**There’s No Time Like the Present:**

**Present-bias, Temporal Attitudes and Temporal Ontology**

**Abstract**

This paper investigates the connection between temporal attitudes (attitudes characterised by a concern (or lack thereof) about future and past events), beliefs about temporal ontology (beliefs about the existence of future and past events) and temporal preferences (preferences regarding where in time events are located). Our aim is to probe the connection between these preferences, attitudes, and beliefs, in order to better evaluate the normative status of these preferences. We investigate the hypothesis that there is a three-way association between (a) being present-biased (that is, preferring that positive events are located in the present, and negative events are located in the non-present), (b) believing that past and future events do not exist and (c) tending to have present-focused rather than non-present-focused temporal attitudes. We find no such association. This suggests that insofar as temporal preferences and temporal attitudes are connected to the ways we represent time, they are not connected to the ways we represent temporal *ontology*; rather, they are more likely connected to the ways we represent relative *movement* in, or of, time. This has important consequences for, first, explaining why we exhibit these preferences and, second, for their normative evaluation.

**1. Introduction**

People have *temporal preferences:* they have preferences about where, in time, events[[1]](#footnote-2) are located. Sometimes these temporal preferences are the product of considerations about the intrinsic value of the event at different temporal locations or about the probability of the event occurring at different locations. For instance, one might prefer to consume the chocolate cake in 10 minutes rather than 10 hours because in 10 hours the cake will be stale, and hence less intrinsically valuable. Or one might prefer to consume the chocolate cake in 10 minutes rather than 10 hours because there is some risk that in 10 hours the cake will have been eaten by someone else (hence chocolate cake in 10 minutes is more certain than chocolate cake in 10 hours). If these are the only considerations that play a role in your preference regarding the temporal location of cake, then we will say that you are *time-neutral* in your cake preferences. You care where cake is temporally located, but not because of the temporal location itself: rather, your preference for non-stale cake, or more certain cake, is leading you to prefer your cake in one temporal location over another. By contrast, if you have a preference about the temporal location of your cake despite thinking that the cake is equally certain and equally pleasurable in either case, then we will say that you have a *time-biased preference.[[2]](#footnote-3)*

There are various kinds of time-biased preference.[[3]](#footnote-4) Near-bias is the preference (all else being equal) for positive events[[4]](#footnote-5) to be located temporally near, and for negative events to be located temporally far.[[5]](#footnote-6) Future-bias is the preference (all else being equal) for positive events to be located in the future, and for negative events to be located in the past.[[6]](#footnote-7) Both near-bias and future-bias have been investigated empirically (to determine the pattern of these biases) and normatively (to investigate whether such biases are rationally permissible).[[7]](#footnote-8)

This paper investigates a time-biased preference that has been the subject of little to no philosophical theorising. Call it *present-bias.* Present-bias is a preference (all else being equal) to have positive events located in the present (i.e., now) and to have negative events located in the non-present (i.e., in the past or the future).

Present-bias is often assumed to be simply the limiting case of near-bias. (This is also how the term ‘present-bias’ tends to be used in psychology.) One problem with this assumption is that even if it is true, (and as we will see, it may not be) the investigation of near-bias has focussed almost exclusively on *prospective near-bias.* Prospective near-bias is the preference (all else being equal) for positive events to be located in the near rather than far future, and for negative events to be located in the far rather than near future. What we mean by ‘present-bias’, however, is simply the preference (all else being equal) for positive events to be located now, and negative events to be located not-now. Hence present-biased people may prefer negative events to be located in either the *past*, or the *future*. Indeed, if people are both present-biased and future-biased we’d expect them to prefer that negative events be in the past. So even if present-bias is the limiting case of near-bias, investigation of prospective near-bias will not reveal the full pattern of present-biased preferences. Alternatively, perhaps present-bias is the limiting case of both near-bias and future-bias acting in consort. In what follows we make no assumptions about whether present-bias is a distinct psychological kind, or instead reducible to some combination of other preferences/biases, (though our work here may shed some light on this).

One way to think about present-bias, then, is that someone is present-biased when they discount the value of the non-present (events, goods or experiences) compared to the present. Thus, because such people discount the value of non-present negative events they prefer them to be not-present, and because they discount the value of non-present positive events they prefer them to be present. As with other time-biases, this discounting will typically be a matter of degree While present-biased people could *absolutely* discount the value of the non-present (i.e. according the non-present no value at all) we have good reason to suppose that they do not, since we know from the literature on prospective near-bias that people do in fact value future events, goods, and experiences, and indeed, we also know people do not entirely discount the value of past events, goods, and experiences.[[8]](#footnote-9) Hence, when we talk of people having present-biased preferences we simply mean that they tend to discount, *to some degree,* the value of the non-present in favour of the present. However, it is often assumed that present-bias is *uninteresting* in at least the following sense: whether or not people do show present-bias, they *ought not* show such bias. After all, (holding all else equal) it cannot be permissible to value the experiences of one’s current self more highly than those of one’s past and future selves. If that is right, then there is really no work for philosophers to do: the only remaining questions are empirical ones, and the task of investigating those should fall to psychologists or economists.

Such reasoning, however, is a mistake. First, while philosophers tend to agree that near-bias is rationally impermissible for precisely these sorts of reasons,[[9]](#footnote-10) it is notable that economists do not share this view.[[10]](#footnote-11) Moreover, many philosophers argue that future-bias is rationally permissible, even if near-bias is not. But future-bias appears to involve valuing future-selves more than past-selves. These philosophers, at least, reject the claim that we ought not value some selves less than others: for they think it is rationally permissible, and perhaps even obligatory, to value past-selves less than future ones.[[11]](#footnote-12) In light of this, we cannot simply assume that present-bias is impermissible.

In turn, normative investigation of present-bias requires knowing descriptive facts about the pattern of present-bias. For instance, the discovery that present-bias reduces to a combination of other biases would be valuable insofar as it would imply that the normative status of said bias will then be inherited from the normative statuses of those further biases. But in order to know whether this sort of picture is plausible we need to know about the pattern of present-biased preferences. If, on the other hand, present-bias does not reduce to a combination of other biases, then we need to know about the pattern of present-biased preferences in order to directly inform our normative theorising about this bias. Why think so? Parallels with normative theorising about future-bias are instructive here. In that arena philosophers have often appealed to descriptive facts in arguing for the impermissibility of future-bias. In particular, for instance, it has been argued that future-bias is seen only with regard to certain kinds of events (hedonic ones) and only in first-personal conditions[[12]](#footnote-13) so it must be the product of some highly contingent mechanism that is unlikely to produce rational preferences. More generally, it has been suggested that the normative status of these preferences depends, at least in part, on the status of the psychological mechanisms that explain said preferences.[[13]](#footnote-14) But determining which mechanisms do so will almost certainly require empirical explication of the circumstances in which we find that bias manifest.

