Robust passage phenomenology probably does not explain future-bias

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Abstract

People are ‘biased toward the future’: all else being equal, we typically prefer to have positive experiences in the future, and negative experiences in the past. Several explanations have been suggested for this pattern of preferences. Adjudicating among these explanations can, among other things, shed light on the rationality of future-bias: For instance, if our preferences are explained by unjustified beliefs or an illusory phenomenology, we might conclude that they are irrational. This paper investigates one hypothesis, according to which future-bias is (at least partially) explained by our having a phenomenology that we describe, or conceive of, as being as of time robustly passing. We empirically tested this hypothesis and found no evidence in its favour. Our results present a puzzle, however, when compared with the results of an earlier study. We conclude that although robust passage phenomenology on its own probably does not explain future-bias, having this phenomenology *and taking it to be veridical* may contribute to future-bias.

Keywords Future bias · Temporal phenomenology · Experimental philosophy

1 Introduction

Going back at least to Hume (1739), philosophers have supposed that we exhibit a *bias toward the future*: At least in some contexts, we prefer that positive events (events that we prefer to occur) be located in the future rather than the past, and that negative events (events that we prefer not to occur) be located in the past rather than the future. In particular, it has been supposed that when it comes to hedonic events—events that

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involve pleasures or pains¹—we exhibit future-bias.² Recent empirical work supports the contention that people are positively hedonically future-biased: all else being equal, they prefer that positive hedonic events be located in the future rather than the past. That work also supports the contention that people are negatively hedonically future-biased: they prefer that, all things being equal, negative hedonic events be located in the past rather than the future (Caruso et al., 2008; Greene et al., 2021a).³ Indeed, there has recently been a spate of empirical work exploring the conditions under which people exhibit future-bias. This work includes investigation of whether such preferences are limited only to hedonic events (Greene et al., 2021a), and whether they are limited only to the first-person condition or also extend to third-person conditions (where people are asked to have preferences about the temporal location of events that someone else will experience) (Caruso et al., 2008; Greene et al., 2021a). This work has also sought to determine the strength of people’s future-biased preferences: in particular, is future-bias only a tie-breaker between options of equal intrinsic value (e.g., preferring a pain in the past to the same quantity of pain in the future), or does it sometimes generate a preference that things be “worse overall” (e.g., preferring more pain in the past to less pain in the future (Greene et al., 2021b) or preferring less pleasure in the future to more pleasure in the past (Greene et al., forthcoming))?

There has recently been considerable debate over the rationality of future-bias (Brink, 2011; Dorsey, 2018; Dougherty, 2011, 2015; Greene & Sullivan, 2015; Hare, 2007, 2013; Parfit, 1984; Sullivan, 2018). It has been suggested that the normative status of these preferences depends, at least in part, on the status of the psychological mechanisms that ground said preferences.⁴ Understanding what explains the existence of these preferences is important, then, for evaluating their rationality. Yet this question has received relatively little empirical investigation. It is this lacuna that this paper attempts to fill.

Philosophers have suggested at least two explanations for future-biased preferences. The first is the *temporal metaphysics hypothesis*.⁵ According to this hypothesis, our beliefs (likely implicit) about the temporal structure of our world (the *temporal belief hypothesis*) and/or our temporal phenomenology (the *temporal phenomenology hypothesis*) explain our future-biased preferences. The second is the *practical irrelevance hypothesis*. According to this hypothesis we are future -biased because there

¹ For instance, experiencing being poked by a hot poker is a (negative) hedonic event, whilst being insulted by a friend behind your back is a (negative) non-hedonic event. Non-hedonic events are typically events that are not experienced directly by the agent, or where the agent’s experience is not tied to the temporal location of the event.

² See for instance Parfit (1984), Prior (1959), Hare (2007, 2013), and Heathwood (2008).

³ Greene et al. (2021a) also found future-biased preferences for negative non-hedonic events.

⁴ Suhler and Callender (2012); McLaurin and Dyke (2002).

⁵ Consideration (or defense) of the temporal metaphysics hypothesis include Prior (1959), Schlesinger (1976), Craig (1999), Yehzekel (2014), Pearson (2018), and Latham et al., (2019).

is nothing we can do to affect the past, which means that past events are not relevant to our choices (and therefore objects of *practical* concern) in the way that potential future events are.^{6,7}

Both hypotheses have received some recent investigation. Latham et al. (2019) found some empirical support for the practical irrelevance hypothesis. They found that future-bias is mitigated when people are asked to consider hypothetical choice situations where they can causally influence past events. Still, this study found significant residual future-bias even when the past is causally accessible, suggesting that the practical irrelevance of the past provides only a partial explanation of future-bias. The question, then, is what else explains these preferences.

Latham et al. (2021) recently investigated a version of the temporal passage belief hypothesis: the hypothesis according to which our belief that time robustly passes explains our future-biased preferences. They found that participants were more future-biased when asked to consider hypothetical situations in which it was stipulated that time robustly passes (as opposed to otherwise similar situations in which it was stipulated that it does not), but that participants' *actual* reported beliefs about whether time robustly passes did not influence their levels of future-bias. They interpreted this as evidence against the temporal belief hypothesis. They hypothesised that reading a vignette that describes time as robustly passing might tend to induce, or make salient, a phenomenology *as of* time robustly passing, in a way that reading a vignette which describes time as static did not. Hence, they suggest, it might be that the presence of a phenomenology *as of* time robustly passing partially explains future-bias.

This paper takes up that idea. We investigate the hypothesis that a certain kind of temporal phenomenology, which we are inclined to describe as being one *as of* robust passage, at least partially explains future-biased preferences.

In Sect. 2 we outline the extant literature on future-bias, and present our hypotheses. In Sect. 3 we describe our methodology and results. In Sect. 4 we consider the implications of those results, with respect to both the explanation and the rationality of future-bias.

⁶ Defenders of something like this view include Kauppinen (2018) and Horwich (1987, pp. 194–196). It is developed more fully and explicitly by Maclaurin and Dyke (2002) and Suhler and Callender (2012).

