not behave like an indexical term, and though it is supposed to pick out an objective present at the boundary of the block, is not entirely unconstrained by the context. Let me clarify. The two perspectives I mention are, on the one hand, the perspective of the individual entertaining statement (2), and, on the other hand, the distinct perspective of us, the assessors of the truth-value of that statement for that individual. We are tacitly assumed to have an "outside of the block" perspective, whereas our individual's utterance is either within the body of the block or at the very edge. One can, of course, debate whether we should help ourselves to such a perspective, since we cannot, as a matter of fact, view the block as if we are outside of it. But true as this may be, it does not mean that we do not actually take such a perspective—in fact, it comes quite naturally to us. What we need to be careful about, I suggest, is what such a perspective entitles us to. When considering the statement "It is now_i now_b", on behalf of the FGB theorist, we must assess its truth value *for* the individual entertaining it; the indexical use of "now_i" is theirs, not ours. But now that we have embraced the perspective of the individual entertaining this statement, we also see that *from that perspective*, they can't know if they are at the edge of the block or not—now_b might happen to coincide with

[9] I am assuming here that (3), if it is to make sense at all, must be understood in the same way as (2) as reading: "The time that I take to be present "now_i" is at the edge of the block".

where they are, or it might be at a later spot, the individual has simply no way of knowing. Thus, rather than concluding that statement (2) will end up being false *simpliciter*, whenever the individual entertains it in the past chunk of the block, what we need to realize is that though from the *outside of the block* perspective, we might be able to visualize the block, its edge, and the little individual trapped inside of the slice of the past, we are not legitimized in bringing in such a perspective when evaluating the block individual's utterance of statement (2). That is, (2) gets assessed purely relative to the individual entertaining it and his/her use of "now_i". And though from that perspective, the boundary of the block—now_b—is supposed to be the edge of the block for all, our individual has simply no way of knowing whether, in fact, now_i and now_b coincide.

This minimizing response in no way inhibits the two *uses* of "now" for the individual; rather, it simply reminds us that though it is natural for us to keep shifting from the individual's perspective to the "out of the block" perspective when considering statement (2), we are not allowed to bring in both of those perspectives into play when assessing the truth-value of the utterance of (2) itself. Since that utterance contains an indexical use of "now_i", the only way to give such an utterance meaning is to assess it relative to its utterer. Once we are doing that, we cannot just hop out of that perspective and say that statement (2) is false because the uses of "now_i" and "now_b" do not align. From the utterer's perspective, and hence the only legitimate perspective of assessment of the statement, there is simply no way of knowing whether statement (2) is true or false. Therefore, the most that now–now objectors can claim is that the proponent of the FGB theory, when considering statements (2) and (3), will have to be committed to not being able to know the truth-value of those statements.

Is that a happy conclusion? Perhaps not. But it is also not as damaging as the now–now objectors wanted it to be. The minimizing strategy has shown that there are four possible statements that our FGB theorist can entertain when uttering "it is now now". Two of those statements—(1) and (4)—will come out trivially true whenever uttered, and the other two will simply lack a truth value.

This is not to say, however, that FGB theorists should rest happy. As I have tried to point out in the first part of my discussion of the FGB theory, there is much work to be done when it comes to explaining how the growth of the block in terms of accumulation of slices is to be fleshed out. There is also more work to be done if one is to take the notion of *becoming* as an acceptable primitive (rather than just referring to a mysterious coming into existence of things and events at the edge of the block). And, as we have just seen in the discussion of the now–now objection, there is more work to be done in addressing the ontological worries raised specifically by responses 1 and 2 to the now–now objection. But, as things stand, the FGB theorist should not abandon their position merely due to the presumed impact of the now–now objection.

3 The Dead Past Growing Block Theory

3.1 DPGB's Metaphysical Picture

Dead Past Growing Block Theory (DPGB) is a distinct variant of the growing block view and its main departure from the FGB theory lies in the way it treats its past. The most vocal proponents of this view are Forrest (2004) and Forbes (2016), and in their respective versions of DPGB, they are both committed to the generic growing block ontological thesis about the existence of the past and the present, and to the dynamic thesis about the constantly changing present. In addition to this, they are committed to the same type of answer to question Q1 as the FGB theorist—that is, growth of the block is achieved through addition, at the edge of the block, of new slices of being. In this respect, they inherit the same difficulties encountered by the FGB theorist, discussed above in Sect. 2.1, concerning the notions of growth and becoming.

