Do time-biases promote or frustrate wellbeing?

Abstract

Empirical evidence shows that people have multiple time-biases. One is near-bias, another is future-bias, and a third is present-bias. Philosophers are concerned with the normative status of these time-biases. They have argued that, at least in part, the normative status of these biases depends on the extent to which they tend to promote, or frustrate, wellbeing, where "wellbeing" is taken to be of fundamental value. Since near-bias is thought to be associated with impulsivity, lack of self-control, and poor long-term health and financial outcomes, it has often been supposed that it is associated with lower wellbeing. On those grounds, philosophers have argued that near-bias is rationally impermissible. By contrast, philosophical views about the normative status of future-bias have been mixed, with some arguing that future-bias is impermissible because, they think, it frustrates wellbeing, and others arguing that it is at least permissible (and perhaps obligatory) because it is the product of mechanisms whose functioning can be expected to promote wellbeing. However, to date there are no studies that have *directly* probed how time-biases correlate with wellbeing. Since it's not a settled matter which psychological mechanisms underlie time-biases, it is not uncontroversial which things serve as proxies for these preferences. We directly empirically investigate the connection between time-biases and measures of wellbeing, to see which of these biases is associated with promoting, or frustrating wellbeing. Contrary to expectation, we found no evidence that near-bias or present-bias are associated with frustrating wellbeing on any of the constructs we measured. On the other hand, and contrary to what some philosophers have supposed, we found that future-bias was associated with higher measures of wellbeing on several measures. We consider the implications of these findings for the evaluation of the normative status of these time biases.

1. Introduction

Someone is *time-biased* with respect to some event[1] when they have a preference for where in time that event is located. Consider Annie the labradoodle. Annie might prefer to eat her liver cake now, or to eat her liver cake at the end of the day. Suppose Annie prefers to eat her liver cake now.

---

[1] In what follows we will talk of the location of events, rather than goods, since we will be particularly interested in the location of certain experiences. But nothing is intended to hang on this.

Then she is time-biased, by being *near-biased*[2]. Annie is near-biased if she prefers positive events (that is, things she values positively) to be located temporally close to her rather than temporally farther away, and prefers negative events (those she disvalues) to be located temporally far from her rather than temporally near.

There are various reasons why Annie might prefer to eat the cake now rather than later. She might think that the liver cake will get progressively staler throughout the day, and hence that the liver cake later in the day will be intrinsically less valuable than the liver cake now. Likewise, she might judge that while she is hungry for liver cake now, by the end of the day she will be full. In such cases, the utility of cake-eating is in itself time-dependent. Alternatively, since the farther future tends to be more uncertain, Annie might prefer eating the cake sooner in light of expected utility. If considerations of time-dependent utility or expected utility, etc., are what's driving Annie's preference, then Annie is *merely apparently* time-biased. What is of our interest, however, are *genuinely* time-biased preferences: time-biased preferences that are motivated by where in time the alternatives are represented as being located, rather than in virtue of features that happen to be associated with temporal location. That is, temporal locations are of *per se* significance for genuinely time-biased agents.

Near-bias is not the only kind of time-bias. Philosophers have long supposed, going back at least to Hume (1738), that humans exhibit a bias toward the future. When it comes to our own pleasant and unpleasant experiences, we prefer that pleasant experiences are located in the future rather than the past, and that unpleasant experiences are located in the past rather than the future. Annie is being *future-biased* when she prefers a painful dental procedure to be over and done with rather than yet to come. Some future-biased preferences are merely apparent. Annie might be future-biased because she disvalues the anticipation of a future dental procedure more than she disvalues the memory of a past procedure. Again, our focus shall be genuine future-bias, which is a preference that is sensitive to the pastness and futurity of the alternatives *per se*, holding all other features of the experience constant

Finally, someone is *present-biased* if they prefer that negative events are located in the non-present rather than the present, and positive events are located in the present rather than the non-present.

---

[2] In economics and psychology this is sometimes known as having a high time preference (as opposed to having a low time preference). For example, see Fredrick, Loewenstein, & O'Donoghue (2002) and, Lawless, Drichoutis, & Nayga Jr (2013).

Present-biased preferences are genuine if these preferences would remain when all the factors contingently associated with temporal locations were equal.

Empirical research shows that people are *genuinely* near-, future- and present-biased. Prospective near-bias (i.e., the preference for positive events to be in the nearer future over the farther future, and negative ones to be in the farther future over the nearer future) has been extensively researched in both economics and psychology (see Lowenstein & Elster 1992) and although there is a good deal of intra-personal and inter-personal variation in near-bias, in general it has been shown that people devalue (i.e., discount) events the further into the future or past they are, even in the absence of considerations such as time-dependent utility and expected utility.[3] Given this, people tend to prefer positive events to be located temporally nearer (when they are accorded with more positive value) and negative events to be located temporally father (when they are accorded with less negative value). Empirical research also shows that people display future-bias when it comes to both hedonic events (those that involve pain or pleasure) and non-hedonic events (those that do not involve experiences) (Greene, Latham, Miller & Norton 2020, 2021a; Baron, Everett, Latham, Miller & Oh 2023; Latham, Miller & Norton 2023; Greene, Latham, Miller & Nielsen 2024; Latham, Oh, Miller, Shpall & Yu 2024) and that people prefer more pain in the past to less pain in the future (Lee, Hoerl, Burns, Fernandes, O'Connor & McCormack 2020; Greene, Latham, Miller & Norton 2021b) and less pleasure in the future to more pleasure in the past (Lee et al. 2020; Greene, Latham, Miller & Norton 2022b). Finally, while there is much less empirical research on present-bias, there is evidence from several studies that people show present-biased preferences (see Deng, Latham, Miller & Norton forthcoming; Deng, Hodroj, Latham, Lee-Tory & Miller 2024).

---

[3] Ainslie and Haslam (1992, 59). For example, in the experiments of Thaler (1981), Hausman (1979), and Akerlof (1991), people assigned less value to future money, time, and effort, respectively, than their present analogues. Indeed, Thaler (1981) showed that people prefer less money now to more money later, and Hausman (1979) found that people were willing to buy air conditioners with lower up-front costs, even if they entailed higher operating costs down the line. Similar results in animal studies backed this idea; e.g., Rachlin et al. (1981). Since then, literally thousands of studies have been undertaken that aim to probe various aspects of prospective near-bias, including the amount by which we discount the value of future goods, events and experiences; how this varies across different sorts of goods/events; how it varies between people; how it varies across time within the same person; and what sorts of mechanisms might be responsible for such preferences. Interestingly, a meta-analysis performed on results observed between 1978 and 2002 (Frederick et al. 2002, 377) found "tremendous variability" in estimates of people's average discount rate. People have been shown to vary both intra- and inter-personally when it comes to the rate with which they discount goods/events (see also Loewenstein & Elster 1992). In totality, though, this research shows a pervasive tendency to discount future events, goods, and experiences and to do so in conditions of inequality (for an overview see Soman et al. 2005; for an informative meta-analysis of prospective near-bias, see), see Frederick et al., 2002). There are also several studies on retrospective near-bias. See Yi, Gatachalian and Bickel (2006), and Bickel, Yi, Kowell and Gatchalian (2008) and Greene, Latham, Holcombe, Miller and Norton (2020)

The normative status of these time-biases remains hotly contested amongst philosophers. In evaluating their status, philosophers have appealed to a range of considerations, including whether such preferences are arbitrary because they are sensitive to temporal location *per se* which is to be sensitive to something normatively irrelevant[4], or whether those preferences are the product of mechanisms that cannot be expected to produce rational preferences (Brink 2011: 378, Dougherty 2015: 3, fn. 4, Greene, Latham, Miller & Norton 2021a). The consideration with which we will be concerned, however, lies in the idea that, at least in part, such preferences should be normatively evaluated in terms of the extent to which they tend to promote, or frustrate wellbeing. We will have much more to say about how we are understanding the notion of wellbeing in the following sections. For now, and contrary to the way that it is sometimes used in psychology or economics, we will say only that we have in mind a notion of wellbeing as fundamental prudential value, i.e., what is good for a person's life for its own sake.

With this in mind, the general form of the argument is as follows: (1) Each of us has a prudential reason to promote our own wellbeing. (2) If each of us has a prudential reason to promote our own wellbeing, then if a preference tends to promote/frustrate wellbeing then that is a prudential reason to have/discard that preference.[5] (3) Time biased preferences of kind K tend to promote/frustrate wellbeing. Therefore (4) There is a prudential reason to have/discard preferences of kind K. Call this form of argument, the *argument from wellbeing.* As we will see in Section 2, versions of this argument, appropriately filled in, have been offered both in support of the rationality of certain kinds of time bias, and against it. In this paper we will simply assume, for argument, that (1) is true: we do have prudential reason to promote our own wellbeing. Given this, in order to evaluate the various versions of the argument from wellbeing, we need to know whether the empirical claim of (2) is true. For each time bias, is it the case that having a preference of that kind tends to promote/frustrate wellbeing? This is the claim that we investigate in this paper.

---

[4] Rawls (1971: 259); Brink (2011); Sullivan (2018: §3); Garrett (2018). As Sidgwick (1884: 380-381) puts it "The mere difference of priority and posteriority in time is not a reasonable ground for having more regard to the consciousness of one moment than to that of another. The form in which it practically presents itself to most men is 'that a smaller present good is not to be preferred to a greater future good' allowing for difference of certainty."

[5] As it should be clear, we do not equate preferences with (actual or hypothetical) choice behaviours here. Rather, we take preferences to be comparative evaluative judgements, a kind of mental state that has both cognitive and conative components. (Hausman 2012: §1; Broome 2006) Preferences are inherently motivating but are also subject to deliberative control. Nonetheless, preferences are closely related to choices. A preference for *A* over *B* tends to lead to a choice for *A* over *B* when the subject can choose from the alternatives. (We will say more about the motivational profiles of *future*-biased preferences in the next section.) But we should guard against reading off preferences from choice behaviours, as choices can also be guided by motivational forces that are more on the "impulsive" side, about which the subjects themselves sometimes regard as irrational. Thus, some of the empirical evidence we cite below (especially from behavioural economics) should be taken with a grain of salt. It's unclear, for example, whether habitual smokers do prefer to smoke or are driven by addictions that are best not classified as preferences.

We begin, in Section 2, by outlining the argument from wellbeing as well as the current empirical literature that bears on the wellbeing claim. In Section 3 we outline the methodology of a study we ran to empirically test the connection between wellbeing and time biased preferences. In Section 4 we discuss the implications of these results for theorising about the normative status of time-biases.

2. Time-bias and wellbeing

The argument from wellbeing has been offered, either explicitly or implicitly, both as an argument to the conclusion that there are prudential reasons to discard certain time biased preferences, and, to the contrary, that there are prudential reasons to display such preferences. We will begin by outlining the former kinds of argument. Sullivan (2018: §2) offers a version of the wellbeing argument according to which all time biased preferences tend to frustrate wellbeing, and hence that we have prudential reason to discard *all* such preferences. More commonly, however, the argument from wellbeing is marshalled against a particular kind of time biased preference. For instance, economists tend to focus quite narrowly on certain *forms* of near-bias: namely those in which we discount the value of goods (or wellbeing) according to a hyperbolic function.[6] People who discount in this manner have dynamically inconsistent preferences, which means that they can turn into a diachronic money pump (Davidson et al. 1955): they would be willing to make a series of choices which leaves them overall no better off in some regard, and worse off in others. One way to interpret such arguments is that preferences that can lead to diachronic money pumping will tend to leave one worse off, and hence will tend to frustrate wellbeing, and because of that, there is prudential reason to discard them.[7] Philosophers and psychologists, by contrast, have typically argued that we have prudential reason to discard all near-biased preferences because there is evidence that they tend to make us overall worse off.[8] That is, they tend to frustrate wellbeing. The idea is that near-biased individuals trade less of a good thing, sooner, for more of a good thing later, and will trade less of a bad thing, sooner, for more of a bad thing, later, and hence will end up with lower wellbeing than they would otherwise have had.

---

[6] See Aislie & Haslan (1992).

