Is Future Bias just a Manifestation of the Temporal Value Asymmetry?

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Abstract

Future-bias is the preference, all else being equal, for positive states of affairs to be located in the future not the past, and for negative states of affairs to be located in the past not the future. Three explanations for future-bias have been posited: the *temporal metaphysics explanation*, the *practical irrelevance explanation,* and the *three mechanisms explanation.* Understanding what explains future-bias is important not only for better understanding the phenomenon itself, but also because many philosophers think that which explanation is the correct one has implications for our evaluation of the normative status of future-bias. In this paper we focus on the connection between future-bias and the temporal value asymmetry. The latter refers to the fact that people tend to assign more value to a state of affairs when it is located in the future, as opposed to being equidistant in the past. All three candidate explanations offered for future-bias proceed by explaining the temporal value asymmetry, and then supposing that future-bias is simply a manifestation of that asymmetry. Recently,however, it has been argued that the conditions under which people display the temporal value asymmetry and future-bias are different, and that this is reason to doubt that the latter is a manifestation of the former. In this paper we empirically test one response to this argument against the manifestation thesis—the simulation response—according to which once we control for the degree to which people can simulate the object of their preference, we find that people display future-bias and the temporal value asymmetry in the same conditions. We find no evidence in favour of the simulation response. Moreover, our results support some previous research that suggests that the temporal value asymmetry is less robust than previously thought, and this in itself casts doubt on the idea that future bias is just a manifestation of this asymmetry.

Keywords:

Future bias; temporal value asymmetry; preference; temporal asymmetry

1. Introduction

Future-bias is the preference, all else being equal, for positive states of affairs (i.e., those one positively values) to be located in the future not the past, and for negative states of affairs (i.e., those one negatively values) to be located in the past not the future. Recent empirical work has confirmed what many, going back at least as far as Hume (1739), supposed to be the case: that when it comes to our own pleasant and unpleasant experiences, all else being equal, we prefer pleasant experiences to be located in the future rather than the past, and unpleasant experiences to be located in the past rather than the future.[[1]](#footnote-1) Specific philosophical predictions about future-bias probably trace back to Parfit (1984), who intuited that, all else being equal, people would prefer to learn that they had just undergone a painful operation, rather than learning that they are about to undergo such an operation. Parfit further claimed that people’s preference to have pain in the past rather than in the future would continue even if there would be ten times as much pain in the past compared to in the future. Future-bias as regards pleasures and painful experiences is known as *hedonic* future-bias, and studies have found that people are future-biased about receiving pleasant/unpleasant meals (Greene, Latham, Miller and Norton 2020, 2021, Bardon, Everett, Latham, Miller and Oh 2023, Latham, Miller and Norton 2023), experiencing pain/pleasure as a side effect of taking medication (Greene, Latham, Miller and Nielsen 2024), and experiencing pleasant/unpleasant tastes, sights, or smells (Latham, Oh, Miller, Shpall and Yu 2023). Philosophers had also initially predicted that future-bias would *only* be found when it came to hedonic experiences such as these. For instance, Hare (2013) predicts that he would have no preference about when in time his wife would be unfaithful to him, (even though he would prefer that she not be). While the negative experience of learning that his wife had been unfaithful is a hedonic event, the actual event of infidelity is a non-hedonic event insofar as it is one that he does not experience. Evidence to date, however, has not supported this prediction. Greene, Latham, Miller and Norton (2020) found that people displayed future-bias about non-hedonic events such as receiving a community service award (positive) or having embarrassing photos released (negative).

In light of this data, work in both philosophy and psychology has targeted two related question: first, what *explains* why people have this preference, and, second what is the *normative status* of that preference; is it rationally permissible, rationally required, or rationally impermissible to have such a preference?[[2]](#footnote-2)

Philosophers are divided on the normative status of future-bias. Those who think that it is at least permissible hold that we can rationally prefer that negative events are in the past where they are over and done with, and pleasant ones are in the future where they have yet to occur. By contrast, those who think that future-bias is impermissible are moved by the thought that mere temporal location is not normatively relevant, and hence should not be a basis for forming preferences (Brink 2011). They are also moved by the idea that people who are future-biased are in fact preferring a life that is overall worse off, by having more negative events and fewer positive ones (since they prefer more of a bad thing, as long it is in the past, and less of a good thing, as long as it is in the future), Of course, since we cannot causally affect the past, it was thought for some time that future-biased preferences are inert. More recently, however, several philosophers have argued that when we combine future-bias either with regret aversion or risk aversion, the combination of these preferences can lead to choices that make us worse off in some respect and better off in none (Dougherty 2011, 2015; Greene and Sullivan 2015). More recently, empirical work has showed that approximately 25% of people are both risk averse and future biased, and that these people do in fact make a series of choices that leave them worse off at some time and better off in none (Braddon-Mitchell, Latham, and Miller 2023). Given this finding, understanding the mechanisms involved in future-bias seems all the more important.

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There are three candidate explanations offered for future-bias: the *temporal metaphysics explanation*, the *practical irrelevance explanation*, and the *three mechanisms explanation.* (Though these candidates need not be thought of as competitors[[3]](#footnote-3)). Determining what explains future-bias is often thought to inform theorising about its normative status. Philosophers who accept the temporal metaphysics explanation typically take future-bias to be at least permissible, and usually obligatory.[[4]](#footnote-4) By contrast, philosophers who accept the practical irrelevance explanation or the three mechanisms explanation often conclude that said explanations undermine the rationality of future-bias. Given this, determining which of these explanations is correct is important not only as a piece of descriptive psychology, but also for normative theorising.

As we will see in section 2, all three candidate explanations share a common feature: they attempt to explain future-bias by (a) explaining the temporal value asymmetry and (b) assuming that future-bias is a manifestation of that asymmetry. The temporal value asymmetry refers to the fact that people tend to assign more value to a state of affairs when it is located in the future, as opposed to being equidistant in the past (Caruso, Gilbert and Wilson 2008; Caruso, 2010; Roh and Schuldt, 2014). For instance, it has been found that people award more monetary compensation for work that will be completed in the future compared to work completed in the past, and that people award a victim of a drunk driving accident more monetary compensation when the resulting pain and suffering occurs in the future compared to in the past (Caruso, Gilbert and Wilson 2008). It has also been found that people will choose to give a more expensive wine to a friend to use their vacation home in the future compared to the past use of that home, and choose to give a greater value coupon to a friend who will help them move home in the future compared to a friend who did help them move in the past (Caruso, Gilbert and Wilson 2008). Relatedly, it has been found that support for a policy against marketing soda to children is greater when it is described as coming into force in the future compared to having already come into force in the past (Roh and Schudt 2014).

Call (b) *the manifestation claim.*

*Manifestation Claim*: Future-bias is a manifestation of the temporal value asymmetry.

The manifestation claim is not only an important component in the various candidate explanations of future-bias, and in that regard is important for normative theorising about future-bias, but in addition, the claim itself, if true, has implications for normative theorising. If future-bias is simply a manifestation of the temporal value asymmetry, then it seems reasonable to think that future-bias inherits its normative status from the normative status of the temporal value asymmetry. Thus, if the manifestation claim is true, independent normative investigation of future-bias is not required: we need only to reflect on the normative status of the temporal value asymmetry. By contrast, if the manifestation thesis is false, then this opens up the possibility that the normative status of the former is independent of the latter, and therefore that independent normative investigation of each is required. Thus, determining the status of the manifestation claim is doubly important.

This paper empirically investigates the status of the manifestation claim by investigating the status of several recent objections to that claim. We begin, in Section 2, by clarifying the phenomena we have in mind—future-bias and the temporal value asymmetry—and saying a bit more about the manifestation thesis. In Section 3 we outline the ways in which the manifestation claim has been used in explanations of future-bias. Then in Section 4 we describe several recent objections to the manifestation claim which have recently been offered. In Section 5 we outline a potential response to one of the objections raised in Section 4, which we call the *simulation response*. We outline that response in Section 6, before presenting our methodology and results in section 7. In Section 8 we turn to the implication of these results for the simulation response, and, in turn, the status of the manifestation claim.

1. Preferences, Values, and the Manifestation Claim

Future-bias is a preference, all else being equal, for pleasant events to be located in the future and not the past, and negative events to be located in the past and not the future. In what follows we assume, as is philosophical orthodoxy, that preferences are mental states that represent the relative attractiveness of states of affairs, and in doing so guide choices. This is to be contrasted with a revealed preference theory (Samuelson 1938, 1948, 1950) according to which to say that an individual prefers x to y is to say nothing more than that in choice situations the individual chooses x over y. This is particularly important in the case of future-bias, since people (typically) cannot choose to have certain events located in the past rather than the future, given that the past is causally inaccessible. So, we take it that studies that ask people what they prefer, provide defeasible evidence regarding those preferences, rather than being constitutive of the individual having those preferences. We return in Section 8 to the implications for our results, of this construal of preferences.

The temporal value asymmetry is usually described as a tendency to accord more value to future states of affairs compared to past ones. In the case of negative events this means to accord them *less* *negative* value when they are past compared to future, and in the case of positive events, to accord them *more* *positive* value when they are future compared to past. It has then been thought that future-bias is a manifestation of the temporal value asymmetry. If people discount the value of past events compared to future ones, then if we are maximising value and hence prefer less of a bad thing and more of a better thing, we will prefer that when an event is positive it is located in the future, *where it has more positive value than it would have in the past,* and when an event is negative that it is located in the past, *where it has less negative value than it would have, if it were located in the future*. That, however, is just to be future-biased.

Nevertheless, this all raises questions about how to think about the connection between preferences and values. What do we mean when we say that the temporal value asymmetry involves differently valuing events when they are past, compared to future? It is natural to read this as a claim about *decision utility,* which is, roughly, the value we afford some option in making decisions (to be contrasted with *experienced utility*, which is the utility we experience when we get that option; see Kahneman, Wakker and Sarin 1997). This raises a puzzle, however, since in normative decision theory, decision utility is defined in terms of our preferences. So, if the temporal value asymmetry is understood in terms of decision utility, the manifestation thesis, or at least, the converse of that thesis, turns out to be a conceptual truth. That is because an event has a greater decision utility when it is future than past, only if we prefer that event to be located in the future not the past, when it is positive, and past not future when it is negative (and have certain preferences over lotteries involving those events). Thus, it will turn out to be a conceptual truth that people display a temporal value asymmetry if and only if they are future-biased. Viewed this way, the connection between future-bias and the temporal value asymmetry is trivial.

In what follows we intend to construe the temporal value asymmetry in terms of decision utility (rather than, say, as simply being identified with the phenomenon of people giving more monetary compensation for future events than past ones (what we might call revealed temporal value asymmetry, an analogue of revealed preference theory).