Thus, we think that a better understanding of present-bias is important, and it is to this task that we turn. To do so, we empirically investigate the connection between temporal preferences, temporal attitudes and beliefs about temporal ontology. We begin, in §2, by outlining the relevant literature in this area, leading to our predictions in §3. In §4 we present our methodology and results, and in §5 we discuss the implications of these findings for theorising about present-bias.

**2. Empirical and Historical Background**

There has been little discussion of present-bias in the contemporary literature. Nevertheless, we think there are several reasons to suspect that there may be a connection between present-bias and two other factors: beliefs about temporal ontology (hereafter ‘TO’), on the one hand, and (non-)present-focused temporal attitudes, on the other. Let’s begin with the idea that there is a connection between present-bias and beliefs about TO.

Notably, some hypothesised explanations for future-bias are also candidate explanations for present-bias. Latham, Miller, Norton & Tarsney (2020) articulate the *temporal metaphysics hypothesis*, according to which our beliefs (likely implicit) about the temporal structure of our world explain future-biased preferences.[[14]](#footnote-15) In particular, they consider a version of this view on which our beliefs about temporal passage[[15]](#footnote-16) (partially) explain future-biased preferences. They reason that such a belief could explain future-bias because if we believe that future events are coming towards us, while past events are receding away from us, this might lead us to prefer that future events are positive, and hence that it is positive events that are approaching us, and that past events are negative, and hence that it is negative events that are moving away from us.

More recently, Latham, Miller, Tarsney & Tierney (2021) tested this hypothesis and found that participants who see a vignette that describes passage are more likely to exhibit future-bias than participants who see a vignette that describes a ‘static’ eternalist world. One possibility, then, is that what is doing the explanatory work here are beliefs about what we will call *relative movement in time.* For instance, it might be that what explains more future-bias in the passage condition is that it describes *time* as moving relative to the individual. In this case the ego is conceived of as standing still, while time is conceived of as moving relative to the ego: that is, future events come ever closer to the stationary ego. This is the hypothesis that Latham et al. took themselves to be testing. Alternatively, it could be that the language of the passage condition brought people to conceive not of time as moving, but instead, of the ego as moving: while past and future events are stationary, the ego is moving towards future events. Whether this amounts to the same underlying metaphysics described in two different ways, or two different underlying metaphysical pictures, is unclear. But we can jointly call them the *relative movement hypothesis.*

What this work leaves untested is the idea that (possibly tacit) beliefs about TO—about which events exist—may also be playing some explanatory role, independent of the role played by beliefs about relative movement. At a first pass, the *TO hypothesis* says that present-bias is (at least partially) explained by a belief that while present events exist, past and future events do not (i.e., a belief in presentism).

The idea that there is an important connection between beliefs about TO and the presence or absence of present-bias has a long history.[[16]](#footnote-17) (Of course, tracing this history risks anachronistic redescription of how historical figures have thought about these issues. Even if historical figures held what we think of as views about TO, they are unlikely to have expressed or understood these in the ways we would, and interpreting their statements through a contemporary lens inevitably risks distortion. Nonetheless, it is possible to recognise the broad idea of a connection between (something like) TO and present-bias in a number of sources.)

For instance, for the Stoics, happiness is connected to a certain view of the world, namely an understanding that nature is a vast eternity of which we are only a very small part and, as part of this, a belief in something like eternalism.[[17]](#footnote-18)

Similarly, Spinoza thought that one should perceive things *sub specie aeternitatis*, abstracted away from time and place, in part in order to control the passions. To do this one should strive for the best kind of knowledge: the kind that sees things under the aspect of eternity and in their relationship to the eternal laws of nature. This suggests a connection between a belief in the existence of all times, on the one hand, and the right attitude towards the present as opposed to the past and the future on the other.[[18]](#footnote-19)

The common theme is a proscription against present-bias. When regarding things *sub specie aeternitatis,* one does not prefer to have positive events located in the present and negative events located in the non-present. Instead, one has no preference as to when positive and negative events are located with respect to the present. (In fact, this way of living is also characterised by an absence of other time-biases such as future-bias and near-bias. One regards events just the same no matter when they happen in time.) In addition, one has at least equal levels of concern about and emotional involvement with other (i.e., past and future) times as with the present. One is not focused on the present as opposed to other times.

Conversely, on the presentist side, one might expect a connection between a belief in presentism and present-bias, as well as a connection with the converse temporal attitudes, such as an attenuation of concern about and emotional involvement with non-present times. If one thinks only the present exists, that may make one more inclined to focus on what is happening in the present moment, and to cultivate a relative lack of concern with the past and future. In its strongest form, this way of living would involve little anxiety about the future or nostalgia/regret about the past, and little time spent thinking about those non-present times.

A connection between presentism and this way of living has some intuitive appeal, as is clear from the fact that something like it frequently appears in popular media (“Imagine the Earth devoid of human life […] Would it still have a past and a future? […] Realize deeply that the present moment is all you ever have” (Tolle 2004)). Something like this idea also plays a role in a number of mystic religious traditions. Fischer speaks of a “singularity thesis” in this context and ascribes to “various spiritual practitioners, authors, lecturers and workshop leaders” the view that “we should focus our full attention on the present moment precisely because of its singularity”.[[19]](#footnote-20) [[20]](#footnote-21)

Overall, the idea that emerges is that one’s ontological picture of time may affect one’s temporal attitudes and preferences. A belief in eternalism may aid people in being free of, or less strongly subject to, various time-biases (present-bias, near-bias and future-bias) and in cultivating concern with non-present as well as present times (non-present-focused attitudes). Conversely, a belief in presentism may aid people in privileging their present selves, being more strongly present-biased and cultivating weaker concern with non-present times and more focus on the present (present-focused temporal attitudes).

If this is right, then we may be able to partially explain why people have present-biased as opposed to non-present-biased preferences and cultivate present-focused temporal attitudes by appealing to their (perhaps tacit) beliefs about TO. This is the *TO hypothesis* (in its final formulation). To be clear, then, the TO hypothesis is not the hypothesis that presentists will *absolutely* discount the value of non-present events and have *entirely* present-focused temporal attitudes. Rather, it is the hypothesis that we will find more present-bias amongst presentists than eternalists, and that presentists will tend to have more present-focused attitudes than eternalists. Thus we predict that there will be an association between being present-biased, believing (perhaps tacitly) that presentism is true, and having present-focused temporal attitudes, and a similar association between being non-present-biased, believing (perhaps tacitly) that eternalism is true and having non-present-focused temporal attitudes.