[7] Of course, some might think that preferences that can lead to being money pumped are not irrational because this might lead to lower wellbeing, but rather, that this is either evidence of, or constitutive of, irrationality (see Callender (2021, 2022); Hedden (2015: §5) for discussion).

[8] Brink (2011: 360-61); Sullivan (2018: §2); Scheffler (2021: 99-100).

There is some empirical evidence for this claim. We know that near-bias significantly influences health and financial outcomes (Dolan, Peasgood & White 2008; Chabris et al. 2008), which might be expected to impact people's judgements about wellbeing from an embedded perspective. It has been observed that near-bias is rather stable over time; that is, people tend to make near-biased decisions over and over despite having suffered detrimental effects of past near-biased behaviours. Some even suggest that near-bias should be considered a personality trait (Odum 2011). Although certain behaviour training and manipulations such as mindfulness are effective in reducing near-bias (Scholten et al. 2019), a multitude of psychological mechanisms can explain why people normally fail to "learn from past mistakes" and perpetuate near-biased tendencies (Polivy & Herman 2002; Buehler et al. 2010; Ainslie 2008; Orphanides & Zervos 1995). A low discount rate (being less strongly near-biased) has been shown to positively predict income (Green, Myerson, Lichtman, Rosen & Fry 1996) and education levels (Warner & Pleeter 2001). On the other hand, a steeper discount rate predicts poorer savings behaviours (Chapman & Elstein 1995), poorer investment decisions and worse financial outcomes (Laibson 1997; Chabris et al. 2008; Meier & Sprenger 2010), and a shallow discount rate predicts increased savings behaviours (Ersner-Hershfield, Garton, Ballard, Samanez-Larkin & Knutson 2009). In the context of health outcomes, associations have been found between discount rates, and both smoking and drug use (Bickel and Marsch 2001; Harrison, Lau & Rutstrom 2010). Generally, steeper discount rates predict smoking, drinking, and drug use, obesity, risky sexual practices, and several other health risk behaviours (Hsu, Lin & McNamara 2008), while higher discount rates have been found to negatively predict proactive behaviours like exercise and other forms of preventative healthcare (Story, Vlaev, Seymour, Darzi & Dolan 2014). Boyle, Yu, Gamble and Bennett (2013) found that discount rates predict overall mortality. More tellingly, Kennedy (2020) found that lower discount rates strongly predict people being more satisfied with their lives, and more weakly predicted people being happier in the moment. Hence, it can be argued that such preferences frustrate wellbeing (Miller 2024), and therefore we have prudential reason to discard them.

While present-bias is rarely explicitly discussed, it is natural to think that many authors have supposed that similar considerations apply to such preferences. That is because, as Deng, Hodroj, Latham, Lee-Tory, and Miller (2024) note, it is often assumed that present-bias is simply the limiting case of near-bias. If that assumption is correct (and we will revisit it later) wellbeing arguments against the rationality of near-bias will generalise to present bias.

Until recently, wellbeing arguments of this form had not been offered against the rationality of future-bias. That is because it is typically assumed that individuals cannot act on future-biased preferences because the past is causally inaccessible, and hence people are unable to bring it about that they have a life with overall more pain, and less pleasure (so long as the pain is in the past, and the pleasure in the future) even if this is what they prefer. If that is right, then having future-biased preferences does not tend to frustrate wellbeing, even if, were one able to act on those preferences, doing so would frustrate wellbeing. More recently, however, this contention has been challenged. Dougherty (2011, 2015) and Greene and Sullivan (2015) both argue that when future-biased preferences are combined with other preferences (strong risk aversion or regret aversion) they can lead people to make a series of choices that leaves them overall worse off in some way, and no better off in any other way. Recent empirical work by Braddon-Mitchell, Latham, and Miller (2023) shows that people who combine future-biased preferences and risk aversion will in fact make a series of choices that leaves them worse off in some respect and better off in none. On the basis of this, we might offer an argument from wellbeing to the conclusion that we have prudential reason to discard future-biased preferences (Miller 2024).

Now, a word of caution is in order at this stage. In offering the argument from wellbeing we said nothing about how to evaluate wellbeing over time. The previous arguments might be thought to rely on the idea that we should evaluate wellbeing or utility from a *time-neutral* perspective. After all, we are supposing that if at a time, someone prefers (and brings about) a life that contains more pain over a life that contains less, by preferring a life with more past pain to less future pain, then that person is preferring a life with lower wellbeing. But it might seem that the right way to evaluate utility is not from a time-neutral perspective, at least not for a *time-biased* agent. To be sure, someone who is future-biased prefers a life that has overall more pain than pleasure, because they prefer, say, a 10-hour painful operation yesterday, to a 5-hour painful operation tomorrow. Still, if we are evaluating utility from their current temporally embedded perspective, and if they are right that past pains are less bad than future ones, then they are right to disvalue those past pains, and so they are right to prefer more pain the past, to less in the future. So, when it comes to evaluating the rationality of time-biases, in part you might think that what is up for grabs is whether we should look at overall time-neutral utility, or at utility from an embedded perspective. Moreover, it may be that for a time-biased agent there is simply no time-neutral perspective from which overall utility can be evaluated. As the perspective the agent occupies – and accordingly her preference for the distribution of goods over time – shifts over time, we end up with a multitude of

incommensurable perspectival evaluations, but no time-neutral evaluation abstracted away from particular perspectives.[9]

In what follows we take no stand on this. However, (as we will outline shortly) in our methodology we ask participants to respond to a range of questions that aim to probe their levels of wellbeing. Some of these measures probe whether people take themselves to be overall happy compared to others, while others ask about their positive/negative experiences, and so on. Regardless of the specific questions involved, people will of necessity be answering from a largely embedded perspective. That is, even if they are evaluating their overall wellbeing[10], rather than their wellbeing in the moment, they will of necessity be evaluating it from their current temporal perspective. Thus, if, for instance, being such that one prefers having more pain in the past and less in the future, and having that preference satisfied leads one to judge that one *is* happy, then future-biased individuals will tend to judge that they are happy, even if from a time-neutral preference they have lives with more pain and less pleasure – and even if from some alternative temporally embedded perspective (e.g., a *long* past perspective) they might judge themselves to be unhappy (as they are anticipating a greater amount of pain in the future, all else being equal).

So, we take it that our studies are probing people's temporally embedded views about their own wellbeing, either at, or over, time. Of course, time-neutralists might now complain that we are measuring the wrong thing! For, they might say, even if we find that time biased people report, at a time, having high levels of wellbeing compared to those who are not time biased, this is consistent with its being the case that nevertheless, their life overall is less good than it would have been, vis-à-vis wellbeing. We return to this idea in our discussion.

Moving on then, let's now consider arguments from wellbeing that aim to show that we have prudential reason to be time biased in one way or another, because doing so tends to promote, rather than frustrate, wellbeing. These arguments are much less explicit, but we think it is reasonable to attribute something like such arguments to a number of authors when it comes to future-bias.

Some authors have argued that future-bias is *adaptive*: it is, very roughly speaking, explained by

---

[9] This seems reasonable especially given subjective theories of wellbeing (e.g., preference-satisfactionism) according to which how well one fares (at a time) depends on her own pro- and con- attitudes towards her life (at a time).
[10] All the scales we utilised (see below) are intended to probe the subjects' evaluations of their wellbeing over long term or life span excepted for SPANE which restricts the temporal window to "the past four weeks".

adaptive features of our affective and attentional systems (Caruso, Maglio, & Van Boven, 2024; Ramos, Caruso, & Van Boven, 2022), in particular, that those systems are temporally asymmetric, with people directing more attentional and affective resources towards future than towards past events. The idea is that people tend to feel more affect towards uncertain states of affairs than more certain ones (Bar-Anan, Wilson, & Gilbert, 2009; Wilson, Centerbar, Kermer, & Gilbert, 2005; Kurtz, Wilson, & Gilbert, 2007) because future states of affairs are less certain than past ones, people tend to experience more intense affect with respect to future events compared to past ones. In addition, events over which we have control tend to elicit stronger emotional responses than those over which we lack control (Frijda, 1986; Frijda, Kuipers, & ter Schure, 1989; Lazarus, 1991). Since people have more control over future compared to past states of affairs, they thereby tend to direct more affect towards future than past events. Hence there is an asymmetry of affect. Second, there is an asymmetry of attention. Since attention tends to be directed towards stimuli that are relevant to attaining one's goals (Aarts, Dijksterhuis, & De Vries, 2001; Dijksterhuis & Aarts, 2010), given that people can causally influence future events but not past ones, it will tend to be future states of affairs that are relevant to attaining our goals and therefore captivate greater attention relative to past ones. The attentional and emotion asymmetries, in turn, explain why we tend to value future events more highly than past ones. People like attended objects more (Shimojo, Simion, Shimojo, & Scheier, 2003; Stormer & Alvarez, 2016) and are more likely to choose, amongst options, those they attend to (Cavanagh et al., 2014; Fiedler & Glockner, 2012; Fiedler et al., 2013) and increasing attention toward an option increases the likelihood that it will be chosen (Ghaffari & Fiedler, 2018; Janiszewski, Kuo, & Tavassoli, 2012; Mormann and Russo 2021). This it at least suggestive of the idea that the attentional asymmetry might explain why people more highly value future events relative to past ones. Intense emotion likewise begets strong (dis)valuing attitudes. So, if people tend to direct more intense emotion to future states compared to past ones, they will tend to more highly (dis)value future states over past ones. Jointly, then, the asymmetries of emotion and attention explains future-biased preferences.

Part of this explanation relies on the idea that the emotion and attention asymmetries are adaptive. As Paul Horwich remarks, "[A]n organism that wanted its future selfish desires to be satisfied would flourish relative to an organism that didn't care; however there is no particular advantage in wanting past desires to have been satisfied." (1987: 197) Although defenders of this explanation of future-bias do not explicitly argue that, in virtue of its being explained by adaptive systems, those preferences are themselves prudentially rational, it is an easy leap to see why one might think so. After all, if future-bias is explained by these kinds of asymmetries, and if those asymmetries are

adaptive such that people who display those asymmetries tend to do better than those who do not, then it seems plausible that people who display future-biased preferences will do better than those who do not. So, according to this version of the wellbeing argument, future-biased preferences tend to promote wellbeing, and therefore we have prudential reason to have those preferences.

There is some weak evidence that future-bias does promote wellbeing. Several studies have shown a correlation between certain *temporal orientations* and population level features such as GDP. Temporal orientation refers to "one's emotional, motivational, and cognitive components that characterize people's experiences with the past, present, and future" (Ramos et al., 2022), and is commonly measured with Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd 2015), by which temporal orientation is dissected into five past-, present- or future-focused traits. Research shows that people who are more strongly future oriented – that is, those who better anticipate and conceptualize future events and engage with them more affectively and agentially – tend to save more money (Hershfield et al., 2011), are less likely to exhibit near-bias (Bartels & Rips, 2010; Bartels & Urminsky, 2011; Ersner-Hershfield, Wimmer, & Knutson, 2009), are less likely to engage in risky, delinquent, and unethical behavior (Hershfield, Cohen, & Thompson, 2012; van Gelder, Hershfield, & Nordgren, 2013), and enjoy better present health (Rutchick, Slepian, Reyes, Pleskus, & Hershfield, 2018). A large cross-cultural study of temporal orientation in 73 countries found that being future-oriented was associated with both a country's national wealth and its level of human development (Milfont & Gapski 2010). A later study found that countries in which people search more for future-related terms relative to past-related terms have a higher GDP per capita (Preis, Moat, Stanley & Bishop 2012). Not only that, but future-focused and past-focussed searches were independently associated with GDP: that is, the number of past-focussed search enquiries in a country was found to be negatively associated with GDP (Noguchi, Stewart, Olivola, Moat & Preis 2014), rather than it merely being that the presence of future-focussed ones is positively associated with GDP. Further, research suggests that depression can also be worsened by rumination on past events (Nolen-Hoeksema 1991, 2000; Rinaldi, Locati, Parolin, Bernardi & Girelli 2016) suggesting that past orientation can negatively impact wellbeing. Research also suggests that interventions that re-orient attention away from the past and towards the future can increase feelings of hope (Hassija, Luterek, Naragon-Gainey, Moore & Simpson (2012). Finally, a recent study looked at associations between wellbeing, as measured by subjective happiness, and future-bias, but found no association (in either direction; Ramos et al., 2022).