We distinguish two kinds of decision utility: *normative* and *actual*. Normative decision utility is defined by normative decision theory, in terms of a complicated set of well-behaved preferences. An individual’s normative decision utility is that input into decision theory which determines which option that individual should rationally choose. That does not mean, however, that normative decision utility is the input to decision that an individual in fact uses in making decisions. For instance, we know that people’s *predictions* regarding how positive an event will be, is more positive than their *actual experience* of the event (Mitchell, Thompson, Peterson, and Cronk 1997). While that does not show that the utility that people use to make decisions is different from decision utility as defined by normative decision theory, it at least suggests that it *might* be, insofar as decision utility is intended to track experienced utility (after all, in making decisions what matters is not what utility you predict you will have, but what utility you will in fact have given certain outcomes).

We will call the utility that people actually use in making decisions, *actual decision utility.* Actual decision utility will typically be different from normative decision utility, both because people’s preferences are not always well-behaved, and because people do not come to value states of affairs by calculating a utility function on the basis of their preferences over outcomes and lotteries of outcomes. Consequently, we assume that studies such as ours probe people’s actual decision utility and provide defeasible evidence regarding that utility (again something we return in section 8). It is, then, a genuinely open question what connection there is, between people’s preferences and their actual decision utility.

As we are conceiving of matters, then, people display a temporal value asymmetry if they tend to accord less actual decision utility to an event when it is past compared to when it is future. In turn, the manifestation thesis is the thesis that future-bias is a manifestation of this asymmetry; it’s a manifestation of a difference in actual decision utility that people accord to past events compared to future ones.

1. Three Explanations and the Manifestation Claim

In what follows we present a number of explanations that have been offered in the literature, and show how those explanations have proceeded via the manifestation claim. In all these cases the explanations have a common structure: there is some feature, or set of features, that is taken to explain the temporal value asymmetry, and that is in turn taken to explain future-bias via the manifestation thesis. We present these explanations as they are articulated in the literature. Our aim is not to show that in the absence of the truth of the manifestation claim these explanations cannot be used to explain future-bias in other ways. It could be that some, or all, of the features which are taken to explain the temporal value asymmetry, directly at least partially explain future-bias. Our claim is just that if the manifestation thesis is false, then they do not explain future-bias via the manifestation claim, and so a re-evaluation of those explanations will need to be made.

The first candidate explanation of future-bias is known as the *temporal metaphysics explanation* (Latham, Miller, Norton and Tarsney 2020; Latham, Miller, Tarsney and Tierney 2021, 2022) since it connects the presence of temporal metaphysical facts—irreducibly tensed facts about which states of affairs are objectively past, present, and future—to the presence of future-bias (Prior 1959; Pearson 2018; Schlesinger, 1976; Craig, 1999; Cockburn, 1997). According to this explanation, one class of events is metaphysically special by being present, but which events those are, changes as time passes. Since which events are present changes, time itself robustly passes or flows[[5]](#footnote-5) in that future experiences come ever closer, become present, and then recede into the past. This relative movement of the present is, according to this view, an explanation of the temporal value asymmetry wherein people value past states of affairs less than present or future ones because they are ‘over and done with’ in a way that future (and present) ones are not because they lie in the objective past. The temporal metaphysics explanation then explains future-bias via the manifestation thesis.

A second explanation of future-bias is known as *practical irrelevance explanation* (Latham, Miller, Norton and Tarsney 2020). According to this explanation, we attach less evaluative weight to past states of affairs because there is nothing we can do to affect the past. This means that past states of affairs cannot count for, or against, present choices in the way that potential future states of affairs can (Hume, 1739, sec. 2.3.7.6; Parfit, 1984, p. 186; Horwich, 1987, pp. 194-196; and developed by Maclaurin & Dyke, 2002; Suhler & Callender, 2012). Thus, the causal inaccessibility of past states of affairs compared to future ones explains why we value them less and hence explains the temporal value asymmetry. In turn, it explains future-bias via the manifestation thesis.

The temporal metaphysics and practical irrelevance explanations are not mutually exclusive. Indeed, defenders of the temporal metaphysics explanation might contend that the reason the past is causally inaccessible is because there are irreducibly tensed facts/genuine flow of time. The familiar idea would be that there is a necessary connection between the direction in which time flows, and the direction of causation, such that the reason the past is causally inaccessible is *that it is the past.* Then she might argue that the explanation of future-bias is the presence of these irreducibly tensed facts, and that these facts mean that past events are over and done with both in the sense that they lie in the objective past, which has already occurred, and the sense in which those events are causally inaccessible to us.

The two explanations are, however, distinct. Defenders of the practical irrelevance explanation need not accept that there are irreducibly tensed facts. They might reject the idea that any class of events is metaphysically special by being objectively present, and instead maintain that it is only ever a subjective or relative matter which events are past, present, and future. On this view, all events are present at the time they occur, and what is past relative to one time, will be future relative to another. So irreducibly tensed facts do not exist, and hence play no role in explaining future-bias. Nevertheless, on this view causation is temporally asymmetric: earlier events cause later events but not the other way around. As such, at any time, earlier events are causally inaccessible, while later events are not. It is then this causal asymmetry which explains future-bias.

A third explanation is what we will call the *three mechanisms explanation*. According to this view, the temporal value asymmetry is the product of the functioning of three fundamental psychological asymmetries: the control, direction, and uncertainty asymmetries (Ramos, Caruso, and Van Boven 2022). According to this view, because future states of affairs seem to us to be approaching and hence to be *closer* (the direction asymmetry), to be more *controllable* (the control asymmetry), and to be less *certain* (the uncertainty asymmetry) than equidistant past states of affairs, people will preferentially engage with future states of affairs over past ones. That is, people will *attend* more (the attention asymmetry) and have more *affect* directed at future states of affairs than past ones (the emotion asymmetry).[[6]](#footnote-6) So, on this view the direction, control, and uncertainty asymmetries jointly explain the attention asymmetry and the emotion asymmetry, which jointly explain the temporal value asymmetry. In turn, this explains future-bias via the manifestation thesis.

Here is the proposal fleshed out a little. Since people tend to feel more affect towards uncertain states of affairs than more certain ones (Bar-Anan, Wilson, and Gilbert, 2009; Wilson, Centerbar, Kermer, and Gilbert, 2005; Kurtz, Wilson and gilbert 2007) and since future states of affairs are less certain than past ones (the uncertainty asymmetry), people will tend to experience more intense affect with respect to future states of affairs compared to past ones. Thus, the uncertainty asymmetry at least partly explains the emotion asymmetry. The direction asymmetry also at least partly explains the emotion asymmetry. According to the direction asymmetry, it seems as though future states of affairs are moving closer, while past states of affairs are moving further away. Since the affective system responds more strongly to stimuli that appear to be moving closer to the self (Mühlberger, Neumann, Wieser, and Pauli 2008; Davis, Gross, and Ochsner, 2011), the affective system will respond more strongly to future states than past ones. The control asymmetry also partly explains the emotion asymmetry. States of affairs over which we have control tend to elicit stronger emotional responses than those over which we lack control (Frijda, 1986; Frijda, Kuipers, and ter Schure, 1989; Lazarus, 1991). Since we have more control over future compared to past states of affairs (the control asymmetry) people will have more intense affect with respect to future compared to past states of affairs.

The direction and control asymmetries also explain why we tend to direct more attention towards future compared to past states of affairs (the attention asymmetry). The direction asymmetry at least partly explains the attention asymmetry because people typically attend more to things that appear to be approaching (Low, Lang, Smith, and Bradley, 2008). Since according to the direction asymmetry future states of affairs appear to be approaching while past ones do not, people will attend more to future compared to past states of affairs. The control asymmetry also partly explains the attention asymmetry. Attention tends to be allocated towards stimuli that are relevant to attaining one’s goals (Aarts, Dijksterhuis, and De Vries, 2001; Dijksterhuis and Aarts, 2010). Given that we can causally influence future states of affairs but not past ones, it will tend to be future states of affairs that are relevant to attaining our goals. In turn, we will tend to attend more to future than to past states of affairs, and hence there will be an attentional asymmetry.

The attentional asymmetry itself can partly explain the temporal value asymmetry. Some studies have found that people like attended objects more (Shimojo, Simion, Shimojo, & Scheier, 2003; Stormer & Alvarez, 2016) and that people are more likely to choose, amongst options, those they attend to (Cavanagh et al., 2014; Fiedler & Glockner, 2012; Fiedler et al., 2013; Folke et al., 2016) and that increasing attention toward an option increases the likelihood that it will be chosen (Ghaffari & Fiedler, 2018; Janiszewski, Kuo, & Tavassoli, 2012; Mormann et al., 2012). This it at least suggestive of the idea that attentional asymmetries might partly explain why people more highly value the option to which they more highly attend.

In addition, the attentional asymmetry partly explains the emotion asymmetry. Attention enhances perceptual experience by making objects more vivid, salient, and clear. It also reduces interference from unattended stimuli and increases memory accessibility of attended objects. Because of this, attention increases the emotional intensity of attended objects (Mrkva, Ramos and Van Boven 2020). The emotion asymmetry then explains the temporal value asymmetry. People tend to more highly value those states of affairs towards which they direct more intense emotion, so if people tend to direct more intense emotion to future states compared to past ones, they will tend to more highly value future states over past ones.

In turn, future-bias is explained via the manifestation thesis.

It is, then, a very general feature of explanations of future-bias that they proceed by first explaining the temporal value asymmetry and then explaining future-bias via the manifestation thesis. If the manifestation thesis is false, then either it needs to be shown that the relevant factors *directly* explain future-bias without going via the temporal value asymmetry, or else different explanations need to be offered for future-bias. In either case it is important to ascertain the status of the manifestation claim in evaluating these explanations both in terms of understanding descriptive facts about what explains future-bias, and, in turn, marshalling those descriptive facts when engaged in normative theorising about future bias.

1. The Manifestation Thesis

Until recently it had simply been assumed that the manifestation thesis is true. The idea is that it is because people accord less value to states of affairs when they are past compared to future, that people tend to prefer negative events to be in the past, where they have less value (and hence less negative value) and positive states of affairs to be in the future, where they have more value (and hence more positive value)

Recently, however, two pieces of evidence have been cited that seem to undermine the manifestation thesis.

The first of these regards an apparent difference in people’s normative judgements regarding the temporal value asymmetry and future-biased preferences. Caruso et al (2008) found that people only show a value asymmetry in an experiment in which people see a single vignette that *either* describes future boring work, or past boring work, and do not show that asymmetry in an experiment in which people see *two* vignettes, one of which describes future boring work and one of which describes past boring work. In both experiments participants then decide on compensation for the work described, but in the second experiment they can compare their compensation rates for past versus future work and in the first they cannot. Caruso et al found no temporal value asymmetry in the second experiment that allowed for comparison. This finding was taken by Caruso et al (2008) to be evidence that people do not take it to be normatively justified to differently value past over future states of affairs, and so in the experiment that allowed for comparison, people tended to bring their judgements in line with one another. The key claim for our purposes is the following:

TVA Normative: People judge the temporal value asymmetry to be normatively unjustified.