**3. Predictions**

We conducted a study designed to test the TO hypothesis. We divided participants between four conditions. In each condition participants see a vignette in which they are asked to imagine that they are an astronaut (in space) whose mission is to investigate space-time. In the two *presentist conditions* participants are asked to imagine that they have discovered that only the present moment exists. In the two *eternalist conditions* participants are asked to imagine that they have discovered that all moments (past, present, and future) exist. In each condition participants are told that the spaceship’s food dispenser normally produces bland meals. In the *positive eternalist condition* and *positive presentist condition* they are told that just once during the voyage the food dispenser produces their favourite meal. In the *negative eternalist condition* and *negative presentist condition* they are told that just once during the voyage the food dispenser produces their most disliked meal. Participants are then asked questions about their preferences regarding the temporal location of their favourite/most-disliked meal, and with a series of Likert scales that probe their temporal attitudes.

If the TO hypothesis is true, then we would expect participants in the presentist conditions to show more present-bias than those in the eternalist conditions. This was our first hypothesis: (our experimental hypotheses, materials and data can be found at https://osf.io/r2g5e//[[21]](#footnote-22)).

**H1:** There will be more present-biased participants in the presentist conditions than in the eternalist conditions.

In addition, we would expect to find that amongst participants who are present-biased, present-biased preferences will be *stronger* amongst those in the presentist conditions than those in the eternalist conditions.

**H2:** Present-biased preferences will be stronger in the presentist conditions than in the eternalist conditions.

Importantly, our vignettes do not directly seek to instil in participants, beliefs about TO. Rather, they ask participants to imagine, or simulate, that they have a certain belief about TO. So, even if it’s the case that people tend to be more present-biased when they simulate having the belief that presentism is true (say) it doesn’t follow that people’s actual beliefs about TO are an explanation for their present-biased preferences. (For instance, it might be that no one in fact believes presentism to be true). Since we want to know what explains people’s *actual* present-biased preferences, we want to know not only whether *simulating* having a certain belief about TO is associated with greater present-bias, but whether *actually having that belief* is associated with greater present-bias.

In order to assess this, we asked participants in each condition how likely they think it is that our universe matches the description in the vignette. We take this to be a way to probe participants’ (perhaps tacit) beliefs about TO. That is, we suppose that participants who report that it is likely that our world is as a presentist vignette describes, believe (perhaps tacitly) that our world is a presentist world, and *mutatis mutandis* for the eternalist vignette.

We need to be a little bit careful here, though. After all, reporting that our universe is as the presentist vignettes describes, need not be the same as reporting that our universe is not as the eternalist vignettes describe. (After all, growing block theorists will deny that our universe is as the eternalist vignettes describe, but do not thereby think that our world is presentist).[[22]](#footnote-23)

Given this, to describe participants’ reported beliefs about TO we will say that a participant

* *Believes that presentism is true* if they are in a presentist condition, and they respond that it is likely that our world is as described by that condition (1, 2, or 3 on a 7-point Likert scale).
* *Believes that presentism is not true* if they are in a presentist condition, and they do not respond that it is likely that our world is as described by that condition (4, 5, 6, or 7).
* *Believes that eternalism is true* if they are in an eternalist condition, and they respond that it is likely that our world is as described by that condition (1, 2, or 3).
* *Believes that eternalism is not true* if they are in an eternalist condition, and they do not respond that it is likely that our world is as described by that condition (4, 5, 6, or 7).[[23]](#footnote-24)

Moreover, we would expect that amongst participants in the presentist conditions, there will be an association between participants’ estimation of the likelihood of presentism being true and (a) exhibiting weaker non-present-focused and stronger present-focused attitudes and (b) being present-biased and (c) if they are present-biased, having stronger present-biased preferences.

Similarly, we would expect that amongst participants in the eternalist conditions, there will be a correlation between participants’ estimation of the likelihood of eternalism being true and (a) exhibiting stronger non-present-focused and weaker present-focused attitudes and (b) not being present-biased and (c) if they are present-biased, having weaker present-biased preferences.

**H3:** The association between condition and present-bias will be stronger among people who believe 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. More people who believe that presentism is true will have present-biased preferences than those who do not. Fewer people who believe that eternalism is true will have present-biased preferences than those who do not.

**H4:** People who believe that presentism is true will have stronger present-focused attitudes and weaker non-present-focused attitudes than those who believe that eternalism is true.

**H5**: Among participants who have present-biased preferences, there will be an association between believing our world is like the condition described and preference strength. People who believe that presentism is true will have stronger present-biased preferences than those who do not. People who believe that eternalism is true will have weaker present-biased preferences than those who do not.

We also tested the extent to which our participants exhibited future-bias. While we made no predictions about the connection between future-biased preferences on the one hand, and present-biased preferences, beliefs about TO and the presence of (non-)present-focused attitudes on the other (since it is unclear what to predict here), we collected data in order to see what associations might be present.

**4. Experimental Design and Results**

**4.1 Method**

*4.1.1 Participants*

934 people participated in the study. Participants were U.S. residents, recruited and tested online using Amazon Mechanical Turk, and compensated $0.85 for a maximum of 7 minutes 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.[[24]](#footnote-25)

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, 631 participants were excluded for either failing to answer all the questions or the attentional checks (402), or failing the comprehension question (229). The remaining sample was composed of 303 participants (aged 21-71; 115 female). Mean age 37.72 (SD = 10.31). Ethics approval was obtained from the [blanked] Human Research Ethics Committee. Informed consent was obtained from all participants prior to testing. The survey was conducted online using Qualtrics.

*4.1.2 Materials and Procedure*

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

*Positive Presentism*

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*Positive Eternalism*



*Negative Presentism*



*Negative Eternalism*

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Participants were presented with four classes of statements in random order. While one class of statements—the Temporal Attitude Scales—was presented prior to the vignettes for some participants, the others were all presented after the vignettes.

One class of statements probed people’s future-biased preferences by eliciting a forced choice between the following statements:

Future-biased Preference Statements

1. “I would prefer to learn that my [favourite]/[most disliked] meal was dispensed yesterday, and will not be dispensed tomorrow.”
2. “I would prefer to learn that my [favourite]/[most disliked] meal will be dispensed tomorrow, and was not dispensed yesterday.”
3. “I have no preference between these two options.”

Statements (a) and (b) were presented in random order. Participants who chose (a) or (b) were also asked to indicate the strength of their preference on a Likert scale from 1 (weak) to 7 (strong).

A second class of statements probed people’s present-biased preferences by eliciting a forced choice between the following statements:

Present-biased Preference Statements

1. “I would prefer to learn that my [favourite]/[most disliked] meal is being dispensed right now, and will not be dispensed tomorrow *and* was not dispensed yesterday.”
2. “I would prefer to learn that my [favourite]/[most disliked] meal is *not* being dispensed right now, and either will be dispensed tomorrow *or* was dispensed yesterday.”
3. “I have no preference between these two options.”

Statements (a) and (b) were presented in random order. Participants who chose (a) or (b) were also asked to indicate the strength of their preferences on a Likert scale from 1 (weak) to 7 (strong).