Among the studies cited, however, only one study *directly* probes the connection between future-

bias and wellbeing. Ramos et al. (2022) found no correlation between future-bias and happiness as measured by the Subjective Happiness Scale, though they did find a correlation between the attention asymmetry and happiness – a curious result given the hypothesis that the attention asymmetry is (partially) responsible for future-bias. The rest of the studies probe associations between some *proxy* for future-bias, such as temporal orientation, and wellbeing. These proxies are not *immediately* indicative of one's tendency to be time biased, although it can be hypothesized that some of them may be partly responsible for certain time-biases or are underwritten by psychological mechanisms that are also responsible for time-biases. For example, it is not an unreasonable thought that future-orientation is positively correlated with future-bias: those who are more cognitively and affectively invested in anticipating and planning for the future also tend to put more value upon future events (relative to past ones). And this nicely dovetails with the aforementioned explanation for future-bias which centres on affective and attentional asymmetries being adaptive. It might be reasoned that the asymmetries are responsible for both stronger future-orientation and future-bias, such that to the extent future-orientation promotes wellbeing, future-bias also promotes wellbeing as they arise from the same adaptive mechanisms.

Nonetheless, we want to *directly* probe how time-biases correlate with wellbeing. It's not a settled matter which psychological mechanisms underlie time-biases, so it is not uncontroversial which things serve as proxies for these preferences. Moreover, even if something like the affective and attentional asymmetries are part of the explanation of future-bias, they may not be the whole explanation.[11] Looking beyond future-bias, different kinds of time-biased preferences may be respectively underwritten by assortments of different psychological mechanisms, especially given that there is little or no association between the three kinds of time-biases (Latham, Oh, Miller, Shpall & Yu 2024; Deng, Latham, Miller & Norton forthcoming; Deng, Hodroj, Latham, Lee-Tory & Miller 2024).[12] It's unclear which proxy can be utilised for any of these individual time-biases, let alone for all.

In the present study, we utilised the standard method in the philosophical literature of probing time-biases, one that directly relies on self-report of preferences in reaction to imagined scenarios where confounding factors (such as uncertainty) are carefully controlled. To the extent that the content of such preferences is introspectively accessible, we take this to be a better method of revealing preferences, and one that bypasses questions about underlying mechanisms.

---

[11] See for example Bacharach (2022), Fernandes (2022) and Hoerl (2022) who propose more sophisticated explanation for future-bias.

[12] Though see Latham, Miller and Norton (2023) For some results to the contrary.

Similar worries present themselves when we consider wellbeing. In several of the studies just cited measures of wellbeing are also indirect, such as those that appeal to GDP as a proxy for wellbeing. But when philosophers entertain that time-biases are rational or irrational to the extent that they promote or frustrate wellbeing, they have in mind wellbeing as fundamental prudential value, i.e., what's good for a person's life for its own sake. Competing theories of wellbeing can be roughly categorized into three kinds: hedonism, preference-satisfactionism, and objective-list theory (Parfit 1984: 464-48; Crisp 2021). Wellbeing in this philosophical sense, then, is wildly heterogeneous and non-transparent, and it is unclear how it could be measured.

The methodology of the present study acknowledges this worry without entirely eliminating it. In what follows we use five different validated scales to measure *happiness*, without presupposing that any of them corresponds to the correct theory of happiness, let alone the correct theory of wellbeing. Though sometimes used interchangeably with 'wellbeing', 'happiness' here refers to a kind of (long-term) mental state, a concept that people tend to have an intuitive grasp of. Compared to wellbeing, it's relatively "superficial" and more susceptible to reliable self-report.

Just as with wellbeing, there is philosophical disagreement over what kind of mental state happiness really is (Haybron 2020). Some think that happiness is just pleasure (i.e., hedonism). Others take it to be satisfaction with one's life as a whole, which is a more cognitive mental state (i.e., life-satisfactionism). Still others think that to be happy is to have a set of positive emotions (i.e., emotion theories). Despite the diversity, happiness is presumably a much more unified concept than wellbeing.[13] Most importantly, given that it's a kind of mental state to which subjects have immediate access, it can be more directly and reliably measured.

For sure, though, the concept of happiness is not identical to the concept of wellbeing, because happiness does not have ultimate prudential value built into its definition; it's a descriptive concept. So, the argument from wellbeing cannot be substituted by a parallel argument from happiness without loss, as it is contestable whether happiness is valuable and to be promoted. Nonetheless, we take it that happiness is a good enough indicator of wellbeing.[14] That is, we take it that there is at least a general association between happiness and wellbeing. The best-case scenario is that

---

[13] There is a fair amount of evidence suggesting substantive association among different measurements of happiness (as well as with some other theoretical constructs surrounding wellbeing, such as quality of life. See for example Medvedev & Landhuis (2018).
[14] Presumably a much better one than "objective" measures such as GDP.

happiness is, as it turns out, all that matters for wellbeing. One who is a hedonist about both wellbeing and happiness can be seen as making this identification. Alternatively, happiness can be very reasonably regarded as a (major) component of wellbeing. Even if there is no direct "overlap" between wellbeing and happiness as such, we should generally expect that wellbeing gives rise to happiness – that is, those whose lives go well tend to be in a positive mental state to which they have immediate access.

Given the lack of direct measurement of wellbeing as well as diverging theoretic accounts of both wellbeing and happiness, the best we can do is to be indiscriminate among these scales of happiness. If it turns out, for example, that some time-biases are associated with either higher or lower levels of *happiness* on *all* scales, then on the assumption that levels of happiness are also associated with wellbeing (at least according to some theories of wellbeing), then we would have good evidence in support of some version of the argument from wellbeing.

3. Methodology and Results

3.1 Experiment Methodology

3.1.1 Participants

1,080 people participated in the study. Participants were U.S. residents who were tested online using Prolific and compensated $1.90USD for their time. 150 participants had to be excluded from the analyses. That is because they failed to answer all the questions (104), failed an attentional check (21) or failed to correctly answer the attention comprehension question (25). The remaining sample was composed of 930 participants (514 female, 24 trans/non-binary, 4 prefer not to answer; mean age 39.32 (SD = 13.38)). Ethics approval for the 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.

3.1.2 Materials and Procedure

Participants were first randomly split into two conditions: positive and negative. In the positive condition, participants were presented with a vignette (A Liked Meal) in which they were asked to imagine that they work at a company that provides them with lunch each day. In the negative condition, participants were presented with a vignette (A Disliked Meal) in which they were also asked to imagine that they work at a company that provides them with lunch each day. In the

positive condition the lunch consists of their most liked meal, and in the negative condition the lunch consists of their most disliked meal. The vignettes used are minimally modified vignettes from Greene, Latham, Miller and Norton (2021).

A Liked/Disliked Meal

> Imagine you work at a company that provides you with lunch each day. Imagine that there is nowhere else to buy lunch, and that you are not allowed to bring in your own lunch. You are contracted to work at the company for 3 years, and you are unable to break the contract under any circumstances. You are 1.5 years into your contract. The company's food dispenser normally produces bland meals containing only essential nutrients. However, it is programmed to dispense your most disliked/liked lunch — which you really dislike/like — during one day of your contract. One morning, you awake from a dream concerning your most disliked/liked lunch and for a moment you cannot remember whether you have received it yet.

Participants were then presented with the following statements to which they respond on a Likert scale of 1 (strongly disagree) to 7 (strongly agree):

Future-biased statements

(a) I would prefer to learn that my most disliked/liked lunch was dispensed yesterday, and will not be dispensed tomorrow.
(b) I would prefer to learn that my most disliked/liked lunch will be dispensed tomorrow, and was not dispensed yesterday.
(c) I have no preference regarding when my most disliked/liked lunch will be dispensed.

Prospectively near-biased statements.

(d) I would prefer to learn that my most disliked/liked lunch will be dispensed tomorrow, and will not be dispensed in 3 months time.

(e) I would prefer to learn that my most disliked/liked lunch will be dispensed in 3 months time, and will not be dispensed tomorrow.

(f) I have no preference regarding when my most disliked/liked lunch will be dispensed.

Present-biased statements

(g) I would prefer to learn that my most disliked/liked lunch will be dispensed now, and will not be dispensed at some time other than now.

(h) I would prefer to learn that my most disliked/liked lunch will be dispensed at some time other than now, and will not be dispensed now.

(i) I have no preference regarding when my most disliked/liked lunch will be dispensed.

After reading the vignette, all participants responded to the following comprehension question.

Then, all participants were asked to answer the questions in The Life Orientation Test, which is a revised version from Carver, Scheier, and Segerstrom (2010). The order of these questions was also randomised. Following that, all participants answered questions, in a random order, on The Satisfaction with Life Scale from Diener, Emmons, Larson and Griffin (1985), then randomised questions from the SPANE scale (The Scale of Positive and Negative Experience) from Diener and Biswas-Diener (2009) then, in a random order, from the Subjective Happiness Scale from Lyubomirsky and Lepper (1999) and finally randomised questions from The Ryff Psychological Well Being Scale from Ryff, Almeida, Ayanian, Carr, Cleary, Coe, and Williams (2010). (For these scales, please see appendix 1).

3.2 *Results*

Let us begin by summarizing our main findings with respect to each of our hypotheses. First, we hypothesised that (H1) there will be a *negative* association between wellbeing, as measured by some, or *all* the scales, and near-bias. We found no evidence of any association between being near-biased and lower scores on *any* of the scales we used. Next, we hypothesised that there will be either be a *negative* (H2) or *positive* (H3) association between wellbeing and future-bias. We found that scores on the autonomy, environmental mastery and self-acceptance subscales of the RYFF tended higher in those people who were future-biased. Thus, we find some limited evidence in favour of

H3 and not H2. Finally, we hypothesised that (H4) there would be a *negative* association between wellbeing and present-bias. Contrary to this we instead found that scores on the autonomy and self-acceptance subscales of the RYFF tended higher in those people who were future-biased.

For the purposes of clarity, we will present our results showing the association between people's temporal preferences and happiness scores separately. We will begin in Section 3.2.1 with near-biased preferences, then future-biased preferences in Section 3.2.2. Finally, we will present data on present-biased preferences in Section 3.2.3.

3.2.1 Near-Biased Preferences

Table 1 below summarizes the descriptive results of participants near-biased preferences and happiness scale scores. Here is how to read the table. The left most column indicates whether participants report having a near-biased, far-biased or time-neutral preference. Each subsequent column then shows the mean happiness score and standard deviation for each of the happiness scales that we used. The top half of the table is the data of participants assigned to the positive case, whereas the bottom half of the table is the data of participants assigned to the negative case.

Table 1. Happiness scores by near-biased preferences. Standard deviations are shown in parentheses.

					RYFF				
Preference	LOT	SwLS	SPANE	SHS	Autonomy	Environment	Personal	Positive	Acceptance
Positive									
Near	19.12	19.99	6.04	4.17	22.11	24.73	19.01	21.49	25.80
N=245	(5.95)	(7.75)	(8.81)	(0.92)	(7.30)	(9.22)	(6.99)	(8.26)	(9.40)
Far	20.59	22.05	7.22	4.34	22.03	23.99	18.68	20.72	24.03
N=74	(4.81)	(7.51)	(8.05)	(0.80)	(6.88)	(8.42)	(6.26)	(8.53)	(8.90)
Neutral	19.07	19.73	5.75	4.15	20.99	24.74	19.42	21.20	25.41
N=164	(6.20)	(8.12)	(9.87)	(0.84)	(7.51)	(9.54)	(6.76)	(8.35)	(10.18)
Negative									
Near	19.22	20.18	5.86	4.07	22.30	25.98	18.94	21.19	26.54
N=144	(5.90)	(8.14)	(9.23)	(0.91)	(6.69)	(9.20)	(6.34)	(7.81)	(9.97)
Far	19.39	19.95	5.69	4.06	23.12	25.43	19.05	21.53	26.27
N=188	(5.93)	(7.52)	(8.49)	(0.90)	(7.67)	(8.50)	(6.56)	(8.06)	(9.58)
Neutral	19.07	20.24	4.97	4.18	21.66	24.70	19.05	21.64	24.94
N=115	(5.68)	(7.86)	(8.20)	(0.88)	(7.30)	(9.31)	(7.83)	(8.36)	(9.09)

We first examined participants' happiness judgements using a MANOVA. Gender and age were entered into the analysis as covariates. Unless otherwise states these covariates were entered into each of the analyses we report. The result of this analysis showed only a significant effect of the

covariates gender, $\Lambda = .952$, F(9, 914) = 5.078, p < .001, and age, $\Lambda = .842$, F(9, 914) = 19.001, p < .001. We found no evidence of any association between participants' near-biased preferences and wellbeing score.