If the manifestation thesis is true, however, then we would expect people to make an analogous claim about future-bias. Namely, we would expect them to endorse the following:

FB Normative: People judge that future-bias is normatively unjustified.

The problem is that FB Normative is not very plausible. As Hoerl (2022) points out, people probably do think it is justified to prefer pains to be in the past, and pleasures in the future, and thus do think that future-bias is justified. Indeed, there is some evidence for this claim. Latham, Miller, Norton and Tarsney (2020), found that there was no significant difference between the proportion of people who were future-biased and the proportion who judged one *should* be future-biased.

So, we have reason to think that FB Normative is false and that TVA Normative is true, and as a consequence we have reason to be sceptical of the manifestation thesis.

For the purposes of this paper, we set aside this piece of evidence and focus only on the second piece of evidence against the manifestation thesis.

The second piece of evidence against the manifestation thesis lies in a difference between first and third personal displays of the temporal value asymmetry and future-bias.

In one direct comparison of first and third personal displays, Caruso et al. (2008, Study 4) found that people exhibited a temporal value asymmetry in making value judgements about *their own* (i.e., first personal) compensation for past and future states of affairs, but not in making the same judgements about the compensation of *others’* (third personal).[[7]](#footnote-7)

TVA First/Third Asymmetry: People display a temporal value asymmetry in first but not third personal conditions.

Greene, Latham, Miller, and Norton (2021a 2021b, 2022) found that people display future-biased preferences in both first and third-personal conditions. Across these studies participants read a vignette describing an individual who is either described as themselves, or as a third party. This individual can either be such that they received their favourite/most disliked meal N units of time in the past, or will receive it N units of time in the future. In each condition participants are asked whether they prefer that their own meal was in the past, or will be in the future, or they asked whether they prefer that the third-party’s meal was in the past, or will be in the future. Thus, in the third-person condition people are being asked their own preferences over the temporal locations of events that will be experienced by some third party, where the events experienced are the same in both cases.

FB First/Third Symmetry: People display future bias in first and third personal conditions.

If the manifestation thesis is true, however, we would expect to find the same asymmetry (or lack thereof) between first and third personal conditions both when it comes to the temporal value asymmetry and future-bias. Thus, this pair of results tend to undermine the manifestation thesis. The argument for this conclusion is what we will call the *argument from co-presentation.*

*The Argument from Co-Presentation*

1. If future-bias is a manifestation of the temporal value asymmetry, then people will display future-bias under the same conditions that they display the temporal value asymmetry.
2. People display the temporal value asymmetry under first personal conditions and not under third personal conditions.
3. People display future-bias under both first and third personal conditions.
4. Therefore, people do not display future-bias and the temporal value asymmetry under the same conditions (from 2, 3)
5. Therefore, future-bias is not a manifestation of the temporal value asymmetry (from 1, 4).

(1) is plausible. If x is a manifestation of y, then we would expect people to display x and y in the same conditions. (2) is an empirical claim that is supported by Caruso et al (2008). (3) is an empirical claim that is supported by Greene et al (2021a, 2021b). (4) follows from (2) and (3), and (5) follows from (1) and (4).

One strategy for defending the manifestation thesis is to suggest that the argument from co-presentation equivocates. (2) should read: *under conditions C,* people display the temporal value asymmetry under first personal conditions and not under third personal conditions, and (3) should read: *under conditions C\*,* people display future-bias under both first and third personal conditions. If this is correct, then the conclusion does not follow. It could still be that under the *same* conditions people either display *both* the temporal value asymmetry and future-bias, or *neither*.

Call this *the equivocation strategy.* If the equivocation strategy is right, then the argument from co-presentation fails and we can dismiss one of the apparent sources of evidence against the manifestation thesis. Thus, the status of the equivocation strategy is important.

One version of the equivocation strategy has already been offered by Greene et al (2021a, 2021b). They suggest that in the Caruso et al study participants are not encouraged to simulate being the third party, who is a mere nameless stranger, whereas in the Greene et al study participants are encouraged to simulate being the third party, because that party is given a name, occupation, and preferences. Greene et al suggest that under *conditions of simulability* people will exhibit a temporal value asymmetry and future-bias in both first and third personal conditions, and under *conditions of un-simulability* people will exhibit a temporal value asymmetry and future-bias in only first personal conditions. Call this version of the equivocation strategy *the simulation response.*

There is already some empirical evidence in favour of the simulation response. As noted, Caruso et al (2008) found that people showed a temporal value asymmetry in assigning compensation for data entry work in the first, but not the third personal conditions. In a second study, however, they found that people awarded an accident victim (who was not themselves) 42% more money when they imagined her suffering to be in the future than when they imagined her suffering to be in the past (Study 2a). In a third study they also found that people gave a friend a bottle of wine that was 37% more expensive when they imagined using their vacation home in the future than when they imagined using it in the past (Study 2b). These latter two cases are third-personal ones: cases in which the compensation is awarded to someone other than the participant, and in both cases a temporal value asymmetry was displayed.

One very obvious difference between the first study in which a temporal value asymmetry was not found in the third personal case, and second and third studies in which it was, lies in the fact that in the third person condition participants are awarding money to a stranger about whom they know nothing, for a task that has low emotional salience. In the other two studies they are awarding compensation either to someone they know something about, and for an event that is has significantly more emotional salience. In both these cases it is plausible that participants were better able to simulate being the relevant third party in these studies than they were in the first study.

There are a few reasons to think that the relative simulability of events might impact people’s preferences. First, research on mental simulation has shown that simulating events can make them seem more vivid and prominent (Kappes & Morewedge, 2016; Mrkva, Travers, & Van Boven, 2018), and in turn, more emotionally evocative and closer than past events (Caruso, Van Boven, Chin, & Ward, 2013; Van Boven & Ashworth, 2007). In turn, people’s tendency to simulate future events more than past events is thought to contribute to them experiencing more intense emotions when thinking about the future than when thinking about the past (Van Boven & Ashworth, 2007; Vosgerau, Wertenbroch, & Carmon, 2006; Weingarten & Berger, 2017). Further, we know that simulating alternative realities can intensify emotion, including counterfactual feelings of regret, relief, or gratitude that result from comparing what did happen with simulations of what could have happened (Markman et al., 1993; Roese, 1997). In turn, this has been shown to have an impact on people’s preferences and choices. For instance, mentally simulating the distant future can increase how much people prioritize saving for retirement (Hershfield, John, & Reiff, 2018) and other long-term goals (Shah, Hershfield, Gomez, & Fertig, 2018). Given this, we would expect that the more people are able to simulate events the more emotionally salient those events will be. If a difference in emotional salience is part of what explains the temporal value asymmetry, then we would expect to find that people are more inclined to display the temporal value asymmetry in conditions of simulability.

A second reason to think there may be a connection between simulability and the temporal value asymmetry is that it has been hypothesised that simulation is connected to attention. In particular, Mrkva, van Boven and Leaf (2020) suggest that many of the effects of simulation may be the product of attentional factors. We know that attention increases objects’ vividness and perceived prominence (Carrasco, Ling, & Read, 2004; Gobell & Carrasco, 2005), how much goals are prioritized (Mrkva & Van Boven, 2017), how severe risks seem (Mrkva, Cole, & Van Boven, 2019), and how emotionally evocative objects are (Mrkva, Westfall, & Van Boven, 2019). Given that mental simulation requires attention, the hypothesis is that the reason mental simulation has the effects it does, is because attention plays the role is does.

But as we have already seen, asymmetries of attention are thought to be a partial explanation of the temporal value asymmetry. Given this, we would expect to find that in conditions of higher simulability, and hence higher levels of attention, that we will find increased levels of the temporal value asymmetry.

A final reason to think that people will be more inclined to show a temporal value asymmetry in conditions of higher simulability is that evidence suggests that activating people’s ability to episodically simulate events leads to increases in empathy (Volberg, Gaeser and Cikara, 2021). One possibility is that people tend to show a less prominent temporal value asymmetry in cases in which they are less able to empathise with the preference target. That is because we might expect that insofar as people empathise with a third party, they will respond to that case in the same way they would respond in the first personal case, by showing a temporal value asymmetry, whereas if they are unable to empathise with that party (or empathise less) then they may be less inclined to respond as they would in the first personal case, and more likely to fail to display a temporal value asymmetry. If high simulability is connected to greater empathy, then we would expect to find that people show a more pronounced temporal value asymmetry in conditions of high simulability compared to low simulability.

A final thought is that because part of what explains the temporal value asymmetry is that because future events tend to be less certain and more controllable than past ones, people direct a more agentive stance towards those events than they do past ones, and this is why future events are more highly valued. In support of this, O’Brien (2015) found that people believe they are more able to exert agency when imagining their future selves than their past selves. More generally people predict having more mastery (Taylor, 1983), willpower (Helzer & Gilovich, 2012), autonomy (Ryff, 1991), drive and purpose (Albert, 1977; Sedikides & Hepper, 2009) in the future than they had in the past. If so, then we might expect that we would find higher levels of the temporal value asymmetry in the first person than third person conditions since in the former, but not the latter, we are taking an agentive stance. If that is correct, then we might expect simulability to have an impact on the first versus third person asymmetry of the temporal value asymmetry. If, in simulating the third party, people merely simulate having that party’s preferences, then increased simulability might not be associated with taking an agentive stance, and hence have no effect on the level of temporal value asymmetry in third-person conditions. By contrast, if simulating a third party involves taking their temporal and agentive perspective, then it will be associated with taking a more agentive perspective, and could be expected to result in people showing a greater temporal value asymmetry in the third person case.

Taken jointly, we think that these considerations give us reason to think that the simulation response may be correct. In this paper we empirically investigate that response.

1. The Simulation Response and Our Hypotheses

According to the simulation response the co-presentation argument is invalid because (2) and (3) equivocate. (2) is true under conditions of low simulability, while (3) is true under conditions of high simulability. Our aim is to test the simulation response.

To do this we ran two studies. These studies aim to manipulate the extent to which participants are encouraged to imaginatively engage with the scenarios described.

In the first experiment we manipulate simulability (and likely empathy) through the use of an episodic simulation manipulation condition (EM). We divided participants into two conditions, a control condition and an EM condition. Participants in the EM condition were asked to imagine, in detail, various aspects of a vignette that they see, and to write down as many details as they could. The control group were simply asked to solve maths problems during the same period of time. Our aim was to use the EM methodology to elicit greater imaginative engagement amongst EM participants. In both the control and EM conditions participants were then divided into those who see a vignette about themselves, about a close friend, or about a stranger, and we measure the extent to which people feel close to that self/friend/stranger using a standardised IOS test. We assume that insofar as people feel closer to particular self (their own, or a friend or a stranger) they will be better placed to simulate the experiences of that self, and therefore that simulability will correlate with closeness.