A third class of statements probed people’s temporal attitudes. Here, participants were presented with a series of Likert scales that were differently labelled at each end and were asked to place the marker where they think is most appropriate for them. So for instance the first Likert scale runs from “I spend a lot of time planning for the future” through to “I do not spend a lot of time planning for the future” where it is randomised which end of the scale is labelled with which description.

Temporal Attitude Scales

(1) “I spend a lot of time planning for the future” through to (7) “I do not spend a lot of time planning for the future”.

(1) “I spend a lot of time thinking about what happened in the past” through to (7) “I do not spend a lot of time thinking about what happened in the past”.

(1) “I often feel anxious or excited about the future” through to (7) “I do not often feel anxious or excited about the future”.

(1) “I often feel regretful or nostalgic about the past” through to (7) “I do not often feel regretful or nostalgic about the past”.

(1) “I try to focus on what is happening in the present moment” through to (7) “I do not try to focus on what is happening in the present moment”.

The fourth class of statements measured participants’ beliefs about TO. To do this, we reminded participants which discovery had been made according to the vignette they read, and then asked them: “How likely do you think it is that our universe is like this?” Participants responded on a Likert scale from 1 (completely unlikely) to 7 (completely likely).

We also required participants to respond to comprehension and attention check questions. We asked participants: “Please answer the following based on the vignette above. Events that take place in the 17th century (a) “Exist” (b) “Do not exist”. Participants in the presentism conditions were excluded unless they answered (b) and participants in the eternalism conditions were excluded unless they answered (a). Finally, participants were asked: “During your voyage, the ship’s food dispenser produces bland meals…”, to which they could answer: (a) “Everyday except for one”, (b) “One day a week”, (c) “One day a year”, or (d) “Every day”, and, “In this vignette, you were asked to imagine that you were...”*,* to which they could answer: (a) “An Engineer”, (b) “An Astronaut”, (c) “A Chef”, or (d) “A Dog”. Participants who did not choose (a) and (b) respectively were excluded.

**4.2 Results and Analyses**

Surprisingly, *none* of our hypotheses were supported by the results of the study. We will revisit each in turn, and then report the relevant statistics. Neither H1 nor H2 were vindicated. We did not find that there weremore present-biased participants in the presentist conditions than in the eternalist conditions. Likewise, we did not find that present-biased preferences were stronger in the presentist conditions than in the eternalist conditions. Participants who were present-biased reported preferences of the same strength across all the conditions.

Neither H3 nor H4 were vindicated. There was no effect whereby those who believe presentism is true are more inclined to be present-biased, and those who believe eternalism is true are more likely not to be present-biased. Quite generally, we found no evidence of an association between participant’s beliefs about TO and whether or not they were present-biased, in either the presentist or eternalist conditions. Nor did we find that people who believe that presentism is true will have stronger present-focused attitudes and weaker non-present-focused attitudes than those who believe that eternalism is true.

Finally, we did not find (H5) that people who believe that presentism is true have *stronger* present-biased preferences than those who do not, nor that people who believe that eternalism is true have weaker present-biased preferences than those who do not. Looking just at those participants who are present-biased, we found no evidence that belief in presentism was associated with stronger present-biased preferences while belief in eternalism was associated with weaker present-biased preferences.

Table 1 below summarises the descriptive data of participants’ responses to the present-bias prompt across all conditions. The ‘PB’ column represents the number of participants who report a present-biased preference. The ‘Non-PB’ column represents the number of participants who report either (i) a non-present-biased preference or (ii) a time-neutral preference.[[25]](#footnote-26) Beneath the numbers (and proportions) of people who report a present-biased or a non-present-biased preference we report the mean (and standard deviation) preference strengths across all conditions. We also include the results of one-way χ2 tests, which tests for each condition whether *most* people reported present-bias. The results of these tests show that people in each condition people are more-or-less evenly divided between reporting present-biased and non-present-biased preferences.

Table 1. Descriptive data from all conditions of participants’ responses to the present-bias prompt.



Table 2 below summarises the descriptive data of participants’ responses to the question: “How likely do you think it is that our universe is like this?” The ‘Yes’ column represents the proportion of participants who reported that it is likely (5, 6, 7). The ‘No’ column represents the proportion of participants who reported that it is unlikely (1, 2, 3). The ‘4’ column represents the proportion of participants who reported being indifferent between these two options. We also include the results of one-sample t-tests for each condition. These tests indicate whether the mean response is significantly different from 4. The results of these tests show that people overall in each condition think that our universe is like the one being described.

Table 2. Descriptive data from all conditions of participants’ beliefs about TO.

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Table 3 below summarises the descriptive data of participants’ responses to the Temporal attitude scales. The ‘NPF’ column represents the proportion of participants who report a non-present-focused response (5, 6, 7). The ‘PF’ column represents the proportion of participant who report a present-focused response (1, 2, 3). The ‘4’ column represents the proportion of participants who reported being indifferent between these two options. Once again, we include the results of one-sample t-tests for each condition, which tests whether the mean attitude response is significantly different from 4. The results of these tests show that people overall for each scale report a non-present-focused attitude.

Table 3. Descriptive data of participants’ (non-)present-focused temporal attitude responses.



First, to test whether there was an association between presentist/eternalist condition and present-bias, we performed a χ2 test of homogeneity. If being presented with a presentist or eternalist vignette influences the proportion of participants reporting present-bias, then we should find a significant test result. We found *no* evidence of such an association, χ2 (1, N = 303) = .378, *p* = .539.[[26]](#footnote-27)

Next, to test whether the association between presentist/eternalist condition and present-bias differed relative to participants’ beliefs about TO, we performed a Breslow-Day test (Breslow & 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, it’s to test the association between presentist/eternalist condition and present bias across participants’ beliefs about TO. If present-bias is associated with participants’ beliefs about TO, then we should expect to see a significant difference in the association between presentist/eternalist condition and present-bias according to whether participants report that the universe in the vignette is like our own universe or not. However, we found *no* evidence of such an association, χ2 ­(1, N = 303) = .077, *p* = .781.[[27]](#footnote-28)

Then, to test whether there was an association between presentist/eternalist condition, participants beliefs about TO, and preference strength among participants who reported present-biased preferences we ran a 2 × 2 between-subjects ANOVA. If participants’ present-biased preferences were stronger in presentist conditions rather than eternalist conditions, then we should observe a main effect of condition. If participants beliefs about TO impacts the strength of their present-biased preferences, then we should observe a two-way interaction between condition and beliefs about TO. The results of this test revealed *no* significant effects.[[28]](#footnote-29)

Finally, to test whether there was an association between participants’ beliefs about TO and (non-)present-focused temporal attitudes we ran separate between-subjects t-tests for each attitude scale comparing participants who believe presentism is true and participants who believe that eternalism is true. The results of these tests found *no* evidence of an association between (non-)present-focused temporal attitudes and participant beliefs about TO.[[29]](#footnote-30)

We also tested if, and the extent to which, our participants exhibited future-bias. While we made no predictions about the connection between people’s future-biased preferences and the others factors we tested (since it is unclear what we ought to predict here), we collected data in order to see what associations we might find.