3.2.2 Future-Biased Preferences

Table 2 below summarizes the descriptive results of participants future-biased preferences and wellbeing scale scores. The table is organized in the same fashion as Table 1 (above).

Table 2. Happiness scores by future-biased preferences. Standard deviations are shown in parentheses.

					RYFF				
Preference	LOT	SwLS	SPANE	SHS	Autonomy	Environment	Personal	Positive	Acceptance
Positive									
Future	19.02	19.93	5.83	4.12	22.21	25.07	18.84	21.34	25.94
N=328	(5.96)	(7.85)	(8.87)	(0.85)	(7.41)	(9.19)	(6.82)	(8.36)	(9.61)
Past	21.42	23.42	8.65	4.94	23.03	21.68	19.13	20.55	21.26
N=31	(4.08)	(6.79)	(9.69)	(0.91)	(5.60)	(8.98)	(6.35)	(8.21)	(8.33)
Neutral	19.45	20.17	6.63	4.19	20.10	24.18	19.77	21.27	24.99
N=123	(5.87)	(8.03)	(9.40)	(0.87)	(7.25)	(9.16)	(6.83)	(8.29)	(9.65)
Negative									
Future	19.19	19.99	5.45	4.06	22.92	25.81	19.03	21.38	26.44
N=326	(5.95)	(7.78)	(8.86)	(0.88)	(7.22)	(8.96)	(6.66)	(7.97)	(9.73)
Past	18.88	20.49	5.17	4.01	22.85	24.15	18.10	21.39	24.56
N=41	(5.87)	(7.94)	(9.15)	(1.05)	(7.38)	(8.79)	(6.41)	(8.42)	(8.29)
Neutral	19.71	20.35	6.16	4.24	20.49	24.46	19.44	21.74	24.99
N=80	(5.41)	(7.86)	(7.54)	(0.87)	(7.24)	(8.88)	(7.70)	(8.27)	(9.56)

Participants' happiness judgements were tested using a MANOVA. The result of this analysis showed significant effects of future-bias, $\Lambda = .948$, F(18, 1828) = 2.766, p < .001, valence, $\Lambda = .979$, F(9, 914) = 2.184, p = .028, and the interaction between future-bias and valence, $\Lambda = .968$, F(18, 1828) = 1.644, p = .043. There was also a significant effect of the covariates gender, $\Lambda = .953$, F(9, 914) = 5.063, p < .001, and age, $\Lambda = .844$, F(9, 914) = 18.725, p < .001. Next, we report the results of separate ANOVAs that show the effects of these factors on participants' wellbeing judgments.

Beginning with the Life Orientation Test (LoT), an ANOVA revealed only a significant effect of the covariate age, F(1, 922) = 30.240, $p < .001$.

Looking at the Satisfaction with Life Survey (SwLS), an ANOVA revealed *no* evidence of any effect of future-biased preference, valence, or the covariates gender and age.

Next, looking at the Scale of Positive and Negative Experience (SPANE), an ANOVA revealed only a significant effect of the covariate age, $F(1, 922) = 24.550$, $p < .001$.

Looking at the Subjective Happiness Scale (SHS), an ANOVA revealed a significant effect of future-bias, $F(2, 922) = 7.085$, $p < .001$, valence, $F(1, 922) = 12.662$, $p < .001$, and the interaction between future-bias and valence, $F(2, 922) = 9.007$, $p < .001$. There was also a significant effect of the covariate age, $F(1, 922) = 5.221$, $p = .023$.

The significant effect of valence was that SHS scores were significantly higher in participants assigned to positive cases (M = 4.42, SD = 1.34) rather than negative cases (M = 4.12, SD = 1.23).

Pairwise comparisons with a Bonferroni correction were performed on the effect of future-bias. SHS scores were higher in participants who are past-biased (M = 4.49, SD = 0.88) than participants who are future-biased (M = 4.10, SD = 0.87, $p < .001$). There was no significant difference in SHS scores between participants who are time-neutral (M = 4.21, SD = 0.90) and both past-biased and future-biased participants ($p > .063$).

Simple effects tests with a Bonferroni correction were performed on the interaction effect of future-bias and valence. First, for both future-biased and time-neutral participants there was no significant difference between positive (future-biased: M = 4.12, SD = 0.87; time-neutral: 4.18, SD = 0.88) and negative cases (future-biased: M = 4.07, SD = 0.87, $p = .523$; time-neutral: 4.24, SD = 0.88, $p = .593$). In contrast, SHS scores in past-biased participants were significantly higher in positive cases (M = 4.95, SD = 1.75) than negative cases (M = 4.03, SD = 1.23, $p < .001$). Second, for positive cases, SHS scores were significantly higher in past-biased participants than both future-biased ($p < .001$) and time neutral participants ($p < .001$). For positive cases, there was no significant difference in SHS scores between future-biased and past-biased participants ($p > .999$). For negative cases, there was no significant differences between future-biased, past-biased, and time-neutral participants ($p > .362$).

Finally, we examined each of the subscales of the Ryff Psychological Wellbeing Scale separately. First, looking at the Autonomy subscale, an ANOVA revealed a significant effect of future-bias,

F(2, 922) = 5.916, p = .003. There was also a significant effect of the covariate gender, F(1, 922) = 4.072, p = .044, and age, F(1, 922) = 116.914, p < .001.

Pairwise comparisons with a Bonferroni correction were performed on the effect of future-bias. Autonomy scores were higher in participants who are future-biased (M = 22.51, SD = 6.83) than participants who are time-neutral (M = 20.60, SD = 7.00, p = .002). There was no significant difference in autonomy scores between participants who are past-biased (M = 22.44, SD = 6.92) and participants who are future-biased and time-neutral (p > .163).

Looking at the Environmental Mastery subscale, an ANOVA revealed a significant effect of future-bias, F(2, 922) = 3.425, p = .033. There was also a significant effect of the covariate gender, F(1, 922) = 8.093, p = .005, and age, F(1, 922) = 41.682, p < .001.

Pairwise comparisons with a Bonferroni correction were performed on the effect of future-bias. Environmental Mastery scores were higher in participants who are future-biased (M = 25.39, SD = .8.85) than participants who are past-biased (M = 22.60, SD = 8.95, p = .037). There was no significant difference in Environmental Mastery scores between participants who are time-neutral (M = 24.58, SD = 9.06) and participants who are future-biased and past-biased (p > .326).

Next, looking at the Personal Growth subscale, an ANOVA revealed *no* evidence of any effect of future-biased preference, valence, or the covariates gender and age.

Looking at the Positive Relations with Others subscale, an ANOVA revealed only a significant effect of the covariate age, F(1, 922) = 31.533, p < .001.

Lastly, looking at the Self-Acceptance subscale, an ANOVA revealed a significant effect of future-bias, F(2, 922) = 4.988, p = .007. There was also a significant effect of the covariate age, F(1, 922) = 30.083, p < .001.

Pairwise comparisons with a Bonferroni correction were performed on the effect of future-bias. Self-Acceptance scores were higher in participants who are future-biased (M = 26.16, SD = 9.41) than participants who are past-biased (M = 22.54, SD = 9.55, p = .007). There was no significant difference in Self-Acceptance scores between participants who are time-neutral (M = 25.20, SD = 9.47) and participants who are future-biased and past-biased (p > .129).

3.2.3 Present-Biased Preferences

Table 3 below summarizes the descriptive results of participants present-biased preferences and wellbeing scale scores.

Table 3. Happiness scores by present-biased preferences. Standard deviations are shown in parentheses.

					RYFF				
Preference	**LOT**	**SwLS**	**SPANE**	**SHS**	**Autonomy**	**Environment**	**Personal**	**Positive**	**Acceptance**
Positive									
Present N=207	19.25 (6.02)	19.91 (7.99)	6.29 (9.34)	4.21 (0.94)	22.24 (7.23)	24.66 (9.53)	19.42 (7.11)	21.82 (8.66)	25.99 (10.01)
Non-Present N=113	19.18 (5.47)	20.88 (7.70)	5.49 (8.61)	4.20 (0.82)	21.60 (7.61)	24.88 (8.92)	19.07 (6.96)	21.62 (8.43)	25.09 (9.10)
Neutral N=163	19.55 (6.03)	20.15 (7.85)	6.34 (9.07)	4.16 (0.84)	21.13 (7.22)	24.40 (8.99)	18.72 (6.26)	20.34 (7.74)	24.86 (9.41)
Negative									
Present N=158	18.63 (5.90)	18.86 (8.31)	4.94 (8.97)	3.97 (0.97)	22.96 (6.80)	26.81 (9.24)	19.38 (6.69)	21.73 (7.93)	27.44 (9.50)
Non-Present N=182	19.68 (5.89)	20.64 (7.59)	6.01 (8.91)	4.14 (0.85)	22.96 (7.73)	24.83 (8.55)	18.75 (6.60)	21.04 (7.93)	25.53 (9.73)
Neutral N=107	19.48 (5.66)	21.01 (7.17)	5.70 (7.69)	4.19 (0.84)	20.96 (7.03)	24.36 (8.96)	19.93 (7.44)	21.73 (8.45)	24.70 (9.29)

We first examined participants' happiness judgements using a MANOVA. Gender and age were entered into the analysis as covariates. The result of this analysis showed only a significant effect of the covariates gender, $\Lambda = .953$, $F(9, 914) = 5.030$, $p < .001$, and age, $\Lambda = .840$, $F(9, 914) = 19.311$, $p < .001$. We found no evidence of any association between participants' present-biased preferences and wellbeing scores.

3.2.4 Exploratory Analyses

One thing that is apparent from the analyses reported so far is the relatively ubiquitous influence of the covariate age (and to a lesser extent gender). As a result, we were interested in examining the association between participant age and scores on the happiness scales. To do this we calculated separate Spearman Rho correlation coefficients (see Table 4).

Table 3. Spearman's Rho correlation coefficients between age and happiness scores.

					RYFF				
	LoT	**SwLS**	**SPANE**	**SHS**	**Autonomy**	**Environment**	**Personal**	**Positive**	**Acceptance**
Age	.174**	.051	.169**	.089*	-.370**	-.192**	-.053	-.180**	-.168**

N.B. *p*=.006, **p*<.001.

For the LoT and SPANE there is a weak, and the SHS negligible, positive association between participant age and scores on these scales. That is, the older a participant the higher their scores tended to be. Interestingly, the opposite was the case for the RYFF psychological wellbeing scales. For the Autonomy subscale there is a moderate, and the Environmental Mastery, Positive Relations, and Self-Acceptance Subscales a weak, negative association between participant age and score on these subscales. That is, the older a participant the lower their scores tended to be.

4. Discussion

There are several notable aspects of our results. First, there is the absence of an association between measure of happiness and near-bias. Second, there is the presence of associations between certain measures of happiness and both future- and present-bias. We will consider each in turn.

4.1 Near-bias, happiness, and wellbeing

First, and contrary to expectation, we found no reliable associations at all between any of our measures of happiness and near-bias. Insofar as we would expect at least some of the happiness measures to be associated with measures of wellbeing, we can interpret our results as finding no association between near-bias and the promotion or frustration of wellbeing. This is puzzling, given that there is robust evidence that people who display near-bias are more likely to suffer, inter alia, negative financial and health consequences, which, in turn, one might expect to be associated with lower levels of wellbeing.