If the simulation response is correct, then in the control condition if people feel closer to a friend than a stranger, and closer still to themselves at other times, we should find that people will be more future-biased when it comes to their first personal preferences than their third personal ones, and more future-biased when it comes to their third personal preferences about the close friend than about the stranger. We should also expect to find more future-biased preferences amongst the EM participants than the control participants, across the self, friend, and stranger conditions since that is a condition of greater simulability than is the control condition. Further, we should find that in the EM condition people will give higher IOS judgements than in the control condition, and that the gap between people’s IOS scores on the self, friend, and stranger condition will be smaller because they will be in a better position to simulate the experiences of the friend and stranger in the EM condition compared to the control condition. As a consequence, we would expect to find that the difference between people’s future biased preferences in the self, friend and stranger conditions will be smaller than in the control condition. In all then, if the simulation response is correct we should find:

H1: In the control condition people will be more future biased in the self condition than in the friend condition, and will be more future biased in the friend condition than the stranger condition.

H2: In the control condition there will be higher IOS scores in the self condition than in the friend condition, and higher IOS scores in the friend condition than the stranger condition.

H3: People will be more future-biased in the EM condition than in the control condition.

H4: In the EM condition the difference between the self, friend, and stranger conditions with respect to future bias will be smaller than in the control condition.

H6: People in the EM condition will give higher IOS judgements than those in the control condition.

H7: Higher scores on the IOS will be associated with more future-bias.

In our second experiment we manipulate simulability in the context of eliciting judgements about compensation for work that was either completed in the past, or will be completed in the future (i.e. in the context of the temporal value asymmetry). Our second experiment was just like our first experiment in all respects except that we replaced the future-bias vignettes with temporal value asymmetry vignettes modified from those used by Caruso et al 2008.

If the simulation response is correct, then we should find that:

H8: In the control condition people will show more of a temporal value asymmetry in the self condition than in the friend condition, and more of a temporal value asymmetry in the friend condition than the stranger condition.

H9: In the control condition there will be higher IOS scores in the self condition than in the friend condition, and higher IOS scores in the friend condition than the stranger condition.

H10: People will be show more of a temporal value asymmetry in the EM condition than in the control condition.

H11: In the EM condition the difference between the self, friend, and stranger conditions with respect to the temporal value asymmetry will be smaller than in the control condition.

H12: People in the EM condition will give higher IOS judgements than those in the control condition.

H13: Higher scores on the IOS will be associated with a greater temporal value asymmetry.

In what follows we outline our methodology in more detail and present our results, before moving on in Section 6 to discuss the implications of these results for theorising in this area.

**5. Methodology and Results**

**5.1 Experiment 1 Methodology**

*5.1.1 Participants*

1507 people participated in the study. Participants were U.S. residents, recruited and tested online using Amazon Mechanical Turk, and compensated $2 for approximately 10 minutes of their time. We adopted the customary quality control measures. First, to avoid bots, 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 attention check questions and comprehension check questions. In experiment 1 673 participants were excluded for failing to follow *all* attention or comprehension checks. The remaining sample was composed of 834 participants (426 female, 7 trans/non-binary; aged 19-77, M = 38.08, SD = 10.69). Ethics approval for this study 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.

*5.1.2* *Materials and Procedure*

Participants were divided into 2 groups a control group and an EM group. Each of these groups was then further divided into 2 (positive versus negative valence) x 3 (self, friend, stranger) conditions.

Those in the control condition completed the following task:

Control condition

“Please answer the following questions”

5+7 =

2 x4 =

10 + 7 =

20 – 10 =

5 x 5 =

15 – 10 =

11 + 3 =

40 – 5 =

10 x 3 =

Those in the ESM group were be asked to imagine a series of 3 scenarios. They were told to spend 20 seconds imagining each of the scenarios and were not able to move onto the next page until 1 minute has elapsed.

Participants in the EM condition were divided into three conditions: self, friend and stranger.

In the self-condition people ere then asked to imagine the following three scenarios:

1. Imagine that you are walking into your doctor’s office. Visualise the office and your doctor in as much detail as you can. Notice any smells or sounds. Take in all the details of the room.
2. Imagine that your doctor tells you that unless you receive medication, you will develop a fatal disease. Imagine the conversation between the two of you. Visualise the appearance of your doctor. Think about how you feel. Visualise your surrounds. Notice how things look and sound. Take in as many details as you can.
3. Imagine that your doctor gives you a drug that will prevent you from developing a fatal disease. Visualise your doctor. Visualise your surrounds. Look at the medication. Imagine what it feels like to receive the medication.

In the friend-condition people were asked to imagine the following three scenarios:

1. Imagine that your friend is walking into your doctor’s office. Visualise the office and your friend’s doctor and your friend in as much detail as you can. Take in all the details of the doctor’s office and your friend in that office.
2. Imagine that the doctor tells your friend that unless they receive medication, they will develop a fatal disease. Imagine the conversation between the two of them. Visualise the appearance of the doctor and your friend. Think about how your friend will feel. Visualise your friend’s surrounds. Notice how things look and sound. Take in as many details as you can.
3. Imagine that your friend’s doctor gives your friend a drug that will prevent them from developing a fatal disease. Visualise your friend’s doctor. Visualise your friend and their surrounds. Imagine the medication. Imagine what your friend is feeling when they receive the medication.

In the stranger-condition people were asked to imagine the following three scenarios:

1. Imagine that a stranger is walking into a doctor’s office. Visualise the office and the stranger in as much detail as you can. Take in all the details of the doctor’s office and the stranger in that office.
2. Imagine that the doctor tells the stranger that unless they receive medication, they will develop a fatal disease. Imagine the conversation between the two of them. Visualise the appearance of the doctor and the stranger. Think about how the stranger will feel. Visualise the stranger’s surrounds. Notice how things look and sound. Take in as many details as you can.
3. Imagine that the stranger’s doctor gives the stranger a drug that will prevent them from developing a fatal disease. Visualise the stranger’s doctor. Visualise the stranger and their surrounds. Imagine the medication. Imagine what the stranger is feeling when they receive the medication.

Participants in all three conditions then move to a new page, where they are asked to write a detailed description of what they imagined. They are told:

“Please describe in as much detail as possible what you imagined in the previous scenarios. You will not be able to move onto the next page until 1 minute has elapsed.”

Participants in both the EM and the control condition then moved to the next page where they see either a positive/negative variant of the self/strange/friend vignette below.

**Positive/Negative Self/Stranger/Friend**

Imagine that 3 months ago [you]/[someone you don’t know]/[your best friend] had a genetic test and the results showed that [you]/[they] are very likely to develop a fatal disease in 10 years. Luckily, 3-months ago the doctor gave you a drug that ensures that [you/[they] will not develop the disease. In order to make *completely* certain that the drug works, the doctor also implanted in [you]/[them] a small device that will release *another* drug into [your]/[their] body at some point during the 12-months after it was implanted.

It does not matter when, during that 12-month period, the second drug is released into [your]/[their] body. The device is extremely reliable, and will definitely release the drug into [your]/[their] body during the 12-month period. It has in fact been programmed to do so at a specific time during the period, but [you]/[they] do not know when it will release the drug.

The drug that will be released is very safe, and is certain to have no long-term side effects. The drug does, however, have one short-term side effect. It causes the brain to misinterpret certain signals, and as a result causes one day of [pain]/[pleasure] after which these side-effects cease and you return to normal.

 [You]/[they]/[your best friend] wake[s] up one morning after a restless night, and for a moment cannot remember whether the device has already released the drug.

All participants then answered four attention check/comprehension questions which were as follows:

In this vignette you were asked to imagine that:

1. 3 months ago that [you]/[a stranger]/[your best friend] had a genetic test, which shows that [you]/[a stranger]/[your best friend] [are]/[is] likely to develop a fatal disease in 10 years time.

True/False

1. [you]/[a stranger]/[your best friend] have/has a device implanted that releases a second drug that makes it certain that you will not develop the genetic disease.

True/False

(c) [you]/[someone]/[your best friend] wake up one morning and remember that the implanted device released the drug three days ago.

True/False

(d) The release of the drug via the implant will cause [you]/[the stranger]/[your best friend] to experience 3 days of high fever

True/False

All participants then answered the probe questions in which they were asked to “Please indicate your preference using one of the following statements:

1. I would prefer to learn that the implanted device released the drug in [me]/[the stranger]/ [my best friend] **2 days ago** and will not release the drug in **2 days time.**
2. I would prefer to learn that the implanted device will release the drug in **2 days time** and did not release the drug **2 days ago.**
3. I have no preference between these options.

Following this forced-choice response, participants indicated the *strength* of their preference on a 7-point Likert scale running from 1 (very weak) through to 7 (very strong). The orientation of all Likert scales was randomised.

All participants in the stranger and friend conditions then were shown the IOS scale below, and were asked:

“Please circle the picture below that best describes your relationship with the stranger/friend”



All participants in the self condition were then shown the IOS scale, below, and are asked:

“Please circle the picture below that best describes your relationship with your self two days ago”

An

“Please circle the picture that best describes your relationship with your self in two days time.”



**5.2 Experiment 2 Methodology**

*5.2.1 Participants*

1672 people participated in the study. Participants were U.S. residents, recruited and tested online using Amazon Mechanical Turk, and compensated $2 for approximately 10 minutes of their time. We adopted the customary quality control measures. First, to avoid bots, 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 attention check questions and comprehension check questions. In experiment 2 838 participants were excluded for failing to follow all attention or comprehension checks. The remaining sample was for experiment one composed of 834 participants (426 female, 7 trans/non-binary; aged 19-77, M = 38.08, SD = 10.69). The remaining sample was for experiment two composed of 856 participants (380 female, 4 trans/non-binary; aged 18-72, M = 36.06, SD = 11.08). Ethics approval for this study 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.

* + 1. *Materials and Procedure*

The experimental method for this study was the same as in experiment 1. Participants were divided in a control and ESM group. The control group saw the saw questions as in experiment 1. The ESM group were given the following prompt:

In what follows you will be asked to imagine a series of 3 scenarios. Please spend about 20 seconds imagining each of the scenarios. You will not be able to move onto the next page until 1 minute has elapsed.

In the self condition people are then asked to imagine the following three scenarios:

1. Imagine that you are inputting the data into the computer. Visualise the office, the stack of papers, and the computer in as much detail as you can. Notice any smells or sounds. Take in all the details of the room.
2. Imaging how you find the task of transcribing the data from the stack of papers into the computer for 5 hours.

In the friend condition people are asked to imagine the following three scenarios:

1. Imagine that you friend Bob is inputting the data into the computer. Imagine Bob in detail. Visualise the office, the stack of papers, and the computer in as much detail as you can. Notice any smells or sounds. Take in all the details of the room.
2. Imaging how your friend Bob will find the task of transcribing the data from the stack of papers into the computer for 5 hours.

In the stranger condition people are asked to imagine the following three scenarios:

1. Imagine that Bob, a stranger, is inputting the data into the computer. Imagine Bob in detail. Visualise the office, the stack of papers, and the computer in as much detail as you can. Notice any smells or sounds. Take in all the details of the room.
2. Imaging how Bob will find the task of transcribing the data from the stack of papers into the computer for 5 hours.