Unlike the FGB theory, however, DPGB theorists address question Q2 about the comparative status of past and present by introducing an asymmetry: the past is existent but dead, while the present is existent and "alive". For Forrest and Forbes, there is no "activity" or "life" in the past, there is no consciousness and no thought, and thus the now–now objection considered above has no traction here. It simply cannot be that one has a thought about it being now_i now_b, while being stuck in the past region of the block, for there are simply no thinkers at all in the past. There are no thinkers *and* there is no life. As Forrest puts it: "Life and sentience are … activities not states. Activities only occur on the boundary of reality, while states can be in the past" (Forrest 2004, p. 259). But, as I will argue in Sect. 3.2, although this approach is successful in blocking the now–now objection, more work needs to be done to make the metaphysical picture plausible. In particular: (1) the view risks being committed to two kinds of existence, or even to degrees of existence; and (2) there is a difficulty in explaining activity, life, and consciousness in purely extrinsic terms.

Before developing these worries further, let me briefly address DPGB's answer to Q3. In this respect, DPGB theorists are as vague as their FGB counterparts. That is, it is far from clear what the fundamental constituents of spatio-temporal reality are supposed to be—whether they should be three-dimensional instantaneous slices or whether they should be temporally extended events. To help the DPGB theorist get clearer on how to further develop their answers to Q3 and Q1, I will distinguish between different conceptions of dynamicity and different conceptions of events in Sect. 3.3.

3.2 Problems for the DPGB Theorist's Answer to Q2: Types of Existence and Extrinsic Consciousness

The DPGB theorist's answer to Q2 raises the worry of commitment to two types of existence. If both past and present exist but the past lacks life and activity, while the present enjoys such activity and liveliness, it begins to look as if we can have entities

with different kinds of existence—the lively kind at the edge of the block, and the deadly kind in the past. One might think that this is not at all bad because in our everyday experience of the world we are indeed surrounded by two sorts of things, the live ones (plants, insects, animals, other humans, etc.) and lifeless ones (dead plants, dead insects, dead animals, as well as inanimate things such as rocks, various artifacts, etc.). Why couldn't the DPGB theorists help themselves to this ubiquitous distinction? The reason why they can't, or rather, that they *shouldn't*[10] help themselves to such a distinction is that the two cases are importantly disanalogous. Intuitively, entities that lack life and activity can continue to persist through time just like the ones that are alive and active. But the DPGB theorist makes no room for this sort of persistence—rather, it seems that as soon as the new temporal slice of a certain object or event comes into being, the previous one must change from being active and alive to being dead. Thus, it is not that things that are alive continue to persist as such; rather, they persist by having part by part of them die, while new parts spring into existence. This is a very odd way of persisting indeed.

If the DPGB theorist were tempted to soften such a harsh and sudden transition from lively and active slices of being to dead ones, they might want to claim that slices that are closer to the edge of the block are not entirely dead, just a little less lively than the ones that are further away. But this way of proceeding would then lead them to asserting that liveliness/deadliness is the sort of thing that comes in degrees, depending on how far from the edge of the block the slice is.

I don't think that Forrest and Forbes would welcome such a reply, but at the same time, they don't offer much in the way of explanation of their answer to Q2. On the one hand, Forbes points out that it is strictly speaking wrong to talk about events *happening* in the past; the past is gone and there is no activity in it. When we ask about events in the past, he says, we can certainly consider those past slices as if they are present and succeeded by nothing. But we should not be tricked by such talk to think of the past as flourishing with activity. On the other hand, Forbes claims that "each event has persisted, *intrinsically unchanged*, since it came into existence" (Forbes 2016, p. 704, italics mine), thus implying that events don't change as they cease to be present. But then it is quite a mystery how events become dead if they remain *intrinsically* exactly the same as the live and present ones.