⁷ There are interesting questions here about whether these two hypotheses map onto system 1 versus system 2 type thinking (where system 1 thinking is intuitive, automatic and 'hot', while system 2 is conscious, top-down, effortful, and 'cool'; see, for example, Metcalfe and Mischel, 1999; Kahneman, 2011; Greene, 2014). One might think that the practical irrelevance hypothesis more naturally connects with system 1 and the temporal metaphysics hypothesis with system 2, since the latter appears to involve more conscious top-down reflection and the former might reflect a more intuitive, automatic appraisal. (Thanks to a helpful referee for this suggestion.) But this is far from obvious. On the one hand, being indifferent to the past because we cannot affect it could well reflect conscious or semi-conscious reasoning. (We clearly sometimes engage in exactly this sort of reasoning, when we say things like "No use crying over spilled milk!") On the other hand, our beliefs about temporal metaphysics or experience of time as dynamic/static might influence our preferences entirely implicitly, without any conscious reflection. It would be interesting to explore whether the psychological mechanisms behind future-bias, whatever they turn out to be, operate intuitively/automatically or consciously/effortfully. But it's also worth noting that most dual-systems theories these days do not posit a clear distinction between Type 1 and Type 2 systems. For example, Jonathan Evans (2006), one of the most prominent dual-systems theorists, distinguishes between two different types of thinking, but thinks that it is plausible that they are not realised by distinct systems. So it's not obvious that we should expect the causes of future-bias to neatly be associated with one rather than the other system.

2 The literature and our hypotheses

As noted, there are at least two versions of the temporal metaphysics hypothesis: the temporal belief hypothesis (according to which future-bias is at least partly explained by our beliefs about temporal metaphysics) and the temporal phenomenology hypothesis (according to which future-bias is at least partly explained by our temporal phenomenology). For present purposes we set aside the temporal belief hypothesis and focus entirely on the temporal phenomenology hypothesis.

In particular, we focus on one aspect of our temporal phenomenology (and hence on one version of the temporal phenomenology hypothesis). There is widespread agreement that we have what we will call a certain *target phenomenology*. Roughly, this is the phenomenology that we are inclined to describe by saying that it seems to us as though time (robustly) passes. By “robust temporal passage”, we mean the kind of passage posited by A-theories of time, according to which a single moment is objectively present, and which moment that is, changes as time passes. By contrast, there is no robust temporal passage if events simply stand in earlier/later relations without any times or events being picked out as objectively past, present, or future. In that case we will say that time is *static*. Then by “phenomenology as of robust passage”, we mean phenomenology whose content represents the world as containing this sort of passage, whether or not the world is in fact the way it is represented to be (hence the *as of*). Importantly then, having a phenomenology with this content explains our being future-biased even if, as a matter of fact, time does not robustly pass, just as having a phenomenology as of the stick being bent can explain why we believe it is bent (and, for instance, why we prefer another stick for some task where a straight stick is called for), even if the stick is not really bent and hence the phenomenology is not veridical. In this regard, then, we assume that the phenomenology in question has representational content rather than, for instance, only having phenomenal character.⁸ The phenomenology presents the world as being some particular way to us (i.e., as containing robust passage) whether or not the world does in fact contain such passage. Quite generally, since we take robust passage to be the phenomenon in which there is a single moment that is objectively present, such that which moment that is changes (i.e., there is in some sense movement of, or change in, the present), we take a phenomenology as of robust passage to be a phenomenology in which, *inter alia*, it seems as though the present moves. In turn, we take it that, in part, what it is for the present to seem to move (or change) is for it to seem as though you are located in the present, and future events are moving towards you and past events are receding away from you, or for it to seem as though the present (and yourself, located therein) is moving towards future events and away from past ones.

Both of these ways of describing things capture some sense of movement. One possibility, then, is that there is a phenomenology as of movement of some kind, which we describe in two ways. One of these ways appeals to so-called moving time expressions (in which we talk of the future coming towards us, and the past receding)

⁸ We make no assumption that the phenomenal character of this state is exhausted by the representational content. For views on which this is not so see Torrenco (2017).

and the other of which appeals to so-called moving ego expressions (in which we talk of the present, or the self, moving towards the future and away from the past).⁹

Since motion is in fact relative, and since we know that there is a correlation between people reporting that things seem as though time is moving and as though the ego is moving (Latham et al., 2020a, 2020b), we think it quite likely that robust passage phenomenology and moving ego phenomenology are one and the same phenomenology described using two suites of expressions. The study we ran uses moving time rather than moving ego expressions; but if there is a single phenomenology that can be elicited using *either* set of expressions, then we will still have tested the role of moving ego phenomenology (since that just is robust passage phenomenology).

However, we do not know that there is a single phenomenology here. It might be that there is a moving ego phenomenology that is distinct from a moving time (i.e., robust passage) phenomenology. (Even if all motion is relative, it may seem to us as though motion is absolute.) Our aim in this paper is to test the hypothesis that it is a phenomenology as of robust passage, or a phenomenology that we describe and conceptualise as such, that explains future-bias. If there is a distinct moving ego phenomenology, then there is a separate hypothesis that is worthy of testing: namely, that it is this moving ego phenomenology that explains future-bias. Since our study uses moving time expressions, if there are two distinct phenomenologies here, our study does not test the moving ego phenomenology hypothesis, and for all we can tell it may be that the presence of that phenomenology does indeed explain future-bias, even if the presence of robust passage phenomenology does not.

In what follows, then, we focus entirely on robust passage phenomenology and not on moving ego phenomenology, bearing in mind that these might be one and the same thing. So when we talk of the target phenomenology, we mean the phenomenology that either has content as of robust passage, or the phenomenology that people describe or conceptualise as having that content. That second caveat is important. The literature is divided between those who think that the target phenomenology does have content as of time robustly passing¹⁰ and those who think it has some other content¹¹ which some (or perhaps most) of us mistakenly describe as being as of robust passage.¹² For instance, some defenders of the B-theory hold that the target phenomenology has content as of temporal succession (Oaklander, 2015; Leininger, 2021; Deng, 2013; Ismael, 2012) or as of a moving ego (Prosser, 2012).

Whatever view one takes of the content of the target phenomenology, philosophers have generally agreed that it has content that we often *report*, or *describe*, as representing robust passage.¹³

⁹ See Sinha and Gardenfors (2014).

¹⁰ Schuster (1986); Smith (1994); Schlesinger (1994); Craig (1999); Le Poidevin (2007); Paul (2010); (Hohwy et al., (2015).

¹¹ Deng (2013); Bardon (2013); Braddon-Mitchell (2013); Hoerl (2014); Prosser (2012; 2016); Miller et al. (2018); Miller (2019); Latham, Miller and Norton (2020b).

¹² Miller et al. (2018); Hoerl (2014).

¹³ See for instance Latham, Miller and Norton (2020b); Shardlow et al. (2020). Some have argued that we do so due to fairly contingent features of language, including both use of tense (which is not found in all languages) but also use of certain kinds of metaphors and language constructions which lend themselves to our describing the underlying phenomenology in passage friendly ways (Miller et al., 2018).