There could be many factors which explain this lack of association. One such factor gestured at earlier in this paper is that the temporal perspective of participants is, at all times of the study, embedded. Consider for example a near-biased agent who postpones a dental surgery despite the fact that this will incur greater suffering. She ends up with a life containing greater overall pain, which would be regarded as a life that's worse off from a time-neutral perspective (if there is a legitimate such perspective). But from her near-biased perspective with the disvalue of the further

future discounted, it seems that her life hasn't been made worse off. After all, the state-of-affairs she presently prefers obtains, which from the present perspective counts as an increase in wellbeing. More generally, if subjects who are in fact time-biased tend to invariably evaluate their wellbeing from their embedded time-biased perspectives, we might not expect much negative association between time-biases and wellbeing. Of course, philosophers who argue from wellbeing that time-biases are irrational may object that it is such temporally embedded, rather than the time-neutral perspectives, that are illegitimate. They may contend that it is time-biases that lead to misguided evaluations of wellbeing; that it's the undiscounted rather than discounted value that matters for overall wellbeing. We allow that the time-neutralist might be correct in this regard, and we take no stand on this. But notice that given the findings here, the time-neutralist would be proposing a concept of overall wellbeing that is detached from people's evaluation of their own wellbeing, and some might contest that a concept of wellbeing that no one cares about can be the correct one.

A second, connected, potential explanation of the lack of association is not that participants evaluated wellbeing from a temporally embedded perspective rather than a time-neutral perspective, but that they evaluated wellbeing from a *here-and-now* perspective. (There are also embedded perspectives that are not here-and-now, i.e., that are future or past.) The effect of near-bias is not immediate. If I put off going to the dentist and the resulting tooth problem is worse than it would otherwise be, it is a future temporal stage of me who suffers, regrets, and becomes discontent with her predicament. It might be thought, then, that the lack of association owes to a selective focus on here-and-now perspectives at the expense of future perspectives from which the detrimental effect of near-bias can be appreciated.[15]

---

[15] This proposed explanation has to be distinguished from future anhedonia (Kassam et al. 2008). Future anhedonia refers to the phenomenon that future hedonic experiences are perceived and believed to be less intense and therefore accorded with lesser (dis)utility. For a futurely anhedonic agent, then, there is a sense in which the detrimental effects of (say) postponing the dental surgery can only be appreciated to the full when she comes to suffer the worsening toothache. Nonetheless, when evaluating wellbeing, the exclusive focus on here-and-now perspectives at the expense of other embedded perspectives may be present in the absence of future anhedonia. One may accurately anticipate how terribly the toothache will progress, but still manifest diverging evaluation of wellbeing as her embedded perspectives shifts through time. For such an agent, future suffering – whose intensity is fully appreciated – hardly registers from her present perspective of evaluation but will fully register when it becomes present. Evaluation of wellbeing, as it were, is itself time-biased. With that said, future anhedonia is noteworthy as a potential explanation for near-bias. For futurely anhedonic agents, the subjective utility accorded to hedonic experiences are in effect *time-dependent*, so it's no mystery why impending pain is dispreferred relative to an equal amount of distant-future pain. However, it may be argued that near-bias driven by future anhedonia should be regarded as merely apparent – no different from Annie's preference for eating the liver cake sooner because it gets stale as time progresses (that is, because it's perceived to be of time-dependent utility). If so, and if future anhedonia is to a considerable extent responsible for near-biased preferences, then we cannot claim that we successfully probed genuine near-biased preferences in the present study, and this may explain the lack of association between near-bias and lower wellbeing we found. We take no firm stand on what it takes to be genuine near-bias, but regardless of whether near-bias driven by future anhedonia is merely apparent, it seems that with regard to the effects on wellbeing, such near-bias should

This, however, does not seem quite right. Insofar as people have stable dispositions[16] to be near-biased, we should expect that to the extent that near-bias frustrates future wellbeing, one's current stage would likewise tend to be worse off, in terms of wellbeing, in virtue of the choices of its *earlier* stages. Thus, we would still expect to find an association between lowered wellbeing and near-bias even if people do evaluate wellbeing in terms of the here-and-now.

What we might expect to also find if this hypothesis were right, is that the association becomes stronger as people age. The effect of near-bias is not only lagged, but is also incremental and amplifying over time. Thus, as people age, the effects of previously near-biased preferences might accumulate to have a greater impact on wellbeing. (Think of long-term health problems due to smoking.) However, as noted previously, while we did find an association between age and happiness as measured in our various scales, that association did not interact with near-bias. We did not find that older people who were near-biased tended to differentially show lower wellbeing as measured by any of the happiness scales, compared to those who were younger.[17] In all, then, it seems unlikely that appealing to the idea that people evaluate wellbeing in the here-and-now is an explanation of the absence of an association between near-bias and measures of happiness (or wellbeing).

One other potential reason we may not have found such an association concerns the strength of near-bias in relation to wellbeing-frustration. Let's introduce a distinction between robust and fragile time-biased preferences. One is *robustly* time-biased if and only if her time-bias is strong enough to outweigh an unequal payoff. One is robustly near-biased, for example, if she prefers *greater* displeasure in the more distant future over *lesser* displeasure in the nearer future, or prefers lesser but nearer pleasure over greater but more distant pleasure. By contrast, one is *fragilely* near-biased if and only if she exhibits near-bias when the payoff is equal, but *not* when that would result in a greater amount of displeasure or a lesser amount of pleasure (from a time-neutral perspective).

---

not differ from genuine near-bias, at least according to advocates of the argument of wellbeing against near-bias. This is because from a time-neutralist standpoint, future anhedonia nonetheless involves *mis*appreciation of value due to temporal information, and thereby should frustrate wellbeing according to a time-neutral perspective. As such, we take it that the time-neutralists cannot simply dismiss the lack of association as irrelevant because future anhedonia may be driving near-bias.

[16] As we noted previously, it has been observed that near-bias is rather stable over time.

[17] We performed an exploratory analysis to examine this hypothesis. First, we divided participant ages into quartiles and then we reran the near-bias analysis with participant age quartile included as a factor (and without age as a covariate). Of interest was whether there was an interaction effect between near-bias and participant age quartile. We found no evidence of any interaction effect, $\Lambda = .952$, $F(54, 4578.415) = .815$, $p = .831$. Confirmatory studies are necessary to confirm that there is no association between age and near-biased preference.

In other words, her near-bias *only* serves as a *tie-breaker*. In the present study, the vignettes used to test near-bias involve equal payoff. Our results, then, cannot discriminate between fragile and robust near-bias. However, this distinction matters for the argument from wellbeing. After all, if one's near-bias serves merely as a tie-breaker in decisions and no more, then (from a time-neutral perspective) her life would not be thereby made worse off. As such, we would not expect merely fragile near-bias to be associated with diminished wellbeing. And since for all we can tell, the participants who were near-biased in our study were only fragilely but not robustly near-biased, we cannot determine whether there is an association between robust near-bias and diminished wellbeing.

Still, this does not entirely remove the puzzlement. We know from previous studies that many people have robust near-bias.[18] Many people will trade more of a good thing, later, for less of a good thing now, and *mutatis mutandis* for bad things. So, we would expect a good many of the people who were near-biased in our study, to be robustly near-biased. As such, if robust near-bias is associated with diminished wellbeing[19], we should still expect some association between near-bias and diminished wellbeing, though perhaps not so pronounced. Having said that, as Frederick et al. (2002) note, there is tremendous inter- and intra-individual variability even as regard robust near-bias. So, even if people exhibit robust near-bias, they might not do so *reliably*. But one might expect that it is the reliable display of robust near-bias that would result in the frustration of wellbeing. That, however, is not something our study can detect, and might go some way towards explaining the lack of an observed association.

We should also bear in mind that wellbeing is affected by a variety of factors other than time-biases and moreover, happiness – and even more so self-reports of happiness – may have determinants other than wellbeing (at least according to some theories of wellbeing), such that even if time-

---

[18] See for instance Frederick et al. (2002).

[19] Insofar as this is true, it's also plausible that the stronger near-bias is, to the greater extent wellbeing is frustrated. This hypothesis is supported by Kennedy (2020) where they found that lower discounting rates are strongly predicative of greater wellbeing as measured by the Satisfaction with Life. We failed to replicate any association in the present study, and this might be in part due to the difference in the methods of probing near-bias. As noted, we categorized subjects into three categories (i.e., near-biased, far-biased, and time-neutral – setting aside valence) in terms of their responses to a fixed scenario of equal payoff. Kennedy (2020) gauged discounting rates by asking participants how much of the reward they would like to give up in order to receive the reward immediately rather than some time later. Their method quantities near-bias more fine-grainedly, which is an improvement on ours. However, there are two reasons for doubting whether that accurately measured people's discounting rates. For one thing, money has (and tends to be perceived as having) time-dependent utilities. So, it's unclear whether such discounting rates reflect their genuine rather than merely apparent near-bias. For the other, the set-up of the question seems to "force" the participants to be near-biased – that is, they had to discount the future reward at least to some extent in their response. With the methodological difference recognized, however, it's not immediately clear how this gives rise to different results.

biases do to some extent affect wellbeing (at least according to some theories), that effect might be filtered away. In particular, it's likely that the connection between near-bias and measures of happiness (and wellbeing insofar as the latter measure the former) may depend on features of the environment. For instance, it might be that near-bias is associated with lower measures on happiness scales only if the environment offers little to no protection from the effects of those choices. For instance, some consequences of being near-biased might be offset by insurance, social security, a wide support network, and so on. Hence it may be that the effects on happiness, of near-bias, tend to be most visible among populations without access to those protections. In turn, it may be that our participants tended not to be from amongst those populations.[20] And in regard to sampling bias, it might be hypothesised that the lack of association is partially due to the subpopulation with the strongest near-bias tendencies disproportionately being *excluded* because they tend to, due to repeated and extreme self-sabotaging behaviours, suffer premature death or other conditions that prevent them from participating in the experiment.

Jointly, these factors might explain the failure to find an association between any of the happiness measures, and near-bias.

4.2 Present-bias, future-bias, happiness, and wellbeing

In contrast to the case of near-bias, we did find some associations between each of future-bias and present-bias and some measures of happiness. We found that autonomy, environmental mastery, and self-acceptance were associated with being future-biased as compared to being time neutral (autonomy) or past-biased (environmental mastery and self-acceptance). By contrast, we found that scoring *higher* on the subjective happiness scale is associated with being *past*-biased compared to being future-biased. We will begin by considering the positive associations we found between future-bias and present-bias and certain measures of happiness.

---

[20] More in this regard, recall that research has found that near-bias is predicative of negative financial and health consequences, while such "objective" measures are presumed to be indicative of wellbeing. This may seem inconsistent with our finding of a lack of association between near-bias and happiness, also a presumed indicator of wellbeing. But it need not. Perhaps near-bias does to a considerable extent frustrate such objective measures and on the other hand, has insignificant impact on happiness. Nonetheless, this can be consistent with both the objective measures and happiness (qua mental states) being to some extent indicative of wellbeing. To take an analogy, having irregular shape and having slightly burnt crusts are both predicative of tasty Neapolitan pizzas, though we need not expect irregular shape and burnt crusts to be co-variant. The diverging results regarding objective measures and happiness also suggests a potential, less ambitious argument against near-bias – namely, from the fact that it frustrates these external measures. However, such an argument would be much less powerful. Unlike wellbeing, which is of *per se*, fundamental value, the external measures are merely flimsily related to fundamental value. The argument would at best condemn near-bias in a very circumscribed manner.

4.2.1 Future-bias and autonomy

As just noted, we found several positive associations between being future-biased, and autonomy, environmental mastery, and self-acceptance. These findings fit well with the idea that future-bias is the product of differential attention and affect being directed towards future as compared to past events (Caruso et al., 2024). If future-bias is the product of its being advantageous to temporally asymmetrically direct affect and attention because doing so promotes attending to, and caring about, those events which one can causally affect over those one cannot, then it is not surprising that people who display this bias to a higher degree tend to score higher on measures of happiness that track autonomy and environmental mastery. After all, arguably autonomy and environmental mastery will be heightened by attending more, and directing more affect towards, the future than the past.