As we saw previously, the FGB theorist's distinction between present and past slices is purely external; i.e., it's based on whether or not there are successive slices. If there are successive slices, then the slice is in the past, and if there aren't successive slices, the slice is at the very edge of the block and it is present. In contrast, DPGB theorist wants there to be an additional qualitative difference between the past and the present—the past is dead, while the present is filled with activity. But this qualitative difference can't simply be a matter of the extrinsic difference of where the slice is on the block. And yet that is exactly how Forbes (2016, pp. 705–706) would like this difference characterized. First, he goes on to describe

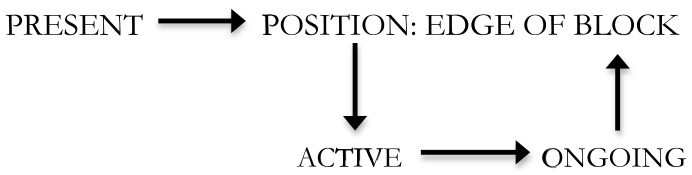
[10] In personal correspondence, Forbes was emphatic that on his view there aren't different types of existence – things either exist or they don't. I am sympathetic but fail to see how his version of the view can actually make good on this claim.

present events as "ongoing" and past events as "finished". In making this association, he appeals to the naturalness of this way of talking—for we indeed do tend to associate the past with completed events and the present with events and activities that are still going on. Next, Forbes proceeds to explain why presentness, in the DPGB conception, should be treated as extrinsic. He writes:

> Why think that presentness is extrinsic? […] Firstly, thinking that there is some intrinsic property of presentness that an event has and then lacks is liable to mystify matters rather than clarify them. We would need to say more about this intrinsic property, and explain why it coincided so neatly with the edge of the block. […] If we think of activity as being extrinsic, we avoid the need to explain the mysterious intrinsic property, and explain why it is so systematically related to the edge of the block. This is because, on the Growing-Block view, the future is pure potential—it doesn't exist—whereas the past is fixed actuality—not only does it exist, but we're stuck with it. Ongoing (i.e. present) events seem naturally placed between the potential of the future, and the fixed actuality of the past; ongoing events are precisely those that have some fixed actuality and some potentiality (i.e. they are unfinished). (Forbes 2016: 705)

From this, we can get a better idea why Forbes and other DPGB theorists are motivated to treat presentness as extrinsic—the worry is that treating it as intrinsic would turn out to be mysterious and mysteriously related to the external relational features of the block. But saying that presentness better be extrinsic doesn't do anything to explain how the activity and life that go with it are to be extrinsic too. In fact, the air of mystery grows.

To be fair, Forbes does appeal to the distinction between ongoing and finished events, thus suggesting that we associate the activity with the ongoing events and the lack thereof with events that are finished. But I worry that with this we end up just chasing our tail, for it is unclear what it might be for an event to be ongoing if not for it to be at the edge of the block. Here is a schematic representation of the troubling circularity:



Of course, a case could be made that one philosopher's vicious circle is another philosopher's rock bottom, a primitive that cannot be elucidated any further. Hence,

to my accusation of being unable to illuminate the notions of *activity* and of *ongoing events* in a non-circular manner, the DPGB theorist might reply by insisting that these are primitive concepts of the theory that cannot be further explained. What we are witnessing is a rock bottom of the DPGB theory and rather than looking at these concepts as *explaining* each other, we should see them as merely being intimately mutually related.[11]

But for this reply to work, there needs to be at least a sketch of how activity, consciousness, and ongoingness *can* all be treated as extrinsic. The first hurdle is that it doesn't look like the sense in which presentness and ongoingness are extrinsic is the same as the sense in which consciousness might be extrinsic. That is, relational features at the edge of the block would appear to pick out one sense of extrinsicness—something is present or ongoing due to there not being any succeeding slices of the block; but activity and consciousness, if they are to be treated as extrinsic as well, would have to be extrinsic to something else—not the slice at the edge of the block itself but perhaps to minds that are constitutive parts of those slices. But then consciousness would seem to be *intrinsic* to the slice of the block, while being *extrinsic* to the slice of the mind that is a constitutive part of the slice of the block. Would then extrinsicness of the latter somehow be derivative of the intrinsicness of the former? And if so, how exactly are the two related? There is certainly more work that needs to be done in this direction if the idea of consciousness being extrinsic in some sense is to convince at all.