A very natural hypothesis is that it is the presence of the target phenomenology, alongside our tendency to describe, report, or otherwise conceptualise this phenomenology as being as of robust passage, which (at least partially) explains future-bias. After all, the effects that experiences have on our preferences and decisions are mediated by how we interpret, conceive, and make sense of those experiences.¹⁴ The idea is that if we have a phenomenology that we conceive as being one in which it seems to us, *inter alia*, as though future events are moving closer to us, and past events are receding from us, then we might expect that if an event is positively valenced, we will prefer to feel as though that event is coming closer to us, and hence prefer it to be in the future. By contrast, if the event is negatively valenced, we will prefer to feel as though the event is getting further from us, and hence prefer it to be in the past. We call this the *cognitively mediated target phenomenology hypothesis*, or the *target phenomenology hypothesis* for short.

So the hypothesis we test (*viz.*, the target phenomenology hypothesis) is that having a phenomenology that people *take to be* (i.e., describe or report as being) a phenomenology as of robust passage contributes to future-bias. According to this hypothesis, there will be an association between future-bias and the tendency to report that it seems as though time robustly passes.

In order to investigate this hypothesis we divided participants between two conditions. In the first condition, participants see a vignette (borrowed and adapted from Latham et al., 2021) in which they are asked to imagine that they are an astronaut (in space) who investigates the phenomenology of time. They are then asked to imagine that they have discovered that in space, it seems as though time robustly passes. This is the *passage condition*. In the second condition, participants see a vignette in which they are asked to imagine that they are an astronaut (in space) who investigates the phenomenology of time. They are then asked to imagine that they have discovered that in space, it seems as though time does not robustly pass: instead, it seems as though time is static. This is the *no-passage condition*.

In each condition participants are told that the spaceship's food dispenser normally produces bland meals, but that once during the voyage it produces the astronaut's

¹⁴ Some B-theorists might maintain that in the absence of conceiving of this phenomenology as being as of robust passage, we would not form future-biased preferences at all. And even those who think that the phenomenology is as of robust passage should think that people will be more inclined to be future-biased if they interpret, describe, and report that phenomenology as being as of robust passage. Again, that is because it is, in part, the ways in which we conceive of and understand our phenomenological states, which grounds our various preferences. If someone had a phenomenology as of robust passage, but interpreted that phenomenology as being a phenomenology as of static time (that is, interpreted it as representing that time is not dynamical) and thus reported it as such, one would expect their interpretation of their phenomenology to play a role in subsequent preferences: in particular, you might expect that such people will have lower levels of future-bias than others who interpret their phenomenology as being of robust passage.

favourite meal (the *positive hedonic condition*) or their most disliked meal (the *negative hedonic condition*).¹⁵ Participants are then asked questions about their preferences regarding the temporal location of their favourite/most-disliked meal.

If the target phenomenology hypothesis is correct, then we should find that more participants exhibit future-biased preferences in the passage condition than in the no-passage condition. That is because the passage vignette (which does not simply tell participants that time passes but uses moving time language and metaphor to describe its passing) is expected to evoke both the target phenomenology and the interpretation of that phenomenology as involving temporal passage. This was our first hypothesis (all our experimental hypotheses, materials and data can be found at <https://osf.io/32fmt/>).

H1 More participants will exhibit future-biased preferences in the passage condition than in the no-passage condition.

Second, if that hypothesis is correct we should find that amongst those who report future-biased preferences across the passage and no-passage conditions, the strength of those future-biased preferences is stronger in the passage condition than in the no-passage condition. This is our second hypothesis:

H2 Future-biased preferences will be stronger in the passage condition than in the no-passage condition.

Importantly, our vignettes may not directly impact participants' phenomenologies. They ask participants to imagine, or simulate, that it feels as though time robustly passes, or that it feels as though time is static. So, even if it's the case that people tend to be more future-biased when they imagine having the phenomenology that time robustly passes, it doesn't follow that people's actual reported phenomenology as of time robustly passing is an explanation for their future-biased preferences. (For instance, it might be that no one would in fact report having a phenomenology as of time robustly passing in ordinary situations.) Since we want to know what explains people's *actual* future-biased preferences, we want to know not only whether *imagining* having a phenomenology as of time robustly passing is associated with greater future-bias, but whether *actually having* such a phenomenology (or a phenomenology that one is disposed to so describe) is associated with greater future-bias.

So, in order to more directly assess the hypothesis we're interested in, we asked participants in the passage and no-passage conditions to what extent they think our universe matches the description in the vignette (i.e., that it seems as though time robustly passes/it seems as though time is static). We take this to be a way to probe participants' own phenomenologies.

¹⁵ An anonymous reviewer suggested that, in a very long journey full of bland meals, the relief from this monotony afforded by a *different* meal—even one's most disliked meal—might be welcome, and even viewed as a positively valenced event in virtue of its novelty. This is an intriguing suggestion, but there is reason to think our participants did not see things this way. First, if they did, we'd expect most people to prefer their most disliked meal to be in the future, not the past. But Greene et al. (2021a) and the present study both find that most people preferred their least favourite meal to be located in the past. Second, since the meal in question is specified to be the participant's most disliked meal (which they are stipulated to 'really dislike'; it's not merely their least favourite of the meals they like), we are doubtful that novelty would be sufficient for participants to view this as a positively valenced event.

We need to be a little bit careful here, though. After all, reporting that our universe seems, phenomenologically, as the passage condition describes, need not be the same as reporting that our universe does not seem, phenomenologically, as the no-passage condition describes (and conversely).

Given this, to describe participants' reported temporal phenomenologies, we will say that a participant:

- *Reports a passage phenomenology* if they are in the passage condition, and they respond that they believe that our world seems to be as described by that condition.
- *Reports no passage phenomenology* if they are in the passage condition, and they respond that they believe that our world does *not* seem to be as described by that condition.
- *Reports a static time phenomenology* if they are in the no-passage condition, and they respond that they believe that our world seems to be as described by that condition.
- *Reports no static time phenomenology* if they are in the no-passage condition, and they respond that they believe that our world does *not* seem to be as described by that condition.

On the basis of the target phenomenology hypothesis we also made the following prediction:

H3 The association between condition and future-bias will be stronger among people who report that our world is as is described by the condition, than among people who believe that the world is not as described by the condition. Future-biased preferences will be more prevalent among people who report that it seems as though time robustly passes than among people who report that it does not. Conversely, future-biased preferences will be less prevalent among people who report that it seems as though time is static than among people who report that it does not.