Participants in all three conditions then move to a new page, where they are asked to write a detailed description of what they imagined. They are told:

“Please describe in as much detail as possible what you imagined in the previous scenarios. You will not be able to move onto the next page until 1 minute has elapsed.”

All participants in both the control and ESM group then move to the next page where they see a version of the compensation vignette amended from the original Caruso et al 2008 study. The Self/Past vignette is below:

Self/Past Vignette

Please imagine that, one month ago, you agreed to do some extra work on a Saturday in order to make some extra money. The job entailed entering data into a computer for 5 hours. No special skills were required, you just needed to input data from a stack of papers into a computer database. You didn’t enjoy the data entry, but you needed the money.

The friend/stranger versions of the vignette replaced ‘you’ with ‘your friend’ or ‘a stranger from the Boston area’ and the future version replaced past tense with future tense.

Participants then respond to the following probe:

How much total money do you feel you/your friend/the stranger should have received for this 5 hours of work you/your friend/the stranger did a month ago?

I/my friend/the stranger should have received $\_\_\_\_\_\_\_\_\_\_\_ for this work.

As in experiment 1, participants then see either a self/other variant of the IOS scale and are asked the same questions as in experiment 1.

1. **Results**

Experiment One:

Table 1 below summarizes the descriptive results for participant’s temporal preferences and IOS scores across all conditions in experiment one. The central columns show participant’s reported temporal preferences. The FB column shows the proportion of participants who reported being future-biased, the PB column shows the proportion of participants who reported being past-biased, finally, the TN column shows the proportion of participants who reported being time neutral. Finally, the right-hand columns show participant’s IOS scores (higher scores indicate closer together whereas higher scores indicate further apart).

*Table 1. Descriptive Results* *of participant’s temporal preferences and IOS scores*.

|  |  |  |
| --- | --- | --- |
|  | **Temporal Preference** | **IOS** |
| **Condition** | **FB** | **PB** | **TN** | **M** | **SD** |
| **Control** |
| Positive Self  | 25 (41.0%) | 20 (32.8%) | 16 (26.2%) | 5.41 | 1.81 |
| Negative Self  | 34 (51.5%) | 16 (24.2%) | 16 (24.2%) | 5.40 | 1.94 |
| Positive Friend  | 25 (33.3%) | 18 (24.0%) | 32 (42.7%) | 4.96 | 1.81 |
| Negative Friend  | 27 (39.1%) | 21 (30.4%) | 21 (30.4%) | 5.07 | 1.75 |
| Positive Stranger  | 21 (26.6%) | 25 (31.6%) | 33 (41.8%) | 4.09 | 2.23 |
| Negative Stranger | 28 (37.8%) | 17 (23.0%) | 29 (39.2%) | 3.51 | 2.40 |
| **Episodic Manipulation** |
| Positive Self  | 19 (26.0%) | 29 (39.7%) | 25 (34.2%) | 5.20 | 2.08 |
| Negative Self  | 23 (37.7%) | 18 (29.5%) | 20 (32.8%) | 5.71 | 1.80 |
| Positive Friend  | 21 (25.9%) | 19 (23.5%) | 41 (50.6%) | 5.47 | 1.78 |
| Negative Friend  | 29 (44.6%) | 21 (32.3%) | 15 (23.1%) | 4.88 | 1.63 |
| Positive Stranger  | 19 (31.1%) | 17 (27.9%) | 25 (41.0%) | 3.97 | 2.21 |
| Negative Stranger  | 16 (23.2%) | 18 (26.1%) | 35 (50.7%) | 3.55 | 2.17 |

Our first hypothesis was that people would be more future-biased in the self-condition, than in the friend-condition, and will be more future-biased in the friend-condition than in the stranger condition (H1). That is, the degree of future-biased preferences observed would vary according to the preference target. Further, we hypothesised that participants would be more future-biased in the episodic manipulation conditions than in control conditions (H3), and that the difference in the degree of future-biased preferences between self, friend, and stranger would be smaller in episodic manipulation conditions than in the control conditions (H4). A chi-squared test of homogeneity was performed to test whether there were any differences in participant’s reported temporal preferences across conditions. The result of that test showed that there was an association, χ2(22, N = 834) = 42.046, *p* = .006. While this test reveals that there is an association between conditions and survival judgments it does not reveal where that association is located. To examine that we performed a series of follow-up tests guided by our hypotheses, however, we found no effects persist correcting for multiple comparisons.

Our second hypothesis was that there would be higher IOS scores in the self-condition, than in the friend-condition, and higher IOS scores in the friend condition than in the stranger condition (H2). That is, once again, the strength of the IOS judgments would vary according to the preference target. Further, we hypothesised that participants would give, overall, higher IOS judgments in the episodic manipulation conditions than in control conditions (H6). A 2 (control; episodic manipulation) x 2 (positive; negative) x 3 (self; friend; stranger) ANOVA was performed to test whether there were any differences in participant’s IOS scores across conditions. We found evidence of a significant main effect of preference target, F(2, 822) = 53.024, *p* <.001. There were no other significant effects. Pairwise comparisons with Bonferroni correction showed that participants judged themselves to be significantly closer to themselves (M = 5.43, SD = 1.99) and friends (M = 5.10, SD = 1.99), than strangers (M = 3.78, SD = 2.00; *p* < .001). There was no significant difference in closeness between selves and friends (*p* = .145). Thus, while H2 was partially vindicated, H6 was not.

Our final hypothesis was that higher IOS scores would be associated with more future-bias (H7). A one-way ANOVA was performed to test whether there were any differences in participant’s IOS scores across temporal preferences. We failed to find any evidence of a difference, F(2, 831) = 2.819, *p* = .060 Nevertheless, this result is suggestive and so we explored the differences in IOS scores between the different temporal preferences. Participants who were future-biased tended to report higher IOS scores (M = 4.95, SD = 1.99) than participants who were time neutral (M = 4.54, SD = 2.29; *p* = .059). Participants who were past-biased reported IOS scores (M = 4.80, SD = 1.98) which were not significantly different to either future-biased (*p* >.999) or time neutral participants (*p* = .451).

Experiment Two:

Table 2 below summarizes the descriptive results for the log of participant’s monetary payout judgments and IOS scores across all conditions in experiment one. The central columns show the mean log monetary amount that participants judged someone should be paid for 5 hours data entry. We took the log of participant’s monetary payout judgments due to the wide variance in people’s monetary judgments. The right-hand columns show participant’s IOS scores (higher scores indicate closer together whereas lower scores indicate further apart).

*Table 1. Descriptive Results* *of the log of participant’s monetary payout judgments and IOS scores*.

|  |  |  |
| --- | --- | --- |
|  | **Monetary Payout (log values)** | **IOS** |
| **Condition** | **M** | **SD** | **M** | **SD** |
| **Control** |
| Past Self | 2.26 | 0.80 | 4.42 | 2.01 |
| Future Self | 2.15 | 0.81 | 4.93 | 1.85 |
| Past Friend | 1.97 | 0.76 | 4.72 | 1.77 |
| Future Friend | 2.30 | 0.88 | 4.93 | 1.83 |
| Past Stranger | 2.10 | 0.67 | 3.87 | 2.10 |
| Future Stranger | 2.23 | 0.81 | 3.71 | 2.06 |
| **Episodic Manipulation** |
| Past Self | 2.06 | 0.72 | 4.32 | 1.80 |
| Future Self | 1.90 | 0.65 | 4.57 | 1.71 |
| Past Friend | 2.14 | 0.72 | 4.90 | 1.73 |
| Future Friend | 1.98 | 0.69 | 4.73 | 1.70 |
| Past Stranger | 2.05 | 0.74 | 3.71 | 2.19 |
| Future Stranger | 2.05 | 0.70 | 3.75 | 1.91 |

Our first hypothesis was that participants would display more of a temporal value asymmetry in the self-condition than in the friend-condition, and more of a temporal value asymmetry in the friend-condition than in the stranger condition (H8). In addition, we hypothesised that participants would show more of a temporal value asymmetry in the episodic manipulation condition than in control condition (H10), and that the difference in temporal value asymmetry between different preference targets would be smaller in the episodic manipulation condition than in the control condition (H11). A 2 (control; episodic manipulation) x 2 (past; future) x 3 (self; friend; stranger) ANOVA was performed to test whether there were any differences in the log of participant’s monetary payout judgments across conditions. The results of this analysis found a significant main effect of manipulation, F(1, 843) = 6.843, *p* = .009, and a significant interaction effect between temporal location and manipulation, F(1, 843) = 4.670, *p* = .031. No other significant effects were observed.

The main effect of manipulation was that the log of participant’s monetary payouts was larger in control conditions (M = 2.17, SD = .76) than in episodic manipulation conditions (M = 2.03, SD = .76).

Simple effects tests with Bonferroni correction were performed on the interaction between temporal location and manipulation. First, for control conditions, there was no difference between past conditions (M = 2.11, SD = .76) and future conditions (M = 2.22, SD = .75; *p* = .097). Similarly, for episodic manipulation conditions there was no difference between past conditions (M = 2.09, SD = .75) and future conditions (M = 1.98, SD = .75; *p* = .158). Second, for past conditions, there was no difference between control conditions and episodic manipulation conditions (*p* = .746). However, for future conditions, the log of participant’s monetary payouts was larger in control conditions than in episodic manipulation conditions (*p* < .001).

Our second hypothesis was that there would be higher IOS scores in the self-condition, than in the friend-condition, and higher IOS scores in the friend-condition than in the stranger-condition (H9). Further, we hypothesised that participants would give, overall, higher IOS judgments in the episodic manipulation conditions than in control conditions (H12). A 2 (control; episodic manipulation) x 2 (past; future) x 3 (self; friend; stranger) ANOVA was performed to test whether there were any differences in participant’s IOS scores across conditions. Once again, we found evidence of an effect of preference target, F(2, 844) = 23.963, *p* < .001. Participants judged themselves to be significantly closer to themselves and friends, than strangers (*p* < .001). There was no significant difference in closeness between selves and friends (*p* = .323). So, while H9 was partially vindicated, H12 was not.

The final hypothesis was that higher IOS scores would be associated with greater temporal value asymmetry (H13). To examine this, we calculated separate Spearman’s Rho correlation coefficients for the relationship between the log of participant’s monetary payout judgments and IOS score for participants assigned to past conditions, and future conditions. However, we failed to find any evidence of an association between the log of participant’s monetary payout judgments and IOS scores for past conditions, r(434) = -0.006, *p* = .897, and found evidence of only a negligible correlation for future conditions, r(417) = .098, *p* = .046.