3.3 Dynamicity and Events: Necessary Clarifications

The above discussion of ongoingness, activity, and extrinsicness at the edge of the block brings out the importance of getting clear on different senses of the notion of dynamicity and different understanding of events. Such clarifications are needed in order to enable the DPGB theorist to answer properly Q1, Q2, and Q3, and make their metaphysical picture more clear and complete. But these clarifications are also very useful for the other two variants of the GB view.

With respect to dynamicity, there are three main senses that need to be kept separate. The first sense—$dynamicity_{EX}$—refers to the extrinsic addition of new slices at the edge of the block (this was referred to as *growth* and *becoming* by the FGB and DPGB theorists). The second sense—$dynamicity_{IN}$—refers to the assumed intrinsic activity within a fourdimensional slice or stretch of the block. This activity is assumed by the classical fourdimensionalist, the FGB theorist, and the now–now objector and I have raised concerns about its plausibility in Sect. 2.2. It is also this sense that is ruled out by the DPGB theorist's insistence that the past is "dead", "devoid of activity", etc. And the third sense—$dynamicity_{OE}$—refers to the irreducible dynamic character of ongoing events, a character that cannot be derived from static slices. This sense of dynamicity applies to temporally extended events *in toto* and throughout their temporal extension, and it depends upon events being the primary constituents of reality.

[11] Forbes has confirmed in personal correspondence that he would indeed be inclined to respond along these lines.

"Events" too need disambiguation within all GB theorists' ontology, because without such disambiguation question Q3—i.e. the question of what the theory considers to be the most metaphysically fundamental inhabitant of spatio-temporal reality—cannot be satisfactorily answered. As we saw in Sect. 2, the classical FGB theorist C.D. Broad uses talk of slices and events almost interchangeably, and considers the former as constituents of the latter. Forbes seems to prefer, constitutively and explanatorily, slices over events. This suggests the first understanding of an "event"—an event as an aggregate of instantaneous (or very thin) fourdimensional slices. Such events, understood as both constitutively and explanatorily derivative from the fourdimensionalist's static slices, can then be made out to be dynamic in the first sense—$dynamic_{EX}$—by incorporating the external edge-of-the-block addition of slices. The FGB theorist might attempt to make them out to be dynamic in the second sense as well—$dynamic_{\text{IN}}$—but, as I have pointed out in Sect. 2, this would certainly require more fleshing out. The second understanding of an "event" takes it to be an irreducible and dynamic constituent of spatio-temporal reality. According to such a view, events cannot be explanatorily or constitutively built up from slices; rather, slices are abstractions from events. This is the view of the Growing Events theorist, discussed in Sect. 4 below, and it goes along with the third sense of $dynamicity_{OE}$.

Before moving on, let's briefly take stock of the discussion of DPGB theory in this section. The main feature of DPGB theory lies in its departure from the FGB theorist's answer to Q2, i.e. in the distinct way it treats its past compared to its present. This departure has its blessings—DPGB theorists do not face any worries concerning the now–now objection because, simply, there can be no activity and consciousness in the past and no thinkers thinking to themselves that "it is now now". But such a departure also has its costs—DPGB theorists need to make clearer how they can avoid a commitment to different types or even degrees of existence, as well as in what way, if any, consciousness can be understood as extrinsic. In addition, they face some of the same worries as the FGB theorists when it comes to answers to questions Q1 (with respect to growth and becoming of the block), and Q3 (with respect to the fundamental ontological constituents of spatio-temporal reality). To help along with question Q3, I have tried to offer to DPGB theorists, and GB theorists more broadly, an important distinction between three notions of dynamicity and two conceptions of events.