Finally, we predicted that amongst participants who have future-biased preferences, those who report that it seems as though time robustly passes, or that it does not seem as though time is static, will have stronger preferences than those who report the opposite. More carefully:

H4 Among participants in a given condition who have future-biased preferences, there will be an association between reporting that our world is like the condition described and preference strength. People who report that it seems as though time robustly passes will have stronger future-biased preferences than those who do not. People who report that it seems as though time is static will have weaker future-biased preferences than those who do not.

3 Experimental design and results

3.1 Method

3.1.1 Participants

933 people participated in the study. Participants were U.S. residents, recruited and tested online using Amazon Mechanical Turk, and compensated \$0.50 for approximately 5 min of their time. Given recent worries about the quality of data collected through MTurk, concerning both the quality of human responders and the presence of bots, we adopted a number of quality control measures.¹⁶

First, we used only those MTurk participants who have a HIT (task) approval rate of at least 95% and who have had their HITs (tasks) approved at least 1000 times. That means that all our participants had already successfully completed at least 1000 other studies and received at least a 95% approval rating on these tasks, a standard that can be expected to eliminate most bots.

Second, our study included both task instructions and attentional checks that doubled as comprehension checks. We excluded participants who failed either to follow instructions or to correctly answer an attentional check/comprehension question. In total, 538 participants were excluded for failing to answer all the questions (165), failing either the attentional check (134) or comprehension question (353), or providing inconsistent responses (39).¹⁷ The remaining sample was composed of 395 participants (aged 19–76; 209 female; 4 trans/non-binary). Mean age 41.96 (SD = 13.49). Ethics approval was obtained from the University of Sydney Human Research Ethics Committee. Informed consent was obtained from all participants prior to testing. The survey was conducted online using Qualtrics.

3.1.2 Materials and procedure

Participants were first randomly assigned to read one of four vignettes:

Passage condition positive/negative hedonic event

It is June 2090. You are an astronaut on a 10-year voyage between planets. Your background is in psychology, and your mission is to investigate the ways in which we experience time, and events in time. You have already discovered that out here in space, it *feels* as though future events are moving ever closer to you in the one, true present moment. Future events feel as though they come closer, and closer, and closer, until they eventually reach you in the present. When they become present, you experience them as present, and then it *seems* and *feels* as though those events are moving away from you into the past. Indeed, it feels as

¹⁶ See Ahler, Roush and Soud (ms) for a discussion of some of the problems associated with collecting data using MTurk and the prevalence thereof.

¹⁷ If participants were simply responding at chance to both the attentional check question and comprehension question, then we would expect a remaining sample of 48 participants (bracketing participants that failed to follow task instructions or provided inconsistent responses).

though once events are past, they move further, and further, and further, away from you. In turn, it feels to you as though which events are present changes as new events move from being future, to being present, and then to being past.

You are 5 years into the voyage. The ship's food dispenser normally produces bland meals containing only essential nutrients. However, it is programmed to dispense your **[favorite]/[most disliked]** meal—which you really **[like]/[dislike]**—during one day of the voyage. One morning, you awake from a dream concerning your **[favorite]/[most disliked]** meal and for a moment you cannot remember whether you have received it yet.

You realise that if you learn that your meal was dispensed yesterday, then it will *feel* to you as though the experience of eating that meal is one day away in the past. Although it will not *feel* to you as though you, *now*, are having the experience of eating that meal, it will *feel* to you as though you experienced eating this meal in the past and this experience recedes ever further into the past, away from the present moment. If you learn that your meal is to be dispensed tomorrow, then it will *feel* to you as though the experience of eating that meal lies in your future. Although it will not *feel* to you as though you, *now*, are having the experience of eating that meal, it will *feel* to you as though the experience of eating that meal is moving ever closer to you, and will continue to move *closer* and *closer* until it reaches the present moment.

No passage condition, positive/negative hedonic events

It is June 2090. You are an astronaut on a 10-year voyage between planets. Your background is in psychology, and your mission is to investigate the ways in which we experience time, and events in time. You have already discovered that out here in space, it *feels* as though all moments, and all events, are equally real and are laid out in space-time. It *feels* as though past and future moments and events are located at *different* places in space-time from where you are located. It *feels* as though whatever experiences your past self had, that self is out there in space-time, having those experiences. It *feels* as though whatever experiences your future self has, that self is out there in space-time, having those experiences. It *feels* as though your current self is having whatever experiences your current self is having. Whichever events a self is experiencing, those events feel *equally real* to that self, no matter where it is located.

You are 5 years into the voyage. The ship's food dispenser normally produces bland meals containing only essential nutrients. However, it is programmed to dispense your **[favorite]/[most disliked]** meal—which you really **[like]/[dislike]**—during one day of the voyage. One morning, you awake from a dream concerning your **[favorite]/[most disliked]** meal and for a moment you cannot remember whether you have received it yet.

You realise that if you learn that your meal was dispensed yesterday, then it will *feel* to you as though your experience of eating that meal is located one day away from your current location in space-time, in the past. Although it will not

feel to you as though you, *now*, are having the experience of eating that meal, it will *feel* to you as though your past self is located one day into the past and is experiencing eating that meal. If you learn that your meal is to be dispensed tomorrow, then it will *feel* to you as though your experience of eating that meal is located one day away from your current location in space-time, in the future. Although it will not *feel* to you as though you, *now*, are having the experience of eating that meal, it will *feel* to you as though your future self is located one day into the future and is experiencing eating that meal.

After reading the vignette, participants were asked to indicate their preference using the following statements:

- (a) “I would prefer to learn that my favorite/most disliked meal was dispensed yesterday, and will not be dispensed tomorrow.”
- (b) “I would prefer to learn that my favorite/most disliked meal will be dispensed tomorrow, and was not dispensed yesterday.”
- (c) “I have no preference regarding what I learn about when my favorite/most disliked meal is dispensed.”

We presented participants with both (a) and (b) in order to control for question effects—effects due to being asked to agree that one would prefer the event to be in the near past versus being asked to agree that one would prefer the event to be in the near future. And (c) served to distinguish people who strongly disagreed that they had the relevant preference because they simply lacked a preference on the matter from those who disagreed because they had an opposing preference. The statements were presented in random order.

Participants were also asked how strong their preference was regarding what they learn about the timing of their favourite/most disliked meal. They responded using a Likert scale that ranged from 1 (I would strongly prefer to learn that it was dispensed yesterday) via 4 (I have no preference with respect to the timing of the meal) through to 7 (I would strongly prefer to learn that it will be dispensed tomorrow). People who gave a response to this question that was inconsistent with their indicated preference were excluded from our analyses. For example, if a participant responded (a) “I would prefer to learn that my favourite/most disliked meal was dispensed yesterday, and was not dispensed tomorrow” and then 7 (I would strongly prefer to learn that it will be dispensed tomorrow), they were excluded. Preference strength was measured by the distance from neutrality on this scale—that is, a response of n on the 1–7 Likert scale was coded as a preference strength of $|n-4|$.