Table 4 below summarises the descriptive data of participants’ responses to the future-bias prompt across all conditions. The ‘FB’ column represents the number of participants who report a future-biased preference. The ‘Non-FB’ column represents the number of participants who report either (i) a past-biased preference or (ii) a time-neutral preference.[[30]](#footnote-31) Beneath the numbers (and proportions) of people who report a future-biased or a past-biased preference we report the mean (and standard deviation) preference strengths across all conditions. We also include the results of one-way χ2 tests, which test, for each condition, whether most people responded as present-biased. Surprisingly, the results show that in each condition people are divided between responding future-biased and non-future-biased.

Table 4. Descriptive data from all conditions of participants’ future-biased preferences.



We also wanted to explore whether there was an association between participants reporting being present-biased and reporting being future-biased. We tested for this association with a χ2 test of independence. We found *no* evidence that there is such an association, χ2 (1, N = 303) = 3.183, *p* = .074.

Finally, we wanted to explore whether there was an association between participants reporting being present-biased or future-biased and reporting having certain non-present-focused/present-focused attitudes. We tested for this by running separate between-subjects t-tests for each attitude scale comparing participants who report being present-biased or future-biased with those who report being non-present-biased or non-future-biased. These tests found that non-present-biased participants report slightly, albeit significantly, higher past thinking (*M* = 5.18, *SD* = 1.30) and past emotion (*M* = 5.12, *SD* = 1.21), than present-biased people (PT: *M* = 4.81, *SD* = 1.37, *t*(301) = -2.404, *p* = .017; PE: *M* = 4.75, *SD* = 1.48, *t*(286.912) = -2.390, *p* = .017). Further, they found non-future-biased participants report slightly, albeit significantly, higher past thinking (*M* = 5.21, *SD* = 1.24), future emotion (*M* = 5.34, *SD* = 1.07) and past emotion (*M* = 5.17, *SD* = 1.21) than future-biased people (PT: *M* = 4.78, *SD* = 1.42, *t*(301) = -2.841, *p* = .005; FE: *M* = 5.06, *SD* = 1.29, *t*(301) = -2.038, *p* = .042; PE: *M* = 4.72, *SD* = 1.46, *t*(294.281) = -2.908, *p* = .004).

**5. Discussion**

The results we found were surprising. None of our predictions were vindicated. Across the board we found no association between people’s temporal attitudes and their beliefs about TO, or between their temporal preferences (future/present-bias) and their beliefs about TO.

There are several aspects to these results that we take to be notable. First, these results undermine a widely held view that there is an association between (non-)present-focused attitudes, and beliefs about TO. Insofar as one wanted to promote (or suppress) some of these attitudes, the sorts of advice given, including historically, that involve focussing on TO, would, these results suggest, be ineffective. With that said, it is interesting that the results confirm the suspicion that non-present-focused attitudes are prevalent, since the majority of participants indicated that they are better described by the statement expressing the non-present-focused attitude than the statement expressing the present-focused attitude. One might have had this suspicion insofar as it is well known that people experience anticipation, nostalgia, dread and regret, and that many of their attitudes are directed towards non-present times. Certainly, organisms that have *entirely* present-focused attitudes would not be expected to survive for long, and hence we would expect to find that evolved organisms have a range of non-present-focused attitudes. That being said, we might still have expected to find a range of present-focused attitudes, and, in turn, to find that the extent to which people exhibit these attitudes is associated with their beliefs about TO. This latter, however, we did not find. What we can say, then, is that insofar as one wanted to further promote non-present-focused attitudes, intervening on people’s views about TO would not be a good way to do so.

Second, we found no association between temporal preferences and beliefs about TO. Indeed, not only did we find no association between the beliefs people reported having regarding TO (on which more below), but the condition to which people were assigned (presentist vs eternalist) made no difference to their temporal preferences. These are results are particularly interesting in light of recent work by Latham, Miller, Tarsney & Tierney (2021). In a series of experiments Latham et al. found that although people’s beliefs about whether time passes made no difference to whether they were future-biased, whether people were assigned to the passage condition (in which they saw a vignette in which time was described as passing) or the no-passage condition (in which they saw a vignette in which time was described as being static) did make a difference to future-biased preferences. More participants in the passage condition were future-biased compared to the no-passage condition. Latham et al. concluded that the ‘static’ language associated with the no-passage condition suppressed future-bias.

There is typically, however, a connection between TO and passage. For instance, presentism is not just the view that only the present exists; it’s also the view that time passes in virtue of the present changing. Likewise, the growing block theory is one on which a change in ontology is tightly connected to the presence of passage. Conversely, eternalism (at least in its block universe guise) is not just the view that past and future events exist; it is also the view that time does not pass: instead, events simply bear static relations of earlier-than and later-than to one another. Having said that, there are plenty of models of temporal passage that do not connect passage with ontology, or, more precisely, with a change in ontology. Moving spotlight models such as those explicated in Skow (2015) and Cameron (2015) are models such as this. Thus, we can broadly distinguish two versions of the A-theory, eternalist ones and non-eternalist ones (or, if you prefer, those that are permanentist about ontology and those that are temporaryist). Insofar as A-theorists are interested in whether, and how, people’s preferences and attitudes are connected to the dynamical aspects of our world (if such there be), research that tends to suggest that these attitudes are more likely to be connected to the relative movement of the present, rather than to changes in ontology, should be of interest.

The question arises, then, as to whether the relative movement hypothesis and the TO hypothesis are both true, or whether it is relative movement *alone* that explains our temporal preferences (such as, for instance, by passage-infused language promoting/static language suppressing a temporal phenomenology as of said movement, as Latham et al. 2021 hypothesise to explain their results).

The results of this study tend to suggest that insofar as beliefs about temporal metaphysics play a role in explaining our having certain temporal preferences, it is not aspects of TO that are doing the explanatory work, but rather, it is aspects of relative movement. That is, our results tend to suggest that at most, the relative movement hypothesis may be true, but the TO hypothesis is not.

Perhaps this should not come entirely as surprise. If you believe that past and future events have the same ontological status then there is a *prima facie* case for time-neutrality at least as regards past- and future-selves. So we might expect eternalism to be associated with time-neutrality in this respect, rather than future-bias. Presentism also accords the same ontological status to both past and future events; nonexistence. So insofar as ontological status plays a role in our temporal preferences, we would expect that presentists would show no more or less future-bias than eternalists. This is what we found.