4 The Growing Events Theory

4.1 GE's Metaphysical Picture

The *Growing Events* theory (GE) is another variant of the growing block view. It is committed to the growing block ontological thesis about the existence of past and present, and to the dynamic thesis about the ever-changing present. Where this view strongly departs from the two previously considered ones is in the characterization of events, their relationship to slices, and the type of dynamicity involved.

As far as I know, no one holds the exact combination of views that I will be describing here as the *Growing Events* view, so my discussion of it will be relatively brief. Still, it's worth outlining this sort of view because it draws on Whitehead's understanding of events and their temporal existence, and it helps us see the metaphysical playing field of the GB theory better. In what follows, I will first paint the broad metaphysical picture that GE theory is committed to, and then, in Sect. 4.2, I will present two variants of the GE view, the first one of which depends on the notion of $dynamicity_{EX}$, while the second one depends on the notion of $dynamicity_{OE}$ as well as $dynamicity_{EX}$. Interestingly, the first one parallels in some important respects, including the difficulties, the DPGB theory, while the second one parallels the FGB theory.

A GE theorist thinks of events as primary existents of the spatio-temporal world. The way she addresses Q3 is by claiming that the world is a world of events. Those who think of events, intuitively, as a sort of "happening" with a reasonably clear temporal beginning and end, with a lot of change in between, may think it odd to say that events are fundamental constituents of the world. For, if events are just thought of as dynamic sorts of happenings, the world seems to contain a whole lot more besides; that is, there appear to be a great number of entities of a non-dynamic sort. These might be thought of as static objects or states of affairs. But to this, a GE theorist has an inclusive reply: namely, events can be static or dynamic, depending on the amount of change that they involve. Thus, an event of, say, this table being gray is a relatively static event which has as its starting point some time when the carpenter finished painting the entirety of the table gray, it persists for 5 years, and it ends when the table is painted white. During the 5 years in which the table remained gray, there was scarcely any change to the table, which is why it seems correct to call this sort of event static. On the other end of the spectrum, an example of a highly dynamic event is a woman's pregnancy—it involves a large amount of change both in the mother and in the developing baby, from the moment of conception until baby's birth. Depending on the amount of change involved, events can exhibit varying amounts of change and variability; there is really no reason why the dynamic aspect of events could not come in degrees. Moreover, longer and more complex events can be constituted out of a number of simpler (i.e., less encompassing) and (temporally) shorter events.

The GE theorist's events are *fundamentally* temporal entities; they have temporal aspect built into them. The exact way in which it is built into events will depend on the ontological preferences of individual GE theorists. One way might appeal to temporally extended objects and their atemporal properties; another way might appeal to temporally extended properties as well as temporally extended objects; another yet might construe events in terms of bundles of momentary and temporally extended tropes, and there are more possibilities still. What matters here is that it be clear that: (1) for a GE theorist, events can be developed in a fine-grained enough way to help provide sufficiently precise identity conditions; and (2) that for a GE theorist, the temporal aspect is merely an abstraction from an event; events have a metaphysical priority. Thus, it is not the case that the world is a spatio-temporal continuum that gets filled with events, but rather the

spatio-temporal continuum is an abstraction from existing static and dynamic events.

Another abstraction is instantaneous temporal slices—it is not such slices with their instantaneous properties that build up the GE theorist's events; rather, events are metaphysically prior and instantaneous slices and their properties are abstractions from events. This is just another way of saying that events take some time to unfold and such temporal extendedness of an event is difficult (if not impossible) to recover from instantaneous temporal slices of objects and their properties. I believe that Whitehead was thinking something along these lines when he wrote:

> It is nonsense to conceive of nature as a static fact, even for an instant devoid of duration. There is no nature apart from transition, and there is no transition apart from temporal duration. *This is the reason why the notion of an instant of time, conceived as a primary simple fact, is non-sense*. (Whitehead 1938, p. 207, italics mine)

If we replace his talks of processes with events, we can see how Whitehead too was worried that dynamic temporally extended entities could not be analyzed away with the help of instants and points devoid of the dynamic aspect altogether. He writes:

> The notion of a 'point' in process is fallacious. The concept of 'point' is here meant to imply that process can be analyzed into compositions of final realities, themselves devoid of process. (Whitehead 1938, p. 131)

This line of argument then suggests a picture in which dynamic events and their change cannot be reduced to, or derived from, instants; it is rather an irreducible and intrinsic feature of events. In this respect, the GE theory presents quite a departure from the FGB and DPGB theories. The FGB and DPGB seemed to build on fourdimensionalism and its static picture of temporal slices placed in succession. The GE theorist abandons this outlook entirely. The GE theorist assumes that there is a growing universe, but that universe is not a block. Instead it is the universe-event, with a multitude of constitutive events as parts.