Next, we measured participants’ reported temporal phenomenology. To do this, we reminded participants which discovery had been made about the way things seem according to the vignette they read, and then asked them: “How accurate do you think this is, as a description of how things feel to you, on Earth?”, on a scale from (1) “completely inaccurate” through to (7) “completely accurate”.¹⁸

¹⁸ A referee pointed out that participants might have interpreted ‘discovery’ to mean ‘unexpected discovery’. We don’t think that they did—after all, there is nothing paradoxical or even particularly uncommon about *expected* discoveries (e.g., the Higgs boson). But we cannot rule out the possibility that the availability of this interpretation affected our results.

We also required participants to respond to comprehension and attention check questions. The comprehension check asked: “In the preceding vignette (a) ‘future events feel as though they are moving closer to the present’, (b) ‘past events feel as though they are moving away from the present’, (c) ‘events feel as though they are fixed in time, neither moving towards nor moving away from the present’, (d) ‘both (a) and (b)’? The attention check asked: “In this vignette, you were asked to imagine that you were...”, to which participants could answer: (a) “A Spaceship”, (b) “An Astronaut”, (c) “A Food Dispenser”, or (d) “A Dog”. Participants who answered either question incorrectly were excluded.

3.2 Results and analyses

Before we summarise the main findings, let’s introduce some terminology. To describe the time biases reported in our survey, we will say that a participant:

- has a *positive future-biased preference* if they prefer their favourite meal to be located in the future rather than the past.
- has a *positive past-biased preference* if they prefer their favourite meal to be located in the past rather than the future.
- is *positively time-neutral* if they have no preference between these options.
- has a *negative future-biased preference* if they prefer their most disliked meal to be located in the past rather than the future.
- has a *negative past-biased preference* if they prefer their most disliked meal to be located in the future rather than the past.
- is *negatively time-neutral* if they have no preference between these options.

Before reporting the statistics, let us summarise our main findings by considering each of our hypotheses. Our hypotheses were, first, that more people would report a future-biased preference (positive or negative) in the passage condition than in the no-passage condition; second, that future-biased preferences would be stronger in the passage condition than in the no-passage condition; third, that the association between condition and the prevalence of future-biased preferences would be stronger among people who believe that our world seems like the condition described than among people who do not; and fourth, that the association between condition and strength of future-biased preferences would be stronger among people who believe that our world seems like the condition described than among people who do not.

None of these hypotheses were vindicated. We found no evidence of an effect of condition on the number of people who reported future-biased preferences, nor on the strength of future-biased preferences. We also found no evidence of an effect of people’s beliefs on the association between condition and future-biased preferences, nor on the strength of people’s future-biased preferences.

Table 1 below summarises the descriptive data of participants’ reported preferences across all conditions. The “FB” column represents the number of participants who report a positive or negative future-biased preference. The “non-FB” column represents the number of participants who report either (i) a positive or negative past-biased preference or (ii) a positive or negative time-neutral preference. We have combined these numbers due to the low numbers of participants who report having a preference

Table 1 Descriptive data from all conditions of participants' preferences

Condition	FB	Non-FB	χ^2	<i>p</i> -value
<i>Positive event</i>				
Passage (<i>n</i> = 123)	104 (84.6%)	19 (15.4%)	58.470	< .001
No passage (<i>n</i> = 85)	69 (81.2%)	16 (18.8%)	33.047	< .001
<i>Negative event</i>				
Passage (<i>n</i> = 105)	85 (81.0%)	20 (19.0%)	40.238	< .001
No passage (<i>n</i> = 82)	61 (74.4%)	21 (25.6%)	19.512	< .001

Table 2 Descriptive data from all conditions for participants' responses re whether our universe is like the one described in the vignette

Condition	%A	%NA	%I	Mean	SD	<i>t</i> -test	<i>p</i> -value
<i>Positive event</i>							
Passage	67.5	17.1	15.4	4.97	1.60	6.690	< .001
No-passage	38.8	40.0	21.2	3.80	1.79	−1.029	.306
<i>Negative event</i>							
Passage	66.7	21.9	11.4	4.88	1.64	4.877	< .001
No-passage	34.2	52.4	13.4	3.49	1.87	−2.475	.015

that is not future-biased. We also include the results of one-way chi-square tests, which tests, for each condition, whether most people gave future-biased responses. The results of these tests show that most people in each condition report a future-biased preference.¹⁹

Table 2 below summarises the descriptive data of participants' responses to the question: "How accurate do you think this is, as a description of how things feel to you, on Earth?" The "A" column represents the proportion of participants who reported that it is accurate (5, 6, 7). The "NA" column represents the proportion of participants who reported that it is not accurate (1, 2, 3). The "I" column represents the proportion of people who reported being indifferent between these two options. We also include the results of one-sample *t*-tests for each condition, which test whether the mean accuracy response is significantly different from 4. The results of these tests show that people overall think that our universe seems like the one described in the passage condition. Conversely, people overall do not think that our universe seems like the one described in the no-passage condition.

First, to confirm that there was no association between future-bias and valence, we performed a chi-square test of homogeneity. If being a positive or negative event

¹⁹ Non-FB numbers are made up as follows: (i) positive event passage condition—3 positive past-biased preferences and 16 positive time-neutral preferences; (ii) positive event no passage condition—5 positive past-biased preferences and 11 positive time-neutral preferences; (iii) negative event passage condition—6 negative past-biased preferences and 14 time-neutral preferences; (iv) negative event no passage condition—8 negative past-biased preferences and 13 negative time-neutral preferences.

influences the proportion of people reporting future-bias, then we should expect a significant test result. We found *no* evidence that there is such an association $\chi^2(1, N = 319) = 1.647, p = 0.199$. Thus, in what follows we collapse our data across the factor valence. That is, we ignore whether the event participants were being asked to respond to was positive or negative (unless otherwise stated).

To test whether there was an association between future-bias and passage condition, we performed a chi-square test of homogeneity. If the passage condition is associated with more future-bias, then there should be a significant association, with more people reporting future-bias in the passage condition than in the no-passage condition. We found *no* evidence that there is such an association $\chi^2(1, N = 319) = 1.582, p = 0.208$. That is, we found no evidence of a difference between the number of people that report being future-biased in the passage and no-passage conditions.