1. **Discussion**

Let’s begin by considering experiment 1. As predicted, we found that participants judged themselves to be significantly closer to their selves and their friends, than to strangers. However, participants did not give lower IOS judgments in the episodic manipulation conditions than in control conditions, and they did not show differential amounts of future-bias in the episodic manipulation condition compared to the control condition. Nor, surprisingly, did we find any differences in future-bias across the self, friend, and stranger conditions in either the control condition or the episodic manipulation condition. This experiment, therefore, failed to find any evidence in support of the simulation response.

Next, consider experiment 2. As in experiment 1, we found that participants judged themselves to be significantly closer to their selves and friends, than to strangers on the IOS measure. We did not, however, find that people displayed a differential temporal value asymmetry in the self, friend, and stranger conditions, nor that they showed a differential temporal value asymmetry in the episodic manipulation condition compared to the control condition. Nor did we find any association between the amount of compensation participants awarded and their IOS scores. Thus, our results in experiment 2 also failed to find any evidence in favour of the simulation response.

Taken jointly, then, our results do not provide support for the simulation response to the co-presentation argument.

There are several approaches that defenders of the manifestation thesis might take at this point. First, returning to the co-presentation argument, they might directly contest the truth of (2) and/or (3). Recall that (2) says that people display the temporal value asymmetry under first personal conditions and not under third personal conditions, while (3) says that people display future-bias under both first and third personal conditions. We have cited evidence in favour of each of these. However, as we noted in the introduction, we assume that future-biased preferences are mental states that can be probed by asking people for their preferences, rather than being constituted by what people report in those probes. Likewise, we assume that the temporal value asymmetry is an asymmetry in *actual* decision utility, which is something that we can probe by asking people to, for instance, award compensation. But of course, each of these is at best a defeasible way of probing each of the phenomena. Hence, defenders of the manifestation claim might argue that although future-biased preferences are a manifestation of the temporal value asymmetry, our imperfect evidence about each of these makes it *appear* as though these two ‘come apart’ in certain ways. But this appearance is just an artefact of these ways of probing them.

This is certainly a possibility. It is a limitation on any study such as this, that the evidence we obtain is only defeasible evidence for the underlying preferences/utilities. We do know, however, that people’s temporal discounting rates are the same regardless of whether the money is real or hypothetical (Johnson and Bickel 2002) suggesting that people’s simulation of what they would do under hypothetical choice situations can be a good predictor of what they will in fact do. That gives us at least some reason to think that people’s reported preference and utilities are a guide to their actual preferences and utilities. Nevertheless, it is important to bear in mind that there may be a gap between these, and this gap might explain the data that appear to undermine the manifestation thesis.

Next our results invite us to revisit the status of the co-presentation argument. Recall that according to that argument we have reason to deny the manifestation thesis because (2) people display the temporal value asymmetry under first personal conditions and not under third personal conditions and (3) people display future-bias under both first and third personal conditions. (2) is supported by the results of the first study of Caruso et al 2008.

However, we failed to find any evidence of a temporal value asymmetry in either the self, friend, or stranger conditions. So, we did not find any asymmetry between first and third personal conditions, and so no evidence in favour of (2). This, in conjunction with other evidence, suggests that the temporal value asymmetry may be relatively weak and inconsistent. First, Halabi, Chan, Tunca, Ziano, and Feldman (2022) failed to replicate the findings of the first study of Caruso et al 2008. That study, like this one, failed to find a temporal value asymmetry in either the first or third personal conditions. Second, Burns, McCormack, Jaroslawska, Fitzpatrick, McGourty, and Caruso (2019) conducted a series of studies exploring the development of the temporal value asymmetry, the temporal emotion asymmetry (that people experience greater affect when considering the future than the past) and the temporal distance asymmetry (that events in the future feel subjectively closer than to equidistant past events) with a view to determining which of these is more fundamental. They found a temporal emotion asymmetry and a temporal distance a symmetry in children and adults from 6-7 onwards, but failed to find a temporal value asymmetry in children, and found an inverse value asymmetry in adults using a different paradigm to the one used in Caruso et al 2008. Over several other experiments they found that the temporal value asymmetry was the least consistent in children, adolescents and adults, and was not observed until 9-10 years (somewhat later than the other asymmetries.

Taken jointly, all the aforementioned studies suggest that although people do sometimes display a temporal value asymmetry, it may be relatively weak and inconstant. It also suggests that the finding of an asymmetry between first and third personal conditions may not be robust: it might simply reflect the fact that sometimes people display a temporal value asymmetry and sometimes they do not, rather than a robust pattern of displaying it in first but not third personal situations, or a robust pattern of displaying it in conditions of high simulability but not in conditions of low simulability.

If that is right, then although our results do not support the simulation response to the co-presentation argument, they provide another reason to reject the argument, namely a reason to deny (2). However, this line of defence should provide pretty cold comfort to defenders of the manifestation thesis. If (2) is false, then the co-presentation argument fails. However, if it turns out that the temporal value asymmetry is weak and inconstant and appears relatively late in developmental terms, then it is prima facie implausible that future-bias is just a manifestation of that asymmetry. Lee et al 2020 found that children as young as four display future-future biased preferences when it comes to negative hedonic events.[[8]](#footnote-8) But we know that such children do not display a temporal value asymmetry. We also know that adults fairly robustly show future-biased preferences, whereas it is not so clear that they robustly display a temporal value asymmetry. This provides independent reason to think that the manifestation thesis is false: if future-bias is just a manifestation of the temporal value asymmetry, then it ought to be that the two appear developmentally at the same time, and that they are equally robust. Further empirical work that investigates the manifestation thesis could very usefully be pursued in this regard. For a start, it could usefully target the question of whether people really do take a different normative stance on the temporal value asymmetry than they do on future bias, a claim that has been made but not, as far as we know, empirically pursued.

If the manifestation thesis is false then how should we explain future-bias, and in particular, how should we conceive of the relationship between future-bias and the temporal value asymmetry? As noted earlier it is often assumed not only that future-bias is a manifestation of the temporal value asymmetry, but that so too are tensed emotions (see Bacharach (2022) and Hoerl (2022 for discussion)). This latter claim seems implausible if people do not take the temporal value asymmetry to be justified, given that they likely do take tensed emotions to be fitting. If, however, tensed emotions like temporal relief are simply a manifestation of the temporal value asymmetry, then it is hard to see how we could both judge that the temporal value asymmetry is not justified, and that temporal relief (often) is.

If tensed emotions, and temporal relief in particular, is not a manifestation of the temporal value asymmetry, then some other explanation of that phenomenon is required. Both Hoerl (2022) and Bacharach (2022) offer accounts of temporal relief that do not locate it as a manifestation of the temporal value asymmetry. According to Hoerl, temporal relief has evolved in order to motivate us to put ourselves through unpleasant experiences by exploiting the motivating power of anticipation. There are certain unpleasant experiences such that undergoing those experiences makes one better off in the longer term. Consider the unpleasant experience of a dental procedure. Your teeth are bad. They will get worse. Bad teeth are associated with all sorts of other bad outcomes. Things will go better for you if you fix your teeth now, rather than letting them get worse. However, fixing them now is painful (monetarily and otherwise). So, some motivation is required in order to get you to go to the dentist. Hoerl hypothesises that the fact that you can *anticipate* being *relieved* that the procedure is over, can act as a motivation for getting the procedure done and this explains why we evolved to experience temporal relief.

Regardless of whether we accept this particular explanation of temporal relief, we might nevertheless hypothesise that future-bias is explained by the *combination* of the temporal value asymmetry and tensed emotions. On this view, we prefer negative states of affairs to be in the past, not the future, because we both (a) tend to value them less when they are in the past compared to the future (the temporal value asymmetry) and (b) we feel *temporally* *relieved* when they are past, whereas we *anticipate* them when they are future, (tensed emotions) and we prefer to be temporally relieved than to anticipate negative states of affairs. By contrast, we prefer positive states of affairs to be located in the future, not the past, because we more highly value those states of affairs when they are future, (the temporal value asymmetry) and because when they are future we anticipate them, which is pleasant, whereas once they are past, we no longer anticipate them we only retrospect them, which is less pleasant (tensed emotions).

If something like this explanation of future-bias were correct, it could explain why people are inclined to judge that the temporal value asymmetry it not rationally justified, but future-bias is. If future-bias is the joint product of the temporal value asymmetry and tensed emotions, and if tensed emotions are fitting, then this might explain people’s judging that future-bias is justified. More would clearly need to be said, here; for it certainly is not obvious that just because people judge that tensed emotions are fitting, and tensed emotions partly explain future bias, that people will judge that future-bias is rationally permissible (much less, of course, that it follows that future-bias is in fact rationally permissible). Nevertheless, we can at least in principle see how such an account might go.

If something like this explanatory story is correct, we would expect to find that people display a temporal value asymmetry and future-bias in the same conditions given that the former is a partial ground of the latter. That is, we would not expect to find that people display a temporal value asymmetry in first personal but not third personal conditions and display future bias in first and third personal conditions. And that is in fact what we found in across our pair of experiments. So, our findings are at least consistent with this explanatory picture.

Having said that, there are reasons to be sceptical of this view. If the temporal value asymmetry emerges developmentally after future-biased preferences appear, and if it is less robust than those preferences, then it’s hard to see how the conjunction of that asymmetry, alongside the presence of tensed emotions, could be the complete explanation of future-biased preferences, although this leaves open that it might be a partial explanation of these preferences in adults and older children.

Again, we think that further work could profitably be directed at this question.

Finally, one might suggest that there is a different sense in which future-bias is a combination of the temporal value asymmetry and tensed emotion. Hoerl (2022) suggests that perhaps future-bias is an amalgam of the temporal value asymmetry and temporal relief (i.e. relief that something is over and done with). When Hoerl intends by this claim is that there is no unified psychological phenomenon that is the tendency to prefer positive events to be in the future and negative ones in the past, which is measured by asking people their preferences in the sorts of scenarios presented in the studies cited in this paper. Instead, he suggests that responses to those scenarios might be the product of several different mechanisms or tendencies, some of which are to a greater extent driven by the temporal valuation asymmetry, and some by temporal relief, (and perhaps some by other things, including other tensed emotions).

There is some empirical evidence that is consistent with this idea. We know that future-biased responses are considerably stronger in case of negative hedonic events than positive ones (Greene, Latham, Miller and Norton 2022a, 2022b). This could be explained by the fact that whereas the temporal value asymmetry drives these responses when it comes to both positive and negative events, we only experience temporal relief about past *negative* events, and so temporal relief only drives such responses in the case of negative events and not positive ones. We also know that although people exhibit future-bias with respect to both hedonic and non-hedonic events, people are more future-biased with respect to hedonic than non-hedonic events. Again, this could be explained by the fact that only hedonic events are likely to be associated with temporal relief (one can be relieved that the pain of surgery is over and done with, but one is hardly likely to be relieved that embarrassing photos have already been released; Greene, Latham, Miller and Norton 2020).