On the face of it, it's notclear why we might find that self-acceptance correlates with being future-biased. One potential explanation again points to the affective and emotional asymmetries. Self-acceptance is prominently a backward-looking phenomenon. One important way in which high self-acceptance is exhibited is to be affirmative and content about one's past experiences and achievements, be they good or bad. It's not unreasonable, then, to think that self-acceptance tends to be enhanced by *not* ruminating on the past too often (and not be overly invested emotionally into the past)[21] but living more completely in the moment. If this is correct, then this sense of self-acceptance could quite plausibly be thought to correlate with future-bias for the same reasons that we find a correlation between autonomy and self-mastery.

4.2.2. Past-bias and subjective happiness

We also found that scoring higher on the Subjective Happiness Scale is associated with being *past*-biased compared to being future-biased or time-neutral, when it comes to *positive* events but not negative ones. Unlike the other scales, the Subjective Happiness Scale asks participants to evaluate their level of happiness without specifying what happiness means. Thus, it's unclear whether we

---

[21] There is evidence that low self-acceptance is predicative of several mental health conditions, including anxiety and depression, and that those who display high self-acceptance are more likely to be optimistic and focus on the present, as well as looking forward to the future, rather than revisiting the past. (MacInness 2006) However, it's worth noting that a more past-focused outlook should not be considered uniformly wellbeing-frustrating. For example, rumination over the past can sometimes boost life-satisfaction. (O'Brien, Ellsworth, and Schwarz, 2012)

should expect the measurements to associate with any of the other scales, or associate with wellbeing in the sense that matters for the rationality of time-biases. Despite that, the valanced association between past-bias and subjective happiness can be reasonably taken to reflect the fact that people are generally happier when they *positively* attend to, and emotionally engage with, the past, but not when they *negatively* do so.[22]

4.3 Interim Summing Up

What does all of this tell us? It is not our aim, here, to take a stance on the right account of wellbeing. While we think it is not unreasonable to think that there will be associations between these aspects of happiness measurements and wellbeing, this could be doubted. Insofar as it is taken to be so, though, our results do suggest that there is some association between future and wellbeing. The positive associations between these measures and future-bias could be marshalled in favour of the argument from wellbeing to the conclusion that we have reason to be future-biased, because doing so tends to promote wellbeing. The association between past-bias and subjective happiness, to the contrary, could be mounted to the opposite conclusion, namely that we have reason to be *past*-biased (at least as regards positive events) because doing so promotes wellbeing.

The question that arises, at this point, is whether given these empirical findings, the general version of the argument from wellbeing is plausible. We take up this question in the following section.

4.4 The argument from wellbeing

Do these associations provide evidence in favour of any version of the argument from wellbeing? Consider, again, the association between being future-biased and scoring more highly on autonomy and environmental mastery. We said previously that this association is unsurprising given the explanation of future-bias that has been advanced by several authors. Even if we grant that autonomy and environmental mastery are measures of wellbeing, however, does this show that being *future-biased* promotes wellbeing? That is unclear. One might be inclined to say that in that eventuality it is not being future-biased *per se* that promotes wellbeing, and so one does not have prudential reason to be future-biased. Why so? Well given this explanation of future-bias,

---

[22] This is supporting evidence from studies on temporal orientation and happiness, where past-positive orientation is found to positively associate with happiness while past-negative orientation, negatively. See for example Rush and Grouzet (2012).

having future-biased preferences is a causal consequence of having a certain adaptive pattern of attention/emotion. But it is not *constitutive* of having those preferences and so, it might be argued, individuals have a reason *to have that pattern of attention/emotion* rather than *a reason to have those preferences.*

Here's how that argument might go. Consider an analogy. Suppose that being very physically fit promotes wellbeing. Suppose, too, that being very physically fit tends to cause people to turn green (because the mechanisms of physical fitness influence the production of 'green melanin'). Does any of us have reason to turn green? Well, we have reason to become physically fit. But if we could press a button that would simply turn us green, would we have reason to do so? Clearly not, because turning green by pressing the button would not bring it about that we are physically fit. So, turning green *per se* would not promote wellbeing. Future-biased preferences are like being green in this example. We have no reason to *inculcate* those preferences, because doing so will not promote wellbeing, since it will not bring it about that we have the relevant pattern of affect/attention. If something like this reasoning is right, then even if this evidence shows that having a certain pattern of attention/affect promotes wellbeing, and not simply some kind of happiness, we ought not infer from this, that having future-biased preferences thereby promotes wellbeing. And of course, what is true of future-bias is also true of present-bias.[23]

There is a slightly different way to express our suspicion regarding the probative value of such associations for the rationality of time-biases. Recall the distinction between time-biases that are merely apparent and genuine. Merely apparent time-biases can often be rational. More often than not, as time passes by, cakes do get stale, and the prospect of eating the cake dwindles. With time-dependent utilities and uncertainty at stake, as we should all agree, it would be rational to prefer eating the cake sooner rather than later. What's at stake is the rational status of genuine time-biases, which accord significance to temporal locations *per se* even when difference in temporal locations do not beget differences in time-dependent utilities, etc.

Given the explanation of time-biases as evolutionarily adaptive *heuristics* that piggyback on our less reflective emotional and attentional systems, merely apparent time-biases can be generally regarded

---

[23] Of course, having said all this is consistent with it being rationally permissible to have those preferences. If those preferences are the causal consequence of a pattern of emotion/attention that is adaptive, and which *does* promote wellbeing, then it would seem odd to suggest that people who display those preferences have a reason to refrain from doing so. Or at least, so it might be thought.

as the product of the proper functioning of evolved heuristics, while genuine time-biases can be thought of as occurring when those same heuristics overgeneralize and misfire. Now, it might be that having a *stronger general tendency* to be future-biased – which indiscriminately boosts merely apparent and genuine instantiations – do tend to promote wellbeing because differences in pastness and futurity more often than not serve as proxies for what matters for wellbeing. But this is consistent with the contention that *genuine instances* of future-bias (when the heuristic misfires)[24] frustrate rather than promote wellbeing. Again, one might reasonably suggest that the association between (genuine) future-bias and wellbeing at best tells us that it's the heightened emotional and attentional asymmetries – which indiscriminately prompt genuine and merely apparent future-bias – that is desirable in our current environment in which future-bias tends to be merely apparent and wellbeing-promoting. It does not show, however, that genuine future-bias *per se* promotes wellbeing and is therefore rational.

5. Conclusion

We have investigated the connection between a range of measures of happiness, and three kinds of time bias: present, near, and future in an effort to shed light on whether arguments from wellbeing for, or against, having such biases enjoy empirical support. Interestingly, while we found no association between any of these measures and near-bias or present-bias, we found positive associations (and one negative one) between having future-biased preferences, and several measures of happiness. On the assumption that these measures of happiness are correlated with wellbeing, this sheds light on the soundness of several versions of the argument from wellbeing, which attempt to show that certain biases are, or are not, obligatory/impermissible. Ultimately, we suggest that while several of these arguments do enjoy empirical support, it remains unclear whether they really do give us reason to display the relevant preferences rather than only giving us reason to have certain psychological proclivities which tend to be associated with those preferences.

6. Appendix 1

Life Orientation Test:

---

[24] On the assumption that they can be action-guiding and have future repercussions.

Please answer the statements below and indicate, on a scale from 1 to 5, 1 (disagree a lot) through to 5 (agree a lot), to what extent do you agree with the following statements. Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. There are no "correct" or "incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer.

1 = I agree a lot
2 = I agree a little
3 = I neither agree nor disagree
4 = I Disagree a little
5 = I Disagree a lot

1. In uncertain times, I usually expect the best.
2. It's easy for me to relax.
3. If something can go wrong for me, it will.
4. I'm always optimistic about my future.
5. I enjoy my friends a lot.
6. It's important for me to keep busy.
7. I hardly ever expect things to go my way.
8. I don't get upset too easily.
9. I rarely count on good things happening to me.
10. Overall, I expect more good things to happen to me than bad.

Satisfaction with Life Scale:

On a 7 point Likert Scale that runs from (1) strongly disagree to (7) strongly agree, participants are asked to respond to the following statements;

1. In most ways my life is close to ideal
2. The conditions of my life are excellent
3. I am satisfied with my life
4. So far I have gotten the important things I want in life
5. If I could live my life over, I would change almost nothing

SPANE Scale:

Participants are told:

"Please think about what you have been doing and experiencing during the past four weeks. Then report how much you experienced each of the following feelings, using the scale below. For each item, select a number from 1 to 5.
1. Very rarely or never
2. Rarely
3. Sometimes
4. Often
5. Very often or always"

The items are as follows:

Positive
Negative
Good
Bad
Pleasant
Unpleasant
Happy
Sad
Afraid
Joyful
Angry
Contented

Subjective Happiness Scale:

Participants are told:

For each of the following statements/questions, please choose the point on the scale that you feel is most appropriate in describe you.

1. In general, I consider myself:

(1) Not a very happy person through to (7) a very happy person

1. Compared with most of my peers, I consider myself

(1) Less happy through to (7) more happy

2. Some people are generally very happy. They enjoy life regardless of what is going on, getting the most out of everything. To what extent does this characterisation describe you?

(1) Not at all through to (7) a great deal

3. Some people are generally not very happy. Although they are not depressed, they never seem as happy as they might be. To what extent does this characterisation describe you?

(1) Not at all through to (7) a great deal

Ryff Psychological Well Being Scale:

Participants are told to indicate their level of agreement to each statement below.

1. "I am not afraid to voice my opinions, even when they are in opposition to the opinions of most people."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

2. "For me, life has been a continuous process of learning, changing, and growth."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

3. "In general, I feel I am in charge of the situation in which I live."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

4. "People would describe me as a giving person, willing to share my time with others."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

5. "I am not interested in activities that will expand my horizons."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

6. "I enjoy making plans for the future and working to make them a reality."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

7. "Most people see me as loving and affectionate."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

8. "In many ways I feel disappointed about my achievements in life."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly

| agree | agree | agree | agree nor disagree | disagree | disagree | disagree |

9. "I live life one day at a time and don't really think about the future."

| Strongly agree | Somewhat agree | A little agree | Neither agree nor disagree | A little disagree | Somewhat disagree | Strongly disagree |

10. "I tend to worry about what other people think of me."

| Strongly agree | Somewhat agree | A little agree | Neither agree nor disagree | A little disagree | Somewhat disagree | Strongly disagree |

11. "When I look at the story of my life, I am pleased with how things have turned out."

| Strongly agree | Somewhat agree | A little agree | Neither agree nor disagree | A little disagree | Somewhat disagree | Strongly disagree |

12. "I have difficulty arranging my life in a way that is satisfying to me."

| Strongly agree | Somewhat agree | A little agree | Neither agree nor disagree | A little disagree | Somewhat disagree | Strongly disagree |

13. "My decisions are not usually influenced by what everyone else is doing."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

14. "I gave up trying to make big improvements or changes in my life a long time ago."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

15. "The demands of everyday life often get me down."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

16. "I have not experienced many warm and trusting relationships with others."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

17. "I think it is important to have new experiences that challenge how you think about yourself and the world."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

18. "Maintaining close relationships has been difficult and frustrating for me."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

19. "My attitude about myself is probably not as positive as most people feel about themselves."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

20. "I have a sense of direction and purpose in life."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

21. "I judge myself by what I think is important, not by the values of what others think is important."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

22. "In general, I feel confident and positive about myself."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

23. "I have been able to build a living environment and a lifestyle for myself that is much to my liking."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

24. "I tend to be influenced by people with strong opinions."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

25. "I do not enjoy being in new situations that require me to change my old familiar ways of doing things."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

26. "I do not fit very well with the people and the community around me."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

27. "I know that I can trust my friends, and they know they can trust me."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

28. "When I think about it, I haven't really improved much as a person over the years."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

29. "Some people wander aimlessly through life, but I am not one of them."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

30. "I often feel lonely because I have few close friends with whom to share my concerns."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

31. "When I compare myself to friends and acquaintances, it makes me feel good about who I am."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

32. "I don't have a good sense of what it is I'm trying to accomplish in life."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

33. "I sometimes feel as if I've done all there is to do in life."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

34. "I feel like many of the people I know have gotten more out of life than I have."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

35. "I have confidence in my opinions, even if they are contrary to the general consensus."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

36. "I am quite good at managing the many responsibilities of my daily life."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

37. "I have the sense that I have developed a lot as a person over time."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

38. "I enjoy personal and mutual conversations with family members and friends."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

39. "My daily activities often seem trivial and unimportant to me."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

40. "I like most parts of my personality."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

41. "It's difficult for me to voice my own opinions on controversial matters."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

42. "I often feel overwhelmed by my responsibilities."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

References

Aarts, H., Dijksterhuis, A., & De Vries, P. (2001). "On the psychology of drinking: Being thirsty and perceptually ready". *British Journal of Psychology, 92*(4), 631.