Next, to test whether the association between future-bias and passage condition differed relative to people's reported temporal phenomenology, we performed a Breslow-Day test (Breslow and Day 1980). The purpose of this test is to test the association between two variables across the levels of a third variable. In this case, is there an association between future-bias and passage condition, but it's being masked by a difference between those who thought that our universe seemed like the vignette described and those that thought it did not or were unsure?²⁰ If future-bias is associated with people's reported temporal phenomenology, then we should expect to see a significant difference in the association between future-bias and passage condition, according to whether people think that the universe in the vignette seems like our own universe. However, we found no evidence of an association between people's temporal phenomenology and the association between future-bias and passage condition $\chi^2(1, N = 395) = 0.134, p = 0.715$.

Finally, to test whether there was an association between condition, temporal phenomenology, and preference strength among participants who reported future-biased preferences, we ran a 2×2 between-subjects ANOVA. The two between-subjects factors were condition (passage; no-passage) and temporal phenomenology (vignette seems like our universe; vignette does not seem like our universe/unsure). If people's temporal phenomenology impacts the strength of their future-biased preferences, then we should observe a two-way interaction between the condition and temporal phenomenology factors. The results of this test revealed *no* significant effects.²¹

4 Discussion

The primary purpose of our study was to investigate the target phenomenology hypothesis, which hypothesizes that future-bias is at least partly explained by a phenomenology as of robust passage, or a phenomenology that we are inclined to

²⁰ Rerunning our analyses, the reported results are not altered by removing participants who are unsure whether the universe described in the vignette is like our own. Nor are they altered by considering only those who strongly believe the vignette is like our own universe (report a 6 or 7) or strongly believe the vignette is *not* like our own universe (report a 1 or 2).

²¹ Rerunning our analyses, the reported results are not altered by removing participants unsure whether the universe described in the vignette is like our own or by including event valence as an additional factor.

describe/interpret as representing robust passage. It is important to reiterate that this is a psychological hypothesis that might be true even if, as a metaphysical matter, there is no such thing as robust passage—even an illusory phenomenology (or a misdescribed or misinterpreted phenomenology) can be psychologically significant.

Our headline finding, however, is that none of the predictions we extrapolated from the target phenomenology hypothesis were vindicated. Whether participants were in the passage or the no-passage condition made no difference to whether they had future-biased preferences, nor to the strength of those preferences. Moreover, whether participants in the passage condition reported that the condition accurately describes how things seem to them—that is, reported having a phenomenology as of robust passage—as opposed to reporting that the condition does not accurately describe how things seem to them—that is, did not report having a phenomenology as of robust passage—made no difference either to whether participants were future-biased, or to the strength of their future-biased preferences. The same was true, *mutatis mutandis*, for participants in the no-passage condition.

On the face of it, then, there appears to be no evidence in favour of the target phenomenology hypothesis since there is no association between future-bias and having a temporal phenomenology that one is inclined to describe as involving robust passage.

There are several notable limitations of our study, however, which we will describe before examining the apparent implications of our results. First, it is hard to be certain that our vignettes effectively manipulated the target phenomenology. To investigate the target phenomenology hypothesis, we had to describe experiences of time that some might consider nearly ineffable, effectively enough to reliably evoke those experiences in our participants. There are not yet any established psychological instruments for measuring or classifying the experience of time as dynamic or static, which makes it hard to confirm the effectiveness of our manipulations.

There is, therefore, inevitably room for debate about whether our vignettes adequately described the intended phenomenologies (and if they did, whether they elicited them in participants) and whether alternative descriptions might have been more effective. For instance, the no-passage vignette asks participants to imagine that it *feels* as though the experiences of their past self are out there in space-time. But one might think that even if people have a static-time phenomenology, this will fail to elicit it because it is unclear how to imagine that a past self is having an experience. We take it, however, that people are typically able to imagine that things feel some way for people (themselves or others) at other locations, without, as it were, having the experience of those people themselves. You can imagine, for instance, that Freddie is seeing a dragon, even if you are not seeing a dragon, and it does not seem that unfamiliar to suppose that there is some phenomenology associated with the thought that Freddie is seeing a dragon.

A related worry is that if the target phenomenology is ubiquitous, or at least very widespread (that is, everyone, or almost everyone, has the phenomenology) and if it is also pervasive (that is, if people have the phenomenology at all times at which they have any phenomenology at all), then it might be difficult or impossible to manipulate this phenomenology. If people do have phenomenology as of robust passage, then it might be both that the moving time language of the passage vignettes did nothing to elicit or promote that phenomenology (since it was already always present) and that

the static language in the no-passage vignette did not dampen, or otherwise diminish that phenomenology. Moreover, if people don't have a static phenomenology, then we might expect it to be almost impossible to elicit that phenomenology (just as being told to imagine a new colour will, we assume, fail to result in us doing so). In that case, we would not expect to find any effect of condition (passage or no passage) on future-bias. This is a genuine worry, and in the absence of accepted psychological measures, one that is hard to overcome.

Having said that, there are a few notable things that suggest this cannot be what is going on. First, Latham et al. (2021) do find an effect of condition, using essentially the same vignettes as in this study (though focusing on beliefs about the metaphysics of time rather than temporal phenomenology).²²

That suggests that the sort of manipulation used in our vignettes (i.e., the very same manipulation used in their vignettes) does have an effect. This does not require that the no-passage vignette actively elicited a static-time phenomenology. Rather, all it requires is that the use of moving time language might promote, or make unusually salient, an existing passage phenomenology, and that the use of static language might make that phenomenology less salient (or vice versa). Moreover, our study did find that people in the no-passage condition who judge that this is how things seem, have significantly less future-bias than those in other conditions. We discuss this finding in more detail shortly. The point here, though, is that the language used in our vignettes does seem to have some effect, *contra* the worry just outlined.

A second limitation is that participants might have simply not understood the scenarios laid out in our vignettes. In addition to describing a hard-to-describe phenomenology, our vignettes also had to describe unusual situations in which someone is uncertain whether their own experience (of eating a certain meal) is located in the past or future. The strangeness and (moderate) complexity of these scenarios inevitably creates some risk that participants experience cognitive overload and simply fail to respond to our manipulations. Again, we tried to mitigate this worry by using vignettes, and a general experimental setup, closely resembling previous studies that have found intelligible non-null results,²³ and by excluding participants who failed a relatively demanding comprehension check.

Still, with respect to both these first two limitations, it is important to acknowledge that there is always a risk in experimental philosophy that participants will not interpret either the vignettes or the experimental questions as intended. It would certainly be valuable, therefore, for follow-up studies to re-test the target phenomenology hypothesis using different methods (or at least different vignettes).