If future-bias is not a unified phenomenon, but instead is just a label for several other phenomena that play a greater or lesser role in producing people’s judgements across various scenarios, then this could also explain both experimental results in which future-bias and the TVA sometimes appear to go hand in hand, but sometimes do not (the results that motivate us to accept both (2) and (3) in the co-presentation argument). If future-bias is not a unified phenomenon, we would expect to find that sometimes future-biased responses line up with the temporal value asymmetry, namely in cases in which the former responses are driven primarily by that asymmetry. Equally, sometimes we would expect that they will not line up, when the former are driven primarily by other factors, such as by temporal relief.

If Hoerl is right about this, then we should say that future-bias is not a manifestation of the temporal value asymmetry, because there is no one thing that is future-bias. Instead, some *instances* of what we have been calling future-bias are a manifestation of the temporal value asymmetry, while others are not. We think that further work probing the idea that future-bias is not a unified phenomenon could profitably be undertaken.

Finally, as with all empirical work there are limitations to our studies. First, while our vignettes are quite accessible, and the questions straightforward (at least compared to many in experimental philosophy) and while we included attention and comprehension checks and participants with only a high success rate at completing tasks, we nevertheless eliminated quite a few participants for failing at least one of those checks. On the one hand this serves to weed out bots, and people selecting answers at random and without thought to quickly receive payment (Ahler, Roush & Sood 2021), but could potentially lead to an unrepresentative sample.Second, as noted earlier, people’s responses to the probes are only defeasible evidence for their underlying preferences and actual decision utility. It may be that experiments that use a somewhat different methodology will achieve different results.Third, there may be a concern with the use of the IOS to measure the closeness of a relationship between a current self and a past/future self, given that the measure is normally used to evaluate an individual’s closeness of relationship with a distinct individual. It could be, then, that people did not know how to interpret the IOS scale in this circumstance, and that this explains some of our results.[[9]](#footnote-9) This is certainly worth bearing in mind in evaluating our results. Having said that, several recent studies on personal identity have used a *degree of connectedness* measure which is exactly like the IOS, except that it involves the same individual at different times and represents relative degree of closeness in terms of degree of overlap of circles just as does the IOS (e.g., Bartels et al 2013, Mott 2018). The results of those studies suggest that participants can correctly interpret this measure when applied in that setting, which gives us good reason to think that they correctly interpret it here as well.

For now, all we can say is that we do not think that the simulation response to the co-presentation argument is supported, and so those wishing to resist that argument should look to some other way to do so.

Declaration of interest:

The authors declare that they have no conflict of interest that would impact on the material in this paper.

References

Aarts, H., Dijksterhuis, A., and De Vries, P. (2001). On the psychology of drinking:

Being thirsty and perceptually ready. *British Journal of Psychology* (London, England:

1953), 92(Pt 4), 631–42. <https://doi.org/10.1348/000712601162383>

Albert, S. (1977). Temporal comparison theory. Psychological Review, 84, 485–503. http://dx.doi.org/10.1037/0033-295X.84.6.485

Bacharach, J. (2022). “Relief, time-bias and the metaphysics of tense.” Synthese 200 (3):1-22.

Bar-Anan, Y., Wilson, T. D., & Gilbert, D. T. (2009). “The feeling of uncertainty intensifies affective reactions”. *Emotion*, 9(1), 123-127.

Bartels, D., Kvaran, T., & Nichols, S. (2013) Selfless giving. ​*Cognition*​ 129, 392-403.

Bourne, C. (2006) *A Future for Presentism*. Oxford: Oxford University Press.

Braddon-Mitchell, D., Latham, A. J., and Miller, K (2023) “Can we turn people into pain pumps? *The Journal of Moral Philosophy.*

Brink, D. O. (2011). Prospects for Temporal Neutrality, in *The Oxford Handbook of Philosophy of Time*, ed. C. Callender, Oxford University Press: 353–81.

Broad, C. D (1923). *Scientific Thought*. London: Routledge & Kegal Paul

Broad, C. D. (1938). *Examination of McTaggart’s Phlosophy*: Vol II Part I Cambridge: CUP.

Burns, P., McCormack, T., Jaroslawska, A., Fitzpatrick, Á., McGourty, J., & Caruso, E. M. (2019). The development of asymmetries in past and future thinking. Journal of Experimental Psychology: General, 148(2), 272–288. [https://doi.org/10.1037/xge0000464](https://psycnet.apa.org/doi/10.1037/xge0000464)

Cameron, R. P. (2015). *The Moving Spotlight: An Essay on Time and Ontology*. Oxford University Press.

Carrasco, M., Ling, S., & Read, S. (2004). Attention alters appearance. *Nature Neuroscience,*

*7*(3), 308-313.

Caruso, E., D.T. Gilbert, and T.D. Wilson. (2008) A Wrinkle in Time: Asymmetric Valuation of Past and Future Events, *Psychological Science* 19/8): 796–801.

Caruso, E. M. (2010). When the future feels worse than the past: A temporal inconsistency in moral judgment. [Journal of Experimental Psychology: General, 139, 610–624.](https://www.google.com/url?q=https%3A%2F%2Fdoi.org%2F10.1037%2Fa0020757&sa=D&sntz=1&usg=AOvVaw0BjZJUb80nNdm8JJuC7B1V)

Caruso, E. M., Van Boven, L., Chin, M., & Ward, A. (2013). The temporal Doppler effect:

When the future feels closer than the past. *Psychological Science, 24*(4), 530-536.

Cavanagh, J. F., Wiecki, T. V., Kochar, A., & Frank, M. J. (2014). Eye tracking and pupillometry are indicators of dissociable latent decision processes. *Journal of*

*Experimental Psychology: General*, *143*(4), 1476-1488.

Cockburn, D. (1997). *Other Times: Philosophical Perspectives on Past, Present and Future*. CUP

Craig, W. L.: 1996, ‘Tense and the New B-Theory of Language’, Philosophy 71, 5–26.

Craig, W. L. (2000). *The Tensed Theory of Time: A Critical Examination*. (Dordrecht: Kluwer Academic Publishers).

Davis, J. I., Gross, J. J., and Ochsner, K. N. (2011). Psychological distance and emotional

experience: What you see is what you get. *Emotion*, 11(2),

438–44. <https://doi.org/10.1037/a0021783>

Deng, N., Latham, A. J., Miller, K and Norton, J. (forthcoming). “There’s No Time Like the Present: Present-bias, Temporal Attitudes and Temporal Ontology” *Oxford Studies in Experimental Philosophy*

Dijksterhuis, A., and Aarts, H. (2010). Goals, attention, and (un)consciousness.

*Annual Review of Psychology*, 61, 467–90. https://doi.org/10.1146/annurev.

psych.093008.100445

Dorsey, D. 2018. Prudence and Past Selves. *Philosophical Studies* 175(8): 1901–1925.

Dougherty, T. (2011). “On Whether to Prefer Pain to Pass”. *Ethics* 121(3): 521–537.

Dougherty, T. (2015). Future-Bias and Practical Reason, *Philosophers’ Imprint* 15/30: 1–16.

Fiedler, S., & Glöckner, A. (2012). The dynamics of decision making in risky choice: An eyetracking analysis. *Frontiers in Psychology*, *3*, 335.

Fiedler, S., Glöckner, A., Nicklisch, A., & Dickert, S. (2013). Social value orientation and information search in social dilemmas: An eye-tracking analysis. *Organizational*

*Behavior and Human Decision Processes*, *120*(2), 272-284.

Folke, T., Jacobsen, C., Fleming, S. M., & De Martino, B. (2016). Explicit representation of confidence informs future value-based decisions. *Nature Human Behaviour*, *1*(1), 1-8.

Frijda, N. H. (1986). *The Emotions*. Cambridge University Press.

Frijda, N. H., Kuipers, P., and Ter Schure, E. (1989). Relations among emotion,

appraisal, and emotional action readiness. *Journal of Personality and Social Psychology*, 57(2), 212.

Ghaffari, M., & Fiedler, S. (2018). The power of attention: using eye gaze to predict otherregarding and moral choices. *Psychological science*, *29*(11), 1878-1889.

Gobell, J., & Carrasco, M. (2005). Attention alters the appearance of spatial frequency and gap size. *Psychological Science*, *16*(8), 644-651.

Greene, P., Latham, A. J., Holcombe, A., Miller, K., and Norton, J. (2021). “The Rationality of Near Bias towards both Future and Past Events”. Review of Philosophy and Psychology. *DOI: 10.1007/s13164-020-00518-1*

Greene, P., Latham, A. J., Miller, K., and Norton, J (2021a) “Hedonic and non-hedonic bias towards the future”. *The Australasian Journal of Philosophy.* <https://doi.org/10.1080/00048402.2019.1703017>  99(1): 148-163.

Greene, P., Latham, A. J., Miller, K., & Norton, J. (2021b). “On Preferring that Overall, Things are Worse.” *Philosophy and Phenomenological Research.* DOI:10.1111/phpr.12819

Greene, P., Latham, A. J., Miller, K, & Norton, J. (2022). “How much do we discount past pleasures?” *American Philosophical Quarterly.* 59:4): 367-376.

Greene, P., Latham., A. J., Miller., K, Norton, J., Tarsney, C., and Tierney, H (2022). “Bias towards the future” *Philosophy Compass* <https://doi.org/10.1111/phc3.12859>

Greene, P, Latham, A. J. Miller, K., and J Norton (2021). “Why are People So Darn Past-Biased?”. In Temporal Asymmetries in Philosophy and Psychology. Edited by C Hoerl, T McCormack, and A Fernandes. OUP.

Greene, P., Latham, A. J., Miller. K. & Norton, J. (2021). “Capacity for Simulation and Mitigation Drives Hedonic and Non-Hedonic Time-Biases”. *Philosophical Psychology* https://doi.org/10.1080/09515089.2021.1960299

Greene, P. and M. Sullivan 2015. Against Time Bias, *Ethics* 125/5: 947–70.

Halabi, M, Wing Yan Florence Chan, Burak Tunca, Ignazio Ziano, Gilad Feldman, (2022). Replication: Unsuccessful replications and extensions of Temporal Value Asymmetry in monetary valuation and moral judgment, *Journal of Economic Psychology*, <https://doi.org/10.1016/j.joep.2022.102509>.

Hare, C. (2007). Self-Bias, Time-Bias, and the Metaphysics of the Self and Time, *Journal of Philosophy* 104/7: 350–73.

Hare, C. (2008). A Puzzle about Other-Directed Time-Bias, *Australasian Journal of Philosophy* 86/2: 269–77.

Hershfield, H. E., John, E. M., & Reiff, J. S. (2018). Using vividness interventions to improve financial decision making. *Policy Insights from the Behavioral and Brain Sciences*, *5*(2), 209-215.

Hoerl, C. (2022). “Values, Preferences and the Phenomenon of Relief.” In *Temporal Asymmetries in Philosophy and Psychology*. Edited by Christoph Hoerl, Teresa McCormack and Alison Fernandes. p 204-222

Horwich, P. (1987). *Asymmetries in Time: Problems in the Philosophy of Science*, MIT Press.