One might expect, however, that if beliefs about TO do play a role in explaining temporal preferences, then we would find a difference between the proportion of eternalists and presentists who are present-biased; after all, the latter think that only the present exists. Since we found no such association, this suggests that beliefs about TO are probably not doing the explanatory work here. Rather, it is likely something to do with relative movement—whether it is (contra Latham et al. 2021) beliefs about it, or the experience of said movement. It would be valuable for follow up work to see whether certain temporal preferences are more associated with ontologically asymmetrical models (such as the growing block) as compared with, say, eternalist models.

In this connection, it is also interesting to note that we found high levels of agreement that our universe is like the universe described in the vignette, in both the presentist and eternalist conditions. The first, and most straightforward, explanation of this result is that participants do not have strong beliefs about TO, but rather were simply happy to agree with the ontic status attributed to the past and future in the vignette they happened to read. However, there are some alternative explanations of this result that are worth exploring.

The second, and most concerning, explanation is that even participants who passed the comprehension check were unable to truly comprehend the vignettes (or perhaps they could only comprehend the vignettes at the superficial level required to answer the comprehension check; they were “merely parroting the language of the vignette”, as the editors of this volume put it). The third explanation is that people have such *strong* presuppositions about temporal ontology that these presuppositions are not undermined by the vignettes. Perhaps staunch eternalists in the presentist conditions simply read the protagonist of the vignette as making a (very uninteresting) discovery regarding what *exists now*. Likewise, perhaps staunch presentists in the eternalist conditions simply read the protagonist of the vignette as making a (very uninteresting) discovery about what *did, does and will exist*. If either the second or third explanations are correct, our results do not really show that there is no association between past-bias and beliefs about TO, since the latter were not effectively manipulated by our vignettes (either because of a lack of comprehension or because the vignette was reinterpreted so as not to threaten a strong presupposition about TO).

Some light is shed on these possibilities by looking to earlier work investigating people’s beliefs about the temporal metaphysics of the actual world. For instance, Latham, Miller, Tarsney and Tierney (2021 and 2022) found that people are quite willing to disagree that our universe is like a world described as having or lacking, or seeming to have, or seeming to lack, temporal passage. Likewise, Latham, Miller & Norton (2021) found consistent results across multiple experiments, regarding people’s judgements about whether our world contains temporal passage or not, but found that which of the particular dynamical or non-dynamical models people thought was most like our universe varied across experiments.

On the one hand, this suggests that people are able to comprehend whether the vignettes with which they are presented feature temporal passage. Arguably, comprehending whether a vignette stipulates that the past and future exist or do not exist is less demanding than comprehending whether a vignette features temporal passage. Thus these prior studies inspire optimism regarding participants’ comprehension of the vignettes in the present study.

On the other hand, the results of prior studies are also compatible with participants reinterpreting the TO aspect of the vignettes they read in the light of a strong presupposition and also with the possibility that people’s beliefs about actual temporal metaphysics might be determinate regarding whether there is temporal passage, but indeterminate regarding TO. If this is the case, then the lack of association in the present study between present-bias and beliefs about actual TO would be unsurprising. Further investigation of people’s capacity to comprehend vignettes about TO would be valuable. One (effective but resource-intensive) way forward would be to implement “Socratic Questionnaires” (Hansen, Francis & Greening ms), conversational experiments in which an experimenter gently pushes back on participants’ responses, to make sure they really comprehend and take on board the stipulations of the scenario with which they are presented.

Importantly, *even if* people’s beliefs about actual temporal metaphysics might be determinate regarding whether there is temporal passage, but indeterminate regarding TO, that would simply provide further support for the idea that beliefs about TO are less likely to explain temporal preference patterns than are beliefs about relative movement, since it would suggest that subjects are less likely to *have* (even tacit) beliefs regarding the bare (non-)existence of other times/events than they are to have beliefs about temporal passage.

There are various grounds on which we might normatively evaluate temporal preferences. For instance, we might appeal to whether those preferences leave us better or worse off, overall. [[31]](#footnote-32) We can also appeal to the factors that explain why we have those preferences.[[32]](#footnote-33) It is with regard to the latter that temporal metaphysics has come to the fore.[[33]](#footnote-34) Our results suggest that insofar as temporal metaphysics plays a role in justifying as rational (or not) these kinds of preferences, the temporal metaphysics at issue will be relative movement (of ego or time) and not TO.

Third, we learn something important from these results regarding the connection between our attitudes and temporal preferences. As noted, we found that people who were not present-biased scored significantly higher on ‘past thinking’ and ‘past emotion’ than did present-biased people. This suggests that *past*-directed non-present-focused attitudes might be associated with being less present-biased. This, in combination with our finding that there is no association between (a) present-bias and beliefs about TO, and (b) (non-)present-focused attitudes and beliefs about TO, suggests that although these kinds of attitudes may modulate present-bias, they do not do so via any kind of belief about TO. What matters (it would seem) is not beliefs about the (non-)existence of past events, but the extent to which people think about, and are ‘emotionally driven by’ those past events.[[34]](#footnote-35)

This finding is consistent with evidence which shows that people tend to experience more intense emotions during anticipation than during retrospection of the same experience (Caruso, Gilbert, & Wilson, 2008; D’Argembeau & Linden, 2004; Van Boven & Ashworth, 2007) and that our emotional *reactions* to consideration of past experiences are less extreme than our reactions to consideration of future experiences (Bar-Anan, Wilson, & Gilbert, 2009; Van Boven, Kane & McGraw, 2009). A natural hypothesis is that this emotional asymmetry might explain future-biased preferences (Horwich (1987, 196–8), Maclaurin & Dyke (2002), Suhler & Callender (2012), and Greene & Sullivan, (2015, Section V)). Those who experience a significant temporal asymmetry of emotion will be such that future pains tend to evoke more negative emotions than past ones, and those people thus prefer to locate pains in the past, while future pleasures tend to evoke more positive emotions than past ones, and those people thus prefer to locate pleasures in the future.

In turn, we would expect this mechanism to generate present-bias, insofar as we’d expect people to prefer positive events to be in the present rather than the past, and negative events to be in the past not the present, given that retrospection is less intense than actual experience. This is consistent with our finding that people are in fact less present-biased when they show stronger past emotions. A natural thought, then, is that differences in the degree to which retrospection generates intense emotion might, in part, explain differences in present-bias. The less temporally asymmetric someone’s emotions are, the less likely they are to be present-biased. So too, we might expect, the less temporally asymmetric someone’s emotions are, the less likely they are to be future-biased. This is consistent with our findings. Non-future-biased people report higher past thinking and past emotion than future-biased people (though they also report higher future emotion).