Ainslie, G. (2008). Breakdown of will. In J. E. Adler & L. J. Rips (Eds.), *Reasoning: Studies of human inference and its foundations* (pp. 156–186). Cambridge University Press. https://doi.org/10.1017/CBO9780511814273.010

Ainslie, G., & Haslam, N. (1992). Self-control. *Choice over time*, *177*, 209.

Akerlof, G. A. (1991). "Procrastination and Obedience". *The American Economic Review*, *81*(2), 1–19. http://www.jstor.org/stable/2006817

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

Baker, F., Johnson, M. W., & Bickel, W. K. (2003). Delay discounting in current and never-before cigarette smokers: similarities and differences across commodity, sign, and magnitude. *Journal of abnormal psychology*, *112*(3), 382.

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

Baron, S., Everett, B. C., Lathan, A., J., Miller, K, Tierney, H., and Oh, J. (2023). "Moving Ego versus Moving Time: Investigating the Shared Source of Future-Bias and Near-Bias". *Synthese* 10.1007/s11229-023-04286-0

Bartels, D. M., & Rips, L. J. (2010). "Psychological connectedness and intertemporal choice". *Journal of Experimental Psychology: General, 139*(1), 49–69.

Bartels, D. M., & Urminsky, O. (2011). "On intertemporal selfishness: How the perceived instability of identity underlies impatient consumption". *Journal of Consumer Research,* 38(1), 182–198.

Bickel, W. K., & Marsch, L. A. (2001). "Toward a behavioral economic understanding of drug dependence: delay discounting processes". *Addiction (Abingdon, England)*, *96*(1), 73–86.

Bickel, W. K., Yi, R., Kowell, B. P., and Gatchalian, K. M (2008). "Cigarette smokers discount past and future rewards symmetrically and more than controls: Is discounting a measure of impulsivity". *Drug and Alcohol Dependence* 96: 256–262.

Boyle, P. A., Yu, L., Gamble, K. J., & Bennett, D. A. (2013). "Temporal discounting is associated with an increased risk of mortality among community-based older persons without dementia". *PLoS ONE, 8*(6), Article e67376.

Braddon-Mitchell, D., Latham, A. J., and Miller, K (2023) "Can we turn people into pain pumps? *The Journal of Moral Philosophy.* https://doi.org/10.1163/17455243-20234084

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

Broome, John (2006). Reasoning with preferences? *Royal Institute of Philosophy Supplement 59*:183-208.

Buehler, R., Griffin, D., & Peetz, J. (2010). The planning fallacy: Cognitive, motivational, and social origins. In M. P. Zanna & J. M. Olson (Eds.), *Advances in experimental social psychology,* Vol. 43, pp. 1–62). Academic Press. https://doi.org/10.1016/S0065-2601(10)43001-4

Callender, C. (2021). The Normative Standard for Future Discounting. *Australasian Philosophical Review*, *5*(3), 227–253. https://doi.org/10.1080/24740500.2021.2112087

Callender, C. (2022). Is Discounting for Tense Rational? In Hoerl, Christoph; McCormack, Teresa & Fernandes, Alison (eds.) *Temporal Asymmetries in Philosophy and Psychology*. Oxford: Oxford University Press.

Caruso, E. M., Van Boven, L., Chin, M., & Ward, A. (2013). The temporal Doppler effect: When the future feels closer than the past.

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

Caruso, E., Latham, A. J., and Miller, K. (2024). "Is future bias a manifestation of the temporal value asymmetry?" *Philosophical Psychology.*

Caruso, E. M., Maglio, S. J., & Van Boven, L. (2024). *The prioritization of prospection.* Forthcoming.

Carver CS, Scheier MF, Segerstrom SC. (2010). "Optimism". *Clin Psychol Rev.* 30(7):879-89.

Cavanagh K, Strauss C, Forder L, Jones F. (2014). "Can mindfulness and acceptance be learnt by self-help?: a systematic review and meta-analysis of mindfulness and acceptance-based self-help interventions". *Clin Psychol Rev.* 34(2):118-29.

Chabris CF, Laibson D, Morris CL, Schuldt JP, Taubinsky D. (2008). "Individual laboratory-measured discount rates predict field behavior". J Risk Uncertain. 37(2-3): 237-269. doi: 10.1007/s11166-008-9053-x. PMID: 19412359; PMCID: PMC2676104.

Chapman GB, Elstein AS. (1995). "Valuing the future: temporal discounting of health and money". *Med Decis Making.* 15(4):373-86.

Chris Janiszewski, Andrew Kuo, Nader T. Tavassoli (2012). "The Influence of Selective Attention and Inattention to Products on Subsequent Choice". *Journal of Consumer Research.* 39(6): 1258–1274.

Crisp, Roger, "Well-Being", The Stanford Encyclopedia of Philosophy (Winter 2021 Edition), Edward N. Zalta (ed.), URL =<https://plato.stanford.edu/archives/win2021/entries/well-being/>.

Davidson, Donald; McKinsey, J. C. C. & Suppes, Patrick (1955). Outlines of a formal theory of value, I. *Philosophy of Science* 22 (2):140-160.

Deng, N., Hodroj, B., Latham, A. J., Lee-Tory, J, and Miller, K., (2024). "Is Present Bias a Distinctive Psychological Kind?" *Inquiry.* 10.1080/0020174X.2024.2321614

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.*

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). "The Satisfaction With Life Scale". *Journal of Personality Assessment, 49*(1), 71–75.

Diener, E., Wirtz, D., Biswas-Diener, R., Tov, W., Kim-Prieto, C., Choi, D.-w., & Oishi, S. (2009). "New measures of well-being". In E. Diener (Ed.), *Assessing well-being: The collected works of Ed Diener* (pp. 247–266).

Dijksterhuis, A., & Aarts, H. (2010). "Goals, attention, and (un)consciousness". *Annual Review of Psychology, 61,* 467–490.

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.

Dyke, Heather & Maclaurin, James (2002). 'Thank Goodness That's Over': The Evolutionary Story. *Ratio 15* (3):276–292.

Ersner-Hershfield H, Wimmer GE, Knutson B. (2009). "Saving for the future self: neural measures of future self-continuity predict temporal discounting". *Soc Cogn Affect Neurosci.* 4(1):85-92.

Ersner-Hershfield, H., Garton, M. T., Ballard, K., Samanez-Larkin, G. R., & Knutson, B. (2009). "Don't stop thinking about tomorrow: Individual differences in future self-continuity account for saving". *Judgment and decision making, 4*(4), 280–286.

Fernandes, A. 2022. Caring for Our Future Selves. In Hoerl, Christoph; McCormack, Teresa & Fernandes, Alison Sutton (eds.), *Temporal Asymmetries in Philosophy and Psychology.* Oxford: Oxford University Press.

Fiedler S, and Glöckner A. (2012). "The dynamics of decision making in risky choice: an eye-tracking analysis". *Front Psychol.* 1;3:335.

Fiedler, S., Glöckner A, Nicklisch, A., and 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. https://doi.org/10.1016/j.obhdp.2012.07.002.

Frederick, S., Loewenstein, G., & O'Donoghue, T. (2002). "Time discounting and time preference: A critical review". In G. Loewenstein, D. Read, & R. Baumeister (Eds.), *Time and decision: Economic and psychological perspectives on intertemporal choice* (pp. 13–86). Russell Sage Foundation.

Frederick, S., Loewenstein, G., & O'Donoghue, T. (2002). Time discounting and time preference: A critical review. *Journal of economic literature*, *40*(2), 351-401.

Frijda, N. H. (1986). *The emotions.* Cambridge University Press; Editions de la Maison des Sciences de l'Homme.

Frijda, N. H., Kuipers, P., & ter Schure, E. (1989). "Relations among emotion, appraisal, and emotional action readiness". *Journal of Personality and Social Psychology, 57*(2), 212–228.

Garrett, Brian (2018). Experience and Time. *Acta Analytica* 33 (4):427-430.

Ghaffari, M., & Fiedler, S. (2018). "The power of attention: Using eye gaze to predict other-regarding and moral choices". *Psychological Science, 29*(11), 1878–1889.

Green, L., Myerson, J., Lichtman, D., Rosen, S., & Fry, A. (1996). "Temporal discounting in choice between delayed rewards: The role of age and income". *Psychology and Aging, 11*(1), 79–84.

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

Greene, P., Holcombe, A., Latham, A. J., Miller, K., and Norton, J. (2020). "The Rationality of 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. (2022c). 'Why Are People So Darn Past Biased?' In *Temporal Asymmetries in Philosophy and Psychology*, edited by Christoph Hoerl, Teresa McCormack and Alison Fernandes. Oxford: Oxford University Press. DOI: 10.1093/oso/9780198862901.001.0001

Greene, P., Latham, A. J. Miller, K and Norton, J. (2022a). "On Preferring that overall, things are worse". *Philosophy and Phenomenological Research,* 105:1, 181-194. DOI: 10.1111/phpr.12819 DOI:10.1111/phpr.12819

Greene, P., Latham, A. J., Miller, K., and Norton, J. (2021a). 'Hedonic and Non-hedonic Bias Towards the Future.' *Australasian Journal of Philosophy*, 99:1, 148-163. DOI: 10.1080/00048402.2019.1703017

Greene, P., Latham, A. J., Miller, K., and Norton, J. (2021b). 'Capacity for Simulation and Mitigation Drives Hedonic and Non-Hedonic Time Biases' *Philosophical Psychology.* DOI: 10.1080/09515089.2021.1960299

Greene, P., Latham, A. J., Miller, K., Norton, J., Tarsney, C., & Tierney, H. (2022). Bias towards the future. *Philosophy Compass*, e12859.

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

Greene, Preston ; Latham, Andrew ; Miller, Kristie & Nielsen, Michael (2024). "The implicit decision theory of non-philosophers". *Synthese* 203 (2):1-23.

Greene, Preston (2021). 'Pure' Time Preferences Are Irrelevant to the Debate over Time Bias: A Plea for Zero Time Discounting as the Normative Standard. *Australasian Philosophical Review* 5 (3):254-265.

Harrison, G. W., Lau, M. I., & Rutström, E. E. (2010). "Individual discount rates and smoking: evidence from a field experiment in Denmark". *Journal of health economics*, *29*(5), 708–717. https://doi.org/10.1016/j.jhealeco.2010.06.006

Hassija CM, Luterek JA, Naragon-Gainey K, Moore SA, Simpson T. (2012). "Impact of emotional approach coping and hope on PTSD and depression symptoms in a trauma exposed sample of Veterans receiving outpatient VA mental health care services". *Anxiety Stress Coping.* 25(5):559-73.

Hausman, Daniel M. 2012. *Preference, Value, Choice, and Welfare.* Cambridge: Cambridge University Press.

Hausman, J. A. (1979). Individual discount rates and the purchase and utilization of energy-using durables. *The Bell Journal of Economics*, 33-54.

Haybron, Dan, "Happiness", The Stanford Encyclopedia of Philosophy (Summer 2020 Edition), Edward N. Zalta (ed.), URL = < https://plato.stanford.edu/entries/happiness/>

Heathwood, C. 2008. Fitting Attitudes and Welfare, *Oxford Studies in Metaethics* 3: 47-73.