Hume, D. (1738). *A Treatise of Human Nature*, Oxford University Press.

Janiszewski, C., Kuo, A., & Tavassoli, N. T. (2012). The influence of selective attention and inattention to products on subsequent choice. *Journal of Consumer Research*, *39*(6), 1258-1274.

Johnson MW, Bickel WK. Within-subject comparison of real and hypothetical money rewards in delay discounting. J Exp Anal Behav. 2002 Mar;77(2):129-46. doi: 10.1901/jeab.2002.77-129. PMID: 11936247; PMCID: PMC1284852.

Kappes, H. B., & Morewedge, C. K. (2016). Mental simulation as substitute for experience.

*Social and Personality Psychology Compass*, *10*(7), 405-420.

Latham, A. J., Miller, K and Norton, J. (2023). “Against a Normative Asymmetry between Near- and Future-bias” *Synthese* 10.1007/s11229-023-04045-1

Latham, A. J., Miller, K, J. Norton, J. and Tarsney, C. (2020) “Future Bias in Action” Synthese. *DOI: 10.1007/s11229-020-02791-0 (2021) 198(12), 11327-11349*

Latham, A. J., Miller, K. Tarsney, C. and Tierney, H. (2021). “Belief in Robust Temporal Passage (Probably) Does Not Explain Future-Bias.” *Philosophical Studies.* 10.1007/s11098-021-01748-4

Latham, A. J. Miller, K., Tarsney, C and Tierney, H. (2021). “Robust Passage Phenomenology Probably Does Not Explain Future-Bias” *Synthese* 10.1007/s11229-022-03514-3

Lazarus, R. S., (1991). *Emotion and Adaptation.* Oxford: Oxford University Press.

Lee, R., Hoerl, C., Burns, P., Fernandes, A. S., O'Connor, P. A., & McCormack, T. (2020). Pain in the past and pleasure in the future: The development of past–future preferences for hedonic goods. Cognitive Science, 44(9), Article e12887. [https://doi.org/10.1111/cogs.12887](https://awspntest.apa.org/doi/10.1111/cogs.12887)

O'Brien, E. (2015). Mapping out past and future minds: The perceived trajectory of rationality versus emotionality over time. *Journal of Experimental Psychology: General, 144*(3), 624–638. [https://doi.org/10.1037/xge0000064](https://psycnet.apa.org/doi/10.1037/xge0000064)

Maclaurin, J., and H. Dyke 2002. ‘Thank Goodness That’s Over’: The Evolutionary Story, *Ratio* 15/3: 276–92.

Markman, K. D., Gavanski, I., Sherman, S. J., & McMullen, M. N. (1993). The mental simulation of better and worse possible worlds. *Journal of Experimental Social*

*Psychology, 29*(1), 87-109.

Mitchell, T., Thompson, L., Peterson, E., and Cronk, R (1997). Temporal Adjustments in the Evaluation of Events: The “Rosy View”, Journal of Experimental Social Psychology, 33 (4) 421-448,

Mott, C. (2018). “Statutes of Limitations and Personal Identity.” In Tania Lombrozo, Joshua Knobe and Shan Nichols (eds)., [*Oxford Studies in Experimental Philosophy, Volume Two*](https://philarchive.org/rec/BEEOSI). New York, NY, USA: pp. 243-269.

Mrkva, K., Cole, J. C., & Van Boven, L. (2019). Visual attention increases environmental risk perception. Manuscript currently under review.

Mrkva, K., Westfall, J., & Van Boven, L. (2019). Attention drives emotion: Voluntary visual attention increases perceived emotional intensity. *Psychological Science, 30*(6), 932-954.

Mrkva, K., & Van Boven, L. (2017). Attentional accounting: Voluntary spatial attention increases budget category prioritization. *Journal of Experimental Psychology: General*,

*146*(9), 1296-1306.

Mrkva, K., Travers, M., & Van Boven, L. (2018). Simulational fluency reduces feelings of psychological distance. *Journal of Experimental Psychology: General*, *147*(3), 354-376.

Mormann, M., Navalpakkam, V., Koch, C., & Rangel, A. (2012). Relative visual saliency differences induce sizable bias in consumer choice. *Journal of Consumer*

*Psychology*, *22*(1), 67-74.

Mühlberger, A., Neumann, R., Wieser, M. J., and Pauli, P. (2008). The impact of changes

in spatial distance on emotional responses. *Emotion*, 8(2), 192–8. https://doi.

org/10.1037/1528–3542.8.2.192

Parfit, D. 1984. *Reasons and Persons*, Oxford University Press.

Pearson, O. (2018). ‘Appropriate Emotions and the Metaphysics of Time.’ *Philosophical Studies* 175(8):1945-1961.

Prior, A.N. 1959. Thank Goodness That’s Over, *Philosophy* 34/128: 12–17.

Ramos, J., Caruso, E. M., and Van Boven, L. (2022). “Prospection, Retrospection, and Well-Being”. *Temporal Asymmetries in Philosophy and Psychology.* Edited by C Hoerl, T McCormack and A Fernandes. OUP.

Roese, N. J. (1997). Counterfactual thinking. *Psychological Bulletin*, *121*(1), 133-148.

Roh, S., and Schuldt, J. P. (2014). Where there’s a will: Can highlighting future youthtargeted

marketing increase support for soda taxes? *Health Psychology*, 33, 1610–13.

<https://doi.org/10.1037/hea0000021>

Ryff, C. D. (1991). Possible selves in adulthood and old age: A tale of shifting horizons. Psychology and Aging, 6, 286–295. http://dx.doi.org/ 10.1037/0882-7974.6.2.286

Samuelson P. A. 1938. A note on the pure theory of consumer’s behaviour. Economica 5, 61–71.

Samuelson P. A. 1948. Consumption theory in terms of revealed preferences. Economica 15, 243–53.

Samuelson P. A. 1950. The problem of integrability in utility theory. Economica 17, 355–383.

Schlesinger, G. (1976). ‘The stillness of time and philosophical equanimity.’ *Philosophical Studies* 30:145–59.

Sedikides, C., & Hepper, E. G. D. (2009). Self-improvement. Social and Personality Psychology Compass, 3, 899 –917. http://dx.doi.org/ 10.1111/j.1751-9004.2009.00231.x

Skow, B. (2015). *Objective Becomoing.* OUP UK.

Smith, Q. (1993). *Language and Time.* New York: OUP.

Shah, A., Hershfield, H. E., Gomez, D. M., Fertig, A. (2018). Testing the effectiveness of vividness interventions in a field setting. Manuscript in preparation

Shimojo, S., Simion, C., Shimojo, E., & Scheier, C. (2003). Gaze bias both reflects and influences preference. *Nature Neuroscience*, *6*(12), 1317-1322

Suhler, C. and C. Callender 2012. Thank Goodness That Argument Is Over: Explaining the Temporal Value Asymmetry, *Philosophers’ Imprint* 12: 1–16.

Sullivan, M. (2012) The Minimal A-Theory. *Philosophical Studies* 158(2): 149-174.

Sullivan, M. (2018). *Time Biases*. Oxford: Oxford University Press.

Tallant, J. (2012). (Existence) Presentism and the A-theory. *Analysis* 72 (4):673-681.

Taylor, S. E. (1983). Adjustment to threatening events: A theory of cognitive adaptation. American Psychologist, 38, 1161–1173. http://dx .doi.org/10.1037/0003-066X.38.11.1161

Vollberg, Marius C., Brendan Gaesser, and Mina Cikara, (2021). “Activating episodic simulation increases affective empathy,” *Cognition*,209: <https://doi.org/10.1016/j.cognition.2020.104558>.

Vosgerau, J., Wertenbroch, K., & Carmon, Z. (2006). Indeterminacy and live television. *Journal of Consumer Research*, *32*(4), 487-495.

Weingarten, E., & Berger, J. (2017). Fired up for the future: How time shapes sharing. *Journal of*

*Consumer Research*, *44*(2), 432-447.

Wilson, T. D., Centerbar, D. B., Kermer, D. A., & Gilbert, D. T. (2005). “The pleasures of uncertainty: prolonging positive moods in ways people do not anticipate”. *J Pers Soc Psychol*, 88(1), 5-21.

Yehezkel, G. (2014). ‘Theories of Time and the Asymmetry in Human Attitudes.’ *Ratio* 27(1):68-83.

Zimmerman, D. (2005) The A-theory of Time, the B-theory of Time, and ‘Taking Tense Seriously’. *Dialectica*, 59(4): 401-457.

1. See also Greene, Latham, Miller & Norton (2020, 2021a, 2021b, 2022a, 2022b, 2022c) Latham, Miller, Norton & Tarsney (2020) and Lee, Hoerl, Burns, Fernandes, O’Connor, & McCormack (2020). [↑](#footnote-ref-1)
2. Prior (1959) Parfit (1984), Hare (2007, 2013), Dougherty (2011, 2015), Greene and Sullivan (2015), Sullivan (2018), Dorsey (2018), Brink (2011), Maclaurin & Dyke (2002), Suhler & Callender (2012), Yehezkel (2014) and Pearson (2018). [↑](#footnote-ref-2)
3. It could be, for instance, that the temporal metaphysics explanation is correct, and that the three mechanisms explanation is also correct, because the mechanisms in question are ones that allow us to track the robust passage of time. Thus, they are simply giving us explanations at a different level of fine graining. [↑](#footnote-ref-3)
4. Prior 1959, Pearson 2018, Schlesinger (1976), Craig (1999) and Cockburn (1997). [↑](#footnote-ref-4)
5. That is, some version of the A-theory of time is correct or as we might also say, time *robustly* passes. For defence of temporal dynamism see Bourne (2006); Broad (1923; 1938); Cameron (2015); Craig (2000); Zimmerman (2005); Skow (2015); Smith (1993); Sullivan (2012) and Tallant (2012). [↑](#footnote-ref-5)
6. There is a broader emotion asymmetry, which refers to the fact that we direct different emotions towards events depend on whether they are past or future. For instance, we feel relief that something is over, only if it is past, and anticipation only if it is future. Such emotions are often known as tensed emotions. For present purposes, the emotion asymmetry we have in mind only refers to the asymmetry in affect. [↑](#footnote-ref-6)
7. At the time, this finding was widely regarded as vindicating the philosophical prediction that people would be *future-biased* with respect to their own pleasures and pains, but not with respect to those of others (Brink (2011: 378–9), Greene and Sullivan (2015: 968), and Dougherty (2015: 3). Indeed, several philosophers argued, based on these results, that future-bias is arbitrary (since it is only seen in the first personal case) and thus rationally impermissible (Brink (2011: 378–9), Greene and Sullivan (2015: 968), and Dougherty (2015: 3). [↑](#footnote-ref-7)
8. Although very young children also preferred pleasures to be in the past. [↑](#footnote-ref-8)
9. With thanks to an anonymous referee for this suggestion. [↑](#footnote-ref-9)