4.2 Further GE Theory Variants: Lively Past and Many Ongoing Presents?

The above picture needs fleshing out, however, and one will get different versions of the GE theory depending on how it treats its past (i.e. how the Q2 is answered) and the use it makes of distinct notions of dynamicity.

It might seem natural for the GE theorist to make use of two senses of dynamicity—$dynamicity_{OE}$ which captures the intrinsic change and activity within an event, and $dynamicity_{EX}$ which refers to a growth and accumulation of further *events* (rather than slices) in the universe. If the GE theorist does not want to commit to a view that allows for the entire past to be bubbling with activity, she would have to rule out $dynamicity_{OE}$ in favor of just having $dynamicity_{EX}$. Such a view would end up being very close to the DPGB view, with the only difference being that the former is an events-first view, whereas the latter is slices-first view. The difficulties

for the GE + $dynamicity_{EX}$ view would closely parallel the difficulties for the DPGB theory already discussed above in Sect. 3.2 concerning degrees of existence/livelihood and the characterization of consciousness. I won't be re-hashing those arguments here.

The other option is the GE + $dynamicity_{OE}$ + $dynamicity_{EX}$ view, which, in a sense, would end up being close to the FGB view, minus the static component. On such a view, all events in the past and the present would be treated as $dynamic_{OE}$ throughout, with only the present events enjoying also the status of being $dynamic_{EX}$. The now–now objectors' worry would then be re-introduced: there could be many thinkers in the past actively thinking to themselves that "it is now now", and this would have to be fully embraced by the proponents of the view. Note that this sort of GE theorist would not be able to use responses 1 and 2 discussed above on behalf of the FGB theorist, for it is the very assumption of this kind of GE view that $dynamicity_{OE}$ is a pervasive phenomenon. Of course, it would still be open to the proponent of this view to bring in their own version of the *Minimizing Strategy* and to claim that the now–now problem is not as bad as it initially appeared to be.

Further aspects of the metaphysical picture also need fleshing out. In particular, it seems to me that if all events are taken to be dynamic and ongoing "from within", this feature then could not be associated with "ongoingness" and could not be used to distinguish between an event that is objectively present, or at the edge of reality, and the event that is in the objective past. In other words, an "ongoing" event would have to possess an additional type of dynamicity, the one at the boundary—$dynamicity_{EX}$. All events that incorporated such boundary events with their $dynamicity_{EX}$ would then be considered to be ongoing, while the ones that were merely $dynamic_{OE}$ and did not contain any boundary events, would be finished.

This picture is complicated by the examples of events whose status can shift. Take for example an event of my grading papers from this past semester—this event is finished, while the event of my writing and revising the paper on growing block theories is still ongoing. But these designations are not absolute; they are relative to further goings on—when I finish writing this paper, it will no longer be ongoing, whereas if I uncover that there was another paper to grade from the semester that passed, *that* event will change its status from finished to ongoing.

How one goes about partitioning events will also be somewhat messy and dependent on our interests and conventions. Take again the example just provided. If I am considering the writing of this paper on GBT theories to be one extended event, which includes numerous interruptions, and the shifting from one writing project to another, such an event lasts for over a year and is still ongoing. If, on the other hand, I am more careful in how I divide up the events—by including say, the more cohesive and distinct first, second, third, and fourth stages of the process, which correspond to the sections of the paper—then it will be clear that while the first three stages of writing of the paper are finished, this final revision stage is the only one that is still ongoing. I could further partition each of these stages into smaller writing events, and those can be divided up even further, and so on and so forth. All this to say that how events get delineated, divided up, and counted, does indeed seem to depend on the interests of those doing the delineating, dividing, and counting.