Interestingly though, in that case we might have expected to find an association between present-bias and future-bias. Indeed, we would also have expected to find this association if present-bias is just the combination of near-bias and future-bias. This gives us some reason to think that present-bias may indeed be a distinctive psychological kind, one whose normative status must be investigated independent of the investigation of near- and future-biases.

If an asymmetry in emotion does partly explain both present- and future-bias, then this opens up new avenues for exploring the rationality (jointly) of these preferences. Both Prior (1959) and Parfit (1984) appeal to such emotional asymmetries in their evaluation of future-bias, with Prior and also Pearson (2018) arguing that these preferences (future-biased ones) are rationally permissible because they are the product of these asymmetric emotions (which in turn are rationalised, according to them, by the fact that time passes). Hence further normative investigation could profitably focus on the question of whether this emotional asymmetry justifies, or merely explains, the prevalence of these preferences.[[35]](#footnote-36)

Regardless, this finding suggests that insofar as one wanted to diminish present-bias, having people attend more closely to the character of past events, or generally attempting to inculcate non-present-focused temporal attitudes would be more effective. This is consistent with work on prospective near-bias, which has shown that near-bias can be diminished by having people imaginatively engage with their older selves.[[36]](#footnote-37)

Fourth, we found no association between present-bias and future-bias. This is interesting in light of recent work by Latham, Miller & Norton (ms), which found a moderate association between near-bias and future-bias. If present-bias were just the limiting case of near-bias, then we would expect to find that association replicated here. Since we do not, that is some reason to doubt the claim that present-bias should simply be assimilated to (prospective) near-bias. This suggests that further work could profitably look to see whether present-bias is associated with near-bias. If it is, then we would have evidence that there is a shared partial explanation of future-bias and near-bias and a shared partial explanation of near-bias and present-bias, but no shared explanation of future-bias and present-bias. Such a discovery would help us to home in on what explains each bias. On the other hand, if present-bias is not associated with near-bias, then much more work should be put into investigating present-bias in its own right. Given that we know that patterns of both near-bias and future-bias vary intra-personally and interpersonally, and are sensitive to the kind of event and its valence, this would suggest that much more work would need to be done in plumbing the nature of present-bias.

Finally, it is surprising that we did not find a majority of participants to be future-biased, given that prior work has suggested that (first-person hedonic) future-bias is sufficiently robust that people will prefer one unit of pleasure in the future to two in the past, and will prefer *ten* units of pain in the past to one unit of pain in the future (Greene et al. 2021a, 2021b, forthcoming-a). However, there is also evidence that the extent to which people respond with future-biased preferences is sensitive to small methodological changes (Greene et al. 2021c, forthcoming-b).

There are several differences between the current study and the prior studies that found that a majority of participants are future-biased. One is that this is the first study to investigate whether people are future-biased by using a forced-choice question. Another is that this is the first study to test future-bias alongside present-bias. Indeed, these probes appeared (albeit in random order) on the very same page of the survey. One hypothesis regarding our results, then, is that some of those who identified more strongly with their response to the present-bias probe question may have been primed *not* to report future-biased preferences. For the present-bias probe question effectively asks people whether they prefer the event now, or not-now. So it might be that those who strongly identify with their ‘not-now’ preference were disposed, when asked whether they prefer the event to be tomorrow or yesterday, to report that they have no preference: they care only that the event occurs not-now. Likewise, those who prefer the event to occur now may be disposed to report no preference between tomorrow or yesterday, for they care only that the event occurs now. Thus if enough participants identify strongly with either a present-biased or non-present-biased response to the present-bias probe question, this might lead to a reduction in reported future-bias.

Perhaps there is also a similar effect amongst those who identify more strongly with their response to the future-biased probe question. A strong preference for the event to be at *one* not-now location compared to another not-now location might make more salient, or generate an attachment to, these not-now locations, leading fewer people to report present-bias.

Of course, all of this is consistent with present-bias and future-bias being compatible. One can prefer that positive events are present over non-present, and also prefer that they are future not past (and *mutatis mutandis* for negative events). But if this hypothesis is correct it is important not only because it explains why we found lower levels of future-bias than previous studies, but also because it suggests that this study might under-report the true levels of present-bias. In addition, it would also explain the lack of association we found between future-bias and present-bias. If this finding could be explained in this manner, then this leaves open that really there is such an association, and hence that there is a shared explanation for near-bias, future-bias, and present-bias. This is something that could be profitably investigated in further research.