Hedden, Brian (2015). *Reasons Without Persons: Rationality, Identity, and Time.* Oxford, United Kingdom: Oxford University Press UK.

Hershfield, H. E., Cohen, T. R., & Thompson, L. (2012). "Short horizons and tempting situations: Lack of continuity to our future selves leads to unethical decision making and behavior". *Organizational Behavior and Human Decision Processes, 117*(2), 298–310.

Hoerl, Christoph (2022). Past/future attitude asymmetries: Values, preferences and the phenomenon of relief. In Christoph Hoerl, Teresa McCormack & Alison S. Fernandes (eds.), *Temporal asymmetries in philosophy and psychology.* Oxford: Oxford University Press. pp. 204-222.

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

Horwich, Paul (1987). Asymmetries in Time: Problems in the Philosophy of Science (Cambridge,

Hsu, M., Lin, H. T., & McNamara, P. E. (2008). "Neuroeconomics of decision-making in the aging brain: the example of long-term care". *Advances in health economics and health services research, 20*, 203–225.

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

Kassam, K. S., Gilbert, D. T., Boston, A., & Wilson, T. D. (2008). Future anhedonia and time discounting. *Journal of Experimental Social Psychology, 44*(6), 1533–1537. https://doi.org/10.1016/j.jesp.2008.07.008 '

Kennedy, J. (2020). Subjective wellbeing and the discount rate. *Journal of Happiness Studies: An Interdisciplinary Forum on Subjective Well-Being, 21*(2), 635–658. https://doi.org/10.1007/s10902-019-00096-9

Koopmans, T. C. (1960). Stationary ordinal utility and impatience. *Econometrica: Journal of the Econometric Society*, 287-309.

Kurtz, J. L., Wilson, T. D., & Gilbert, D. T. (2007). "Quantity versus uncertainty: When winning one prize is better than winning two". *Journal of Experimental Social Psychology, 43*(6), 979–985.

Laibson, David (1997). "Golden eggs and hyperbolic discounting". *Quarterly Journal of Economics* 112(2): 443-477.

Lancaster, K. (1963). An axiomatic theory of consumer time preference. *International economic review, 4*(2), 221-231.

Latham, A. J. Oh, J., Miller, K. Shpall, S. Yu, W., (2024) "Exploring Arbitrariness Objections to Time-Biases" *Journal of the American Philosophical Association.* https://doi.org/10.1017/apa.2023.14

Latham, A. J., Miller, K and Norton, J. (2023). "Against a Normative Asymmetry between Near- and Future-bias" *Synthese* 201 (9).1007/s11229-023-04045-1

Latham, Andrew J.; Miller, Kristie ; Norton, James & Tarsney, Christian (2020). Future bias in action: does the past matter more when you can affect it? *Synthese* 198 (12):11327-11349.

Lawless, Lydia, Drichoutis, Andreas, and Nayga, Rodolfo (2013). "**Time preferences and health behaviour: a review**," Agricultural and Food Economics, Springer;Italian Society of Agricultural Economics (SIDEA), vol. 1(1), pages 1-19, December.

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

Lee, R., Hoerl, C., Burns, P., Fernandes, S., O'Connor, P., & 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).

Loewenstein, G. (1987). Anticipation and the valuation of delayed consumption. *The Economic Journal*, 97(387), 666-684.

Loewenstein, G. & Angner, E. 2002. "Predicting and Honoring Changing Preferences," in *Time and Decision: Economic and Psychological Perspectives on Intertemporal Choice*. George Loewenstein, Daniel Read and Roy Baumeister, eds. NY: Russell Sage.

Loewenstein, G., & Prelec, D. (1991). Negative time preference. *The American Economic Review*, *81*(2), 347-352.

Lowenstein, G. E. J., & Elster, J. (1992). Choice over Time (New York: Russel Sage Foundation).

Lowry, R. and M Peterson (2011). "Pure Time Preference" *Pacific Philosophical Quarterly* (92): 490–508.

Lyubomirsky, S., & Lepper, H. S. (1999). "A measure of subjective happiness: Preliminary reliability and construct validation". *Social Indicators Research, 46*(2), 137–155.

MacInnes DL. (2006). "Self-esteem and self-acceptance: an examination into their relationship and their effect on psychological health". *J Psychiatr Ment Health Nurs*. 13(5):483-9.

MacInnes, Douglas. (2006). Self-esteem and self-acceptance: An examination into their relationship and their effect on psychological health. Journal of psychiatric and mental health nursing. 13. 483-9. 10.1111/j.1365-2850.2006.00959.x.

Mass.: MIT Press)

Medvedev, O. N., & Landhuis, C. E. (2018). Exploring constructs of well-being, happiness and quality of life. *PeerJ*, *6*, e4903. https://doi.org/10.7717/peerj.4903

Meier, Stephan, and Charles Sprenger. 2010. "Present-Biased Preferences and Credit Card Borrowing." *American Economic Journal: Applied Economics*, 2 (1): 193–210**.**

Milfont T. L., Gapski E. (2010). *Cross-cultural differences in time orientations: Integrating culture-level data.* Paper presented at the 20th Congress of the International Association for Cross-Cultural Psychology, Melbourne, Australia.

Miller, K. (2024). *The normative status of time bias: an empirically led investigation.* Routledge.

Mormann, M and Russo, J.E., (2021). Does Attention Increase the Value of Choice Alternatives?, *Trends in Cognitive Sciences,* 25(4) 305-315, https://doi.org/10.1016/j.tics.2021.01.004.

Noguchi T, Stewart N, Olivola CY, Moat HS, Preis T. (2014). "Characterizing the time-perspective of nations with search engine query data". *PLoS One*. 15;9(4):e95209.

Nolen-Hoeksema, S. (1991). "Responses to depression and their effects on the duration of depressive episodes". *Journal of Abnormal Psychology, 100*(4), 569–582.

Nolen-Hoeksema, S. (2000). "The role of rumination in depressive disorders and mixed anxiety/depressive symptoms". *Journal of Abnormal Psychology, 109*(3), 504–511.

O'Brien, E., Ellsworth, P. C., and Schwarz, N. (2012). Today's misery and yesterday's happiness: Differential effects of current life-events on perceptions of past wellbeing. Journal of Experimental Social Psychology, 48, 968–72.

Odum, Amy. (2011). Delay discounting: Trait variable?. Behavioural processes. 87. 1-9. 10.1016/j.beproc.2011.02.007.

Orphanides, A., & Zervos, D. (1995). Rational Addiction with Learning and Regret. *Journal of Political Economy*, *103*(4), 739–758. http://www.jstor.org/stable/2138580

Parfit, Derek. 1984. *Reasons and Persons.* Oxford: Oxford University Press.

Paul Dolan, Tessa Peasgood, Mathew White, (2008). "Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being". *Journal of Economic Psychology*, 29(1): 94-12.

Polivy, J., & Herman, C. P. (2002). If at first you don't succeed: False hopes of self-change. *American Psychologist, 57*(9), 677–689. https://doi.org/10.1037/0003-066X.57.9.677

Preis, T., Moat, H. & Stanley, H. (2013). "Quantifying Trading Behavior in Financial Markets Using *Google Trends". Sci Rep* **3** 1684.

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

Rachlin, Howard ; Battalio, Ray ; Kagel, John & Green, Leonard (1981). "Maximization theory in behavioral psychology". *Behavioral and Brain Sciences* 4 (3):371-388.

Ramos, J., Caruso, E. M., & Van Boven, L. (2022). "Prospection, retrospection, and well-being". In C. Hoerl, T. McCormack, & A. Fernandes (Eds.), *Temporal asymmetries in philosophy and psychology* (pp. 29–62).

Rawls, J. (1971). *A Theory of Justice*. Cambridge, MA: Belknap

Rinaldi, L., Locati, F., Parolin, L., Bernardi, N. F., & Girelli, L. (2016). "Walking on a mental time line: Temporal processing affects step movements along the sagittal space". *Cortex: A Journal Devoted to the Study of the Nervous System and Behavior, 78,* 170–173.

Rush, J. & Grouzet, F. M. E. (2012). It is about time: Daily relationships between temporal perspective and well-being. The Journal of Positive Psychology, 7(5), 427–442. http://doi.org/10.1080/17439760.2012.713504 10.1080/17439760.2012.713504

Rutchick, A. M., Slepian, M. L., Reyes, M. O., Pleskus, L. N., & Hershfield, H. E. (2018). "Future self-continuity is associated with improved health and increases exercise behavior". *Journal of Experimental Psychology: Applied, 24*(1), 72–80.

Ryff, Almeida, Ayanian, Carr, Cleary, Coe, and Williams (2010) *National Survey of Midlif Development in the United States (MIDUS II) 2004-2006: Documentation of psychological constructs and composite variables in MIDUS II Project 1*. Ann Arbor, MI: Inter-University Consortium for Political and Social Resrarch.

Scheffler, S. (2021). Temporal Neutrality and the Bias Toward the Future. In McMahan, J et al. (eds), *Principles and Persons: The Legacy of Derek Parfit*. Oxford University Press. https://doi.org/10.1093/oso/9780192893994.003.0005

Scholten, H., Scheres, A., De Water, E., Graf, U., Granic, I., & Luijten, M. (2019). Behavioral trainings and manipulations to reduce delay discounting: A systematic review. *Psychonomic Bulletin & Review, 26*(6), 1803-1849. doi:https://doi.org/10.3758/s13423-019-01629-2

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

Sidgwick, H. (1884). *The Methods of Ethics*. London: Macmillan.

Sloman, D. Ainslie, G., Frederick, S., Li, X., Lynch, J., Moreau, P., Mitchell, A., Read, D., Sawyer, A., Trope, Y., Wertenbroch, K., & Strotz, R. H. (1956). "Myopia and Inconsistency in Dynamic Utility Maximisation". *The Review of Economic Studies*. 23(3): 165-180.

Soman, D., Ainslie, G., Frederick, S. *et al.* "The Psychology of Intertemporal Discounting: Why are Distant Events Valued Differently from Proximal Ones?". *Market Lett* **16**, 347–360 (2005).

Störmer, V. S., & Alvarez, G. A. (2016). "Attention alters perceived attractiveness". *Psychological Science, 27*(4), 563–571.

Story, G. W., Vlaev, I., Seymour, B., Darzi, A., & Dolan, R. J. (2014). "Does temporal discounting explain unhealthy behavior? A systematic review and reinforcement learning perspective". *Frontiers in behavioral neuroscience*, *8*, 76. https://doi.org/10.3389/fnbeh.2014.00076

Suhler, Christopher & Callender, Craig (2012). Thank Goodness That Argument Is Over: Explaining the Temporal Value Asymmetry. *Philosophers' Imprint* 12:1-16.

Sullivan, M. (2018). *Time Biases: a Theory of Rational Planning and Personal Persistence.* OUP.

Thaler, R. (1981). Some empirical evidence on dynamic inconsistency. *Economics letters*, *8*(3), 201-207.

Van Boven, L. V. and Ashworth, L. (2007). "Looking forward, looking back: Anticipation is more evocative than retrospection." Journal of Experimental Psychology 136(2): 289-300.

Van Boven, L., Kane, J, McGraw, A. P, and Dale, J. (2010). "Feeling close: emotional intensity reduces perceived psychological distance." *Journal of Personality and Social Psychology.* 98(6): 872-885.

van Gelder, J.-L., Hershfield, H. E., & Nordgren, L. F. (2013). "Vividness of the future self predicts delinquency". *Psychological Science, 24*(6), 974–980.

Warner, John, T., and Saul Pleeter. (2001). "The Personal Discount Rate: Evidence from Military Downsizing Programs." *American Economic Review*, 91 (1): 33–53.

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". *Journal of Personality and Social Psychology, 88*(1), 5–21.

Yi, R., Gatchalian, K. M., & Bickel, W. K. (2006). Discounting of past outcomes. *Experimental and clinical psychopharmacology, 14*(3), 311.

Zimbardo, P. G., and Boyd, J. N. (2015). Putting time in perspective: A valid, reliable individual-differences metric. In *Time Perspective Theory; Review, Research and Application* (pp. 17–55). Cham: Springer.