A third and final limitation stems from the fact that our experience of time has many possible features or components, which are hard to tease apart from one another. For

²² Importantly, what Latham et. al found was a difference in future-bias between people who saw a vignette that employed moving time expressions and one that employed static time expressions. That difference, remember, had nothing to do with whether the people in question believed that time robustly passes or not. That is important, since otherwise one might think perhaps it is easier to manipulate people's beliefs about whether time robustly passes than it is to manipulate their temporal phenomenology: the point here is that Latham et. al found this effect independent of whether the beliefs in question were manipulated.

²³ The portion of the vignettes that targets the future-biased aspect of the experiment is essentially identical with vignettes used in Greene, Latham, Miller and Norton (2021a) and, in modified form, by Greene, Latham, Miller and Norton (2021b).

instance, we have already alluded in Sect. 2 to the possibility of a “moving ego” phenomenology. If such a phenomenology exists, it is unclear whether our vignettes would have manipulated it (even assuming that they did successfully manipulate the phenomenology of robust passage). On the one hand, if we assume that our passage vignettes did evoke the moving ego phenomenology (more than the no-passage vignettes), and if we had found a non-null result, it would be impossible to say based on our data whether that result was attributable to passage phenomenology or moving ego phenomenology. On the other hand, and more importantly in light of our null result, if our vignettes did *not* effectively manipulate the moving ego phenomenology, then they do not tell against the version of the temporal phenomenology hypothesis according to which it is the moving ego phenomenology, rather than passage phenomenology, that explains future-bias.

Alternatively, a reviewer raised the concern that the references to ‘past selves’ and ‘future selves’ in the no-passage vignette might suggest a picture on which individuals persist by perduring (being wholes made up of temporal parts, i.e., stages located at different times) rather than enduring (being successively wholly located at different times), and that perdurance is incompatible with a “moving ego”, so that our no-passage vignettes inadvertently rule out a moving ego phenomenology, or at least rule out that this phenomenology is veridical.

First, it seems to us that the language of “past/future selves” does not presuppose perdurantism or suggest such a supposition to our participants. Endurantists can speak of “X’s time-*t* self” and thereby mean something like “X-at-time-*t*” or “X-considered-with-respect-to-her-condition-at-*t*” (rather than “the part of X located at *t*”).²⁴ Further, we think that to non-philosophers, talk of past/future selves is unlikely to conjure up any technical notion of persistence at all.

This is not to deny, however, that our vignettes might manipulate moving ego phenomenology. It seems plausible that the language in the passage vignette elicits the idea of a moving self or ego, while the no-passage vignette does not. The passage vignette describes the feeling that “future events are moving ever closer to you in the...present moment” and past events “moving away from you into the past”. It is debatable whether there is any meaningful difference between the *experience of future events moving toward you and past events away from you* and the *experience of moving toward future events and away from past events*. (See our discussion of this question in Sect. 2.) If there is not, then the “moving ego phenomenology” is just another way of talking about the target phenomenology. In that case, our results simply speak directly to the role of moving ego phenomenology in explaining future bias.

But even if robust passage phenomenology and moving ego phenomenology are distinct, and even if we could be confident that the reference to “past selves” and “future selves” reduced the moving ego phenomenology of the participants in the no-passage condition, this is entirely compatible with our vignettes also manipulating participants’ robust passage phenomenology via our use of moving time language. Indeed, if the use of “past self” and “future self” language is effective at manipulating moving ego phenomenology, this could give us good reason to think that other forms of temporal

²⁴ After all, many endurantists think that what it is to endure is to be multiply located: that is, to be located at multiple times (see Barker and Dowe (2003); Daniels (2014); Eagle (2010)).

language, like moving time language, would be effective at manipulating other forms of temporal phenomenology, like the phenomenology of robust passage. If this was the case, it would seem like good news for us, since it would mean that our vignettes manipulated the moving ego phenomenology as well as the target phenomenology, and our findings constitute a null result for the moving ego phenomenology hypothesis as well as the target phenomenology hypothesis. Of course, there is also the possibility that our vignettes manipulated *only* the moving ego phenomenology of our participants. If this is the case, then our findings would constitute a null result for the moving ego phenomenology hypothesis alone. While we do not take this to be likely, given our discussion above, it cannot be ruled out. This would be a profitable topic for future research.

Let's now consider the implications of our null results, assuming we take them at face value despite the limitations just described. It is useful first to consider an apparent incongruity between our results and the results of the closely related study, already referred to, by Latham et al. (2021). This study, recall, found that more participants were future-biased in the passage condition than in the no-passage condition, regardless of whether they believed that that condition describes the way our world in fact is. Based on that finding, Latham et al. hypothesised that the language used in the passage condition *was* evoking a phenomenology and making it more likely that people would conceive of that phenomenology as being one as of robust passage, and that the presence of that phenomenology, thus conceived, was associated with higher levels of future-bias. Even if they were wrong about that, what remains puzzling is why their study found an effect of condition, and this one did not, given that the vignettes were so similar.

Recall that the vignettes used in the present study were adapted from those used in the Latham et al. study. Since both sets of vignettes deliberately include passage-evoking language of the same kind, we would expect to find an effect of condition on future-bias in this study given that they found such an effect in their study.

So how do the two studies compare? Looking at the results of the Latham et al. study, we find that in the passage condition ~ 82% of participants are future-biased regarding the positive event, and ~ 79% are future-biased regarding the negative event. Those figures are very similar to the ones we find in the present study. We found that in the passage condition, for positive events ~ 85% are future-biased, and for negative events ~ 81% are future-biased. By contrast, when we look at the no-passage condition we find that in the original Latham et al. study ~ 64% are future-biased regarding the positive event, and ~ 64% are future-biased regarding the negative event. In our study, however, we found that ~ 81% of participants were future-biased regarding the positive event and ~ 74% were future-biased regarding the negative event in the no-passage condition. The relevant difference between the two studies, then, shows itself in the no-passage condition.

What might explain this difference? Looking at the differences between the two sets of vignettes across these two studies suggests a possible explanation. In the Latham et al. study the character described in the vignette is said to be a physicist investigating the nature of time. The physicist is described as either discovering that our universe is one in which time robustly passes (where our universe is described using passage-evoking language) or as finding that our universe is one in which time is static (where

our universe is described using language that evokes static time). Participants are then asked whether they think the vignette they saw describes the way the universe in fact is. By contrast, in our study the character described in the vignette is a psychologist. The psychologist is described as having made certain discoveries about the way things seem and feel. The psychologist has either found that (in space) it seems and feels as though time robustly passes (where the seeming/feeling is described using passage-evoking language) or has found that (in space) it seems and feels as though time is static (where the seeming/feeling is described using static-time-evoking language). Participants are then asked whether the vignette they saw accurately describes how things seem, or feel, to them.