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1. We use ‘event’ to include any occurrence, including the receipt of goods. [↑](#footnote-ref-2)
2. This terminology is not intended to prejudge whether the biases are rational or irrational. [↑](#footnote-ref-3)
3. All of the time-biases discussed here are what Callender (forthcoming) calls tensed, i.e., they are about the temporal location of events in an A-series or a series that includes the perspective of the present. [↑](#footnote-ref-4)
4. i.e., events that one values or finds pleasant. [↑](#footnote-ref-5)
5. For an overview of work in this area see Loewenstein & Elster (1992). [↑](#footnote-ref-6)
6. Caruso, Gilbert & Wilson (2008); Greene, Latham, Miller & Norton (2021a, 2021b, 2021c, 2022 forthcoming); Latham, Miller, Norton & Tarsney (2020), Greene, Latham, Holcombe, Miller & Norton (2021). [↑](#footnote-ref-7)
7. Hare (2007, 2013); Dougherty (2011, 2015); Greene & Sullivan (2015); Sullivan (2018); Dorsey (2018); Brink (2011). [↑](#footnote-ref-8)
8. See Greene, Latham, Holcombe, Miller and Norton (2021). [↑](#footnote-ref-9)
9. See Greene & Sullivan (2015, §2). Sidgwick (1884, 380–1) writes, “The mere difference of priority and posteriority in time is not a reasonable ground for having more regard to the consciousness of one moment than to that of another. The form in which it practically presents itself to most men is ‘that a smaller present good is not to be preferred to a greater future good’ (allowing for difference of certainty).” Rawls (1971, 293) reiterates the point: “A present or near future advantage may be counted more heavily on account of its greater certainty or probability, and we should take into consideration how our situation and capacity for particular enjoyments will change. But none of these things justifies our preferring a lesser present to a greater future good simply because of its nearer temporal position.” (See also Lewis (1946), (1986), Nagel (1970), Broome (1991), and Brink (2011).) [↑](#footnote-ref-10)
10. For discussion see Callender (forthcoming). [↑](#footnote-ref-11)
11. Explicit supporters of the rationality of hedonic future-bias include Prior (1959), Hare (2007; 2008), and Heathwood (2008). [↑](#footnote-ref-12)
12. Hare (2013) Brink (2011: 378) Dougherty (2015: 3, fn. 4). Recent empirical work suggests this, however, to be false on both counts (Greene, Latham, Miller & Norton (2021a, 2021b)). [↑](#footnote-ref-13)
13. Suhler & Callender (2012); MacLaurin & Dyke (2002). [↑](#footnote-ref-14)
14. This hypothesis is defended, in various guises, by Prior (1959), Pearson (2018), Schlesinger (1976) and Craig (1999) and criticised by Mellor (1981, 1983), MacBeath (1983) and Yehezkel (2014). [↑](#footnote-ref-15)
15. By ‘temporal passage’ we mean robust passage, which occurs when there is a fact of the matter as to which moment, or set of events, are objectively present, and which moment/events that is changes. [↑](#footnote-ref-16)
16. For more on this history and its contemporary relevance, see e.g., Cockburn (1997), Dorato (2008, forthcoming). For more discussions of connections between temporal ontology and ethics see e.g., Orilia (2016), Deng (2018), Sweeney (2021). [↑](#footnote-ref-17)
17. ‘Place before your mind’s eye the vast spread of time’s abyss and embrace the universe; and then compare what we call human life with infinity […]’ (Seneca, Letter 99). [↑](#footnote-ref-18)
18. ‘In so far as the mind conceives things under the dictates of reason, it is affected in the same manner, whether the idea be of a thing future, past, or present’ (Ethics IV lxii.) Note that the connection is to a belief not only in eternalism but also in determinism. The best kind of knowledge is a knowledge of things as ‘contained in God’ and as following ‘from the necessity of the divine nature’ (Ethics V P29). [↑](#footnote-ref-19)
19. J. M. Fischer, The problem of Now, https://aeon.co/essays/the-metaphysical-claims-behind-the-injunction-to-be-in-the-now, Jan. 2021. [↑](#footnote-ref-20)
20. There may also be philosophical precursors. For instance, Dorato (forthcoming) argues for a connection between presentism and Epicurus’s views. Death is nothing to us in the sense that death does not exist so long as we live, but also in the sense that it does not exist full-stop (i.e., it is in the future and therefore does not exist); we should not fear death, because it causes no pain in the present. [↑](#footnote-ref-21)
21. This link will only become accessible once the paper is de-anonymised, since the information at the link effectively reveals the authors of the paper. [↑](#footnote-ref-22)
22. A second cautionary remark is in order here. As mentioned, we leave open the possibility that the beliefs in question may be tacit. Exactly how to probe tacit beliefs is a vexed question. For the purposes of this paper, we can leave open the possibility that we are detecting no more and no less than dispositions to respond to the question ‘how likely do you think it is that our universe is like this?’ in the way self-described presentists and eternalists would respond (whether or not this is all that tacit belief in presentism/eternalism amounts to). What matters for our explanatory purposes is that the vignettes are not merely creating but also picking up on some such pre-existing dispositions in the participants. [↑](#footnote-ref-23)
23. Hence we treat people who respond with a ‘4’ as though they believe that presentism/eternalism is not true. We get the same results if we instead remove these people from the analyses. [↑](#footnote-ref-24)
24. See Ahler, Roush & Sood (2020) for a discussion of some of the problems associated with collecting data using MTurk and the prevalence thereof. [↑](#footnote-ref-25)
25. Non-PB numbers are made up as follows:

positive presentism: 30 non-present-biased and 1 time-neutral

positive eternalism: 41 non-present-biased and 6 time-neutral

negative presentism: 27 non-present-biased and 6 time-neutral

negative eternalism: 30 non-present-biased and 12 time-neutral. [↑](#footnote-ref-26)
26. Nor was there an association between valence and present-bias, χ2 (1, N = 303) = .269, *p* = .604. [↑](#footnote-ref-27)
27. You might think it would be more natural to compare present-bias between those who (i) believe presentism is true or believe eternalism is not true and those who (ii) believe presentism is not true or believe eternalism is true. But even if we compare these groups there is still no evidence of a significant association between participant beliefs about TO and present-bias χ2 ­(1, N = 303) = .001, *p* = .978. [↑](#footnote-ref-28)
28. Our reported results are not altered by considering only those participants who strongly report that the vignette is like our own universe (6, 7) or strongly report the vignette is not like our own universe (1, 2). [↑](#footnote-ref-29)
29. Our reported results are not altered by instead comparing participants that between those who (i) believe presentism is true or believe eternalism is not true and those who (ii) believe presentism is not true or believe eternalism is true. [↑](#footnote-ref-30)
30. Non-FB numbers are made up as follows:

positive presentism: 23 past-biased and 10 time-neutral

positive eternalism: 38 past-biased and 9 time-neutral

negative presentism: 15 past-biased and 11 time-neutral

negative eternalism: 33 past-biased and 10 time-neutral. [↑](#footnote-ref-31)
31. See Greene & Sullivan (2015) and, Dougherty (2011), for discussion of how future-based preferences can leave us worse off overall. [↑](#footnote-ref-32)
32. See Dougherty (2011, 2015), Greene & Sullivan (2015), Maclaurin & Dyke (2002), Pearson (2018) and, Prior (1959), when it comes to future-bias. [↑](#footnote-ref-33)
33. See especially Prior, (1959) and Pearson (2018). [↑](#footnote-ref-34)
34. It is worth noting that the temporal attitudes we measured resemble some of the attitudes measured in the psychological literature on *temporal orientation* (also known as *temporal perspective*). Temporal orientation refers to how people think about past, present, and future, and the emphasis which is placed on them in cognition. Such thinking is also often affectively valenced. For instance, one person might think about the past with nostalgic positivity, whereas another person might come to represent the past with regret. Likewise, with respect to the present and future. Psychological research in this area has shown that temporal orientation is influenced by numerous factors, including age, gender, socio-economic status, culture, and so on (e.g., Sircova, et al. 2014, Steinberg et al. 2009). Temporal orientations have been associated with both positive and negative life outcomes. For example, having certain attitudes directed towards the present is associated with positive outcomes such as higher life satisfaction (e.g., Drake et al. 2008) but negative outcomes such as increased procrastination (e.g., Ferrari, & Díaz-Morales 2007). Meanwhile, having certain attitudes directed towards the future is associated with positive outcomes such as engagement and achievement in education (e.g., Horstmanshof, & Zimitat 2007) but negative outcomes such as increased levels of anxiety (e.g., Zimbardo & Boyd 1999). We note that it would be interesting to look at the interaction between present-bias, future-bias, and this broader set of temporal attitudes. [↑](#footnote-ref-35)
35. Greene & Sullivan (2015, 966–8) present an argument against the view that temporally asymmetric emotions justify hedonic future-bias. They argue that philosophers do not treat near-biased emotional responses to be evidence for the rational permissibility of near-bias. And suggest that to be consistent, we should hold that temporally asymmetric emotions explain, but do not justify, time-biases. [↑](#footnote-ref-36)
36. See Hershfield, John & Reiff (2018); Rutchick, Slepian, Reyes, Pleskus & Hershfield (2018). [↑](#footnote-ref-37)