In the light of all of this, it seems wise for the GE theorist not to associate the objective present with the ongoingness of events. For if the ongoingness of events allows for context-dependent variability, then the presentness too would be susceptible to context-variability as well. But this directly clashes with the original intent that all GB theorists, including the GE theorists, share—the commitment to the objective and invariable present at the edge of being. Therefore, for this sort of GE theorist, the way forward would have to be to identify presentness with the very edge of being, i.e. with the events that are unfolding at the very edge of reality and no other events or parts of events.

Lots more needs to be done to properly develop the GE theory and its variants. A fuller discussion of these views is outside the scope of this paper, and I leave it for another time. What I have tried to highlight here is that something along the lines of *Growing Events* theory would still fall within the parameters of the Growing Block theory. It is committed to the existence of past and present, and it takes the present to be constantly changing. It answers Q3 by insisting that it is events rather than slices that are primary inhabitants of spatio-temporal reality, and following Whitehead it takes the points and slices to be mere abstractions from events. Its answer to Q1 would need to be further developed, but it looks like the growth of the universe is understood to happen through accumulation of events at the edge of being. And, finally, the GE theorist's answer to Q2 and commitment to distinct notions of dynamicity will determine further variants of the view. I have here only briefly considered two variants—one that parallels the DPGB theorist's commitment to a dead/inactive past (GE theory + $dynamicity_{\mathrm{EX}}$) and the other that parallels the FGB theorist's commitment to the same status of the past and present (GE theory + $dynamicity_{\mathrm{EX}}$ + $dynamicity_{OE}$).

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References

Bourne, C. (2002). When am i? A tense time for some tense theorists? *Australasian Journal of Philosophy, 80*(3), 359–371.

Braddon-Mitchell, D. (2004). How do we know it is now now? *Analysis, 64*(3), 199–203.

Broad, C. D. (1923). *Scientific thought*. New York: Harcourt, Brace & Company, Inc.

Button, T. (2006). There is no time like the present. *Analysis, 66*(2), 130–135.

Button, T. (2007). Every now and then, no-futurism faces no sceptical problems. *Analysis, 67*(4), 325–332.

Cameron, R. (2015). *The moving spotlight: An Essay on time and ontology*. Oxford: Oxford University Press.

Correia, F., & Rosenkranz, S. (2013). Living on the brink, or welcome back, growing block! In K. Bennett & D. Zimmerman (Eds.), *Oxford studies in metaphysics* (Vol. 8, pp. 333–350). Oxford: Oxford University Press.

Forbes, G. (2016). The growing block's past problems. *Philosophical Studies, 173,* 699–709.

Forrest, P. (2004). The real but dead past: A reply to Braddon-Mitchell. *Analysis, 64*(4), 358–362.

Hawley, K. (2001). *How things persist*. Oxford: Oxford University Press.

Lewis, D. (1986). *On the plurality of worlds*. Oxford: Blackwell.
McCall, S. (1994). *A model of the universe: Space-time, probability, and decision*. Oxford: Oxford University Press.
Miller, K. (2013). Presentism, eternalism, and the growing block. In H. Dyke & A. Bardon (Eds.), *A companion to the philosophy of time*. Malden, MA: Wiley-Blackwell.
Miller, K. (2018). The new growing block theory vs presentism. *Inquiry, 61*(3), 223–251.
Perovic, K. (2018). What is a fourdimensionalist to do about temporally extended properties? *European Journal of Philosophy*. https://doi.org/10.1111/ejop.12412.
Sider, T. (2001). *Four dimensionalism: An ontology of persistence and time*. Oxford: Oxford University Press.
Tallant, J. (2007). There have been, are (now), and will be lots of times like the present in the hybrid view of time. *Analysis, 67*(1), 83–86.
Tooley, M. (1997). *Time, tense, and causation*. Oxford: Oxford University Press.
Whitehead, A. N. (1938). *Modes of thought*. New York: Macmillan.