Crucially then, in the Latham et al. study the relevant language (passage-evoking or static-time-evoking) is framed as a description of how things *are* (even if in fact the participant does not think this is how things are). In the current study the relevant language is framed as a description of how things *seem* or *feel*. It may be, then, that whereas participants in the Latham et al. study were encouraged to imagine that time is in fact dynamic or static, and therefore to implicitly regard any corresponding phenomenology as veridical, participants in the current study were encouraged to imagine that the picture of time described in the vignette is a *mere* seeming, and therefore to implicitly regard any corresponding phenomenology as non-veridical. That is, the vignettes in the current study included what we might call a *phenomenal underminer*: a feature that draws attention to the fact that a phenomenology may be a mere phenomenology. By contrast, there was no phenomenal underminer present in the Latham et al. study.²⁵

Our suggestion, then, is that in the Latham et al. study, people in the no-passage condition came to conceive of themselves as having a static temporal phenomenology (either because the vignettes in fact evoked a different phenomenology than that evoked by the passage vignette, or because it evoked the same phenomenology, but people in the no-passage condition came to conceive of it as being a static time phenomenology), and as a result of this, they tended to exhibit less future-biased preferences. By contrast, in the present study there was no such effect on participants in the no-passage condition because the phenomenal underminer tended to undermine the effect of phenomenology on future-biased preferences. If participants were suspicious that the phenomenology in question was veridical, then it would be natural for that phenomenology to fail to play any role in their preferences. So if participants came to be suspicious of the static time phenomenology in the no-passage condition, then the presence of that phenomenology would fail to decrease their future-bias in the way that it decreased future-bias in the Latham et al. study.

²⁵ Of course, that is not to say that participants in the Latham et al. study could not have come to conclude that the phenomenology in question was non-veridical. After all, many participants were in a condition that they thought did not in fact describe our universe. If being in a condition tended to evoke a certain phenomenology, or a phenomenology that was described in a certain way, and if participants then responded that they think that our world is not as described in that condition, they could come to infer that the phenomenology evoked is non-veridical. But this would require a significantly more complicated series of inferences. They would have to infer, for a start, that the phenomenology they are simulating, or that is evoked in the condition, is the product of being in that condition, and that they would not otherwise have the phenomenology (at least as described) and that as such, the content attributed to the phenomenology is non-veridical. The point here is that this is not a direct phenomenal underminer.

Why, then, do we not see an equal and opposite effect in the passage condition, of less future-bias in the present study than in Latham et al., due to the presence of phenomenal underminers that undercut the effect of the evoked passage phenomenology? One plausible interpretation is that most people most of the time (i) experience a phenomenology that they are inclined to conceive and describe in the language of temporal passage (Shardlow et al., 2020), (ii) regard that phenomenology as veridical, and (iii) partly for that reason, are biased toward the future. At least for most people, then, the language in the passage conditions in either the present study or Latham et al. has little effect on their normal attitudes, regardless of the presence of phenomenal underminers. But the no-passage condition in Latham et al. both evokes an unusual static time phenomenology, or leads to an unusual way of describing or conceiving of one's temporal phenomenology, and encourages participants to regard that phenomenology as veridical, and these factors in combination uniquely cause a reduction in future-bias in some participants.

This suggests that neither our temporal phenomenology nor our beliefs about the metaphysics of time *alone* contribute to future-bias, but that the combination of these two factors—specifically, a phenomenology that we take to be veridical—is required to affect our attitudes toward past and future events. We could test this suggestion, perhaps, by devising experimental conditions that demonstrably either (i) reduce passage phenomenology without undermining the belief that such a phenomenology *would* be veridical or (ii) undermine the belief in the veridicality of our temporal phenomenology without weakening or altering that phenomenology itself. The hypothesis in the last paragraph predicts that either of these interventions should result in a reduction of future-bias. But it is not immediately obvious how to design experimental conditions that demonstrably/reliably have one of these two effects without the other.

If that is right, then it suggests that when people have a target phenomenology that they conceive of as being one as of static time, then so long as they take that phenomenology to be veridical, this decreases their tendency towards future-bias. This suggests a new argument for the irrationality of future-bias, as follows: Our world does not, in fact, contain temporal passage. So a phenomenology as of static time is veridical. Forming a preference on the basis of a veridical phenomenology tends not to render that preference rationally criticisable, whilst forming a preference on the basis of non-veridical phenomenology tends to render that preference rationally criticisable. Forming preferences on the basis of static time phenomenology tends to *decrease* future-bias, whilst forming them on the basis of passage phenomenology does not. This suggests that future-biased preferences formed in response to non-veridical passage phenomenology are more rationally criticisable than non-future-biased preferences formed in response to veridical static time phenomenology. Of course, this argument doesn't indicate that *all* non-future-biased preferences are immune from criticism—only those that are formed in response to veridical static time phenomenology. This argument also relies on its being the case that our world is in fact one in which time does not robustly pass (which is itself controversial) and hence one in which if we conceive of the target phenomenology as having content as of robust passage, then we conceive of it as having non-veridical content. Still, we take this to be an argument that B-theorists, at least, might explore.

Second, if future-bias is in fact irrational (as many have argued—see Dougherty, 2011, 2015; Greene & Sullivan, 2015; Sullivan, 2018; Brink, 2011) then this suggests some partial “antidotes” to future-biased thinking: either (i) encouraging a static time phenomenology (or encouraging people to conceive of their existing phenomenology as having static content) coupled with the understanding of that phenomenology as veridical or (ii) weakening our usual passage phenomenology and/or understanding of *that* phenomenology as veridical. This might be accomplished, for instance, by subtle changes in our use of language (using “static” rather than “dynamic” idioms, metaphors, etc. to talk about time), or religious/meditative practices.

5 Conclusion

There is much more empirical work that must be done in order to fully understand the nature and rationality of future-biased preferences. In the Latham et al. study, a significant majority of participants still showed future-biased preferences even in the no-passage condition. Indeed, we find that a majority of participants are future-biased in both the passage and no-passage conditions in that study. This suggests that other factors, beyond phenomenology, must also be playing a role in generating future-biased preferences.

As we earlier noted, there is evidence that the practical irrelevance of the past plays some role in grounding these preferences. But again, this is only a partial explanation. It is likely that even taken jointly, the causal inaccessibility/practical irrelevance of the past and the presence of the target phenomenology, conceived as a phenomenology as of robust passage, are merely partial explanations for future-biased preferences. There are very likely other factors that have yet to be articulated. The search for these further contributing factors will be important in evaluating the normative status of future-bias, and is, we think, a natural direction for follow-up research.

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