Anticipated Temporal Landmarks Undermine Motivation for Continued Goal Pursuit

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Acknowledgements: We thank Claire Li and Katie Shonk for feedback on the manuscript. We also thank Linda Wang, Michael Zdinak, Sheng Xu, Tayler Bergstrom and UCLA Anderson Behavioral Lab for assistance with data collection. This work was supported by UCLA Anderson School of Management, UCLA Anderson Behavioral Lab, SKK Graduate School of Business (Special Research Fund), National University of Singapore Start-up Grant (R-317-000-124-133), and University of Florida Warrington College of Business.

Anticipated Temporal Landmarks Undermine Motivation for Continued Goal Pursuit

Abstract

Temporal landmarks, especially those that signal new beginnings, have been shown to spur goal initiation. We draw attention to a dark side of temporal landmarks by examining the effects of anticipated temporal landmarks on motivation to persist in an ongoing goal. Across an archival study and four experiments, we find that when an upcoming temporal landmark becomes salient and signals a new beginning, individuals perceive their current and future selves as two separate agents and optimistically believe that their future self will take the responsibility, which licenses them to exert less effort toward their ongoing goals in the present. However, individuals who reduce effort in anticipation of a temporal landmark may not work harder to compensate for the lost progress after the landmark. This detrimental effect of anticipated temporal landmarks is mitigated when individuals are reminded of everyday activities they consistently do to meet their goal.

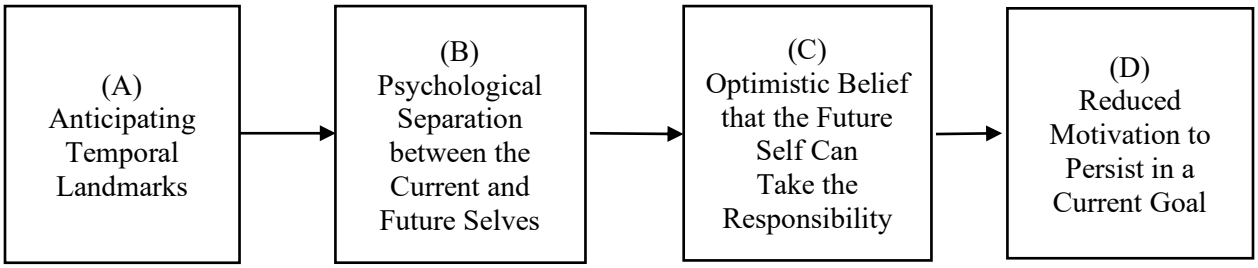
Keywords: temporal landmark, goal pursuit, current self, future self, optimistic belief, responsibility shift

At the beginning of a new year, many people have the best intention of setting resolutions to accomplish important goals. For example, Google searches for gyms, purchases of gym membership, and foot traffic to gyms spike in January each year (Swanson, 2016). Similar self-improvement behaviors also surge on the first day of a week, birthdays, the first day of a new season, and the day one starts a new job or a new school—more broadly, on "temporal landmarks" that demarcate boundaries between temporal periods (Dai, Milkman, & Riis, 2014, 2015; Hennecke & Converse, 2017). However, successful goal pursuit requires not only goal initiation but also persistent effort investment. Beyond the exciting initiation of new goals, it is critical to understand how motivation to persist in *ongoing goal pursuit* changes over time, especially when people are anticipating temporal landmarks.

We propose that focusing on an upcoming temporal landmark can undermine one's current motivation to devote continued effort toward an ongoing goal. When an upcoming temporal landmark becomes salient and signals a new beginning, people view their future self as another agent disconnected from their present self (Bartels & Rips, 2010; Peetz & Wilson, 2013, 2014; Ungemach, Stewart, & Reimers, 2011). Prior research suggests that people reduce their effort on a task if they feel that another person can share the responsibility (Bem, Wallach, & Kogan, 1965; Latané & Darley, 1968) and if they form optimistic beliefs about their future progress (Buehler & Griffin, 2003; Tanner & Carlson, 2008; Taylor & Brown, 1994; Zhang, Fishbach, & Dhar, 2007). Building on these insights, we argue that when people view their post-landmark future self as a separate agent, they become optimistic that their future self can take the responsibility of pursuing the current goal and thus will feel licensed to work less hard toward the current goal (see Figure 1 for our theoretical model). For example, for people who have been pursuing a dieting goal (i.e., an ongoing goal), thinking about the upcoming New Year may lead

them to feel less motivated to continue on their diet because they expect their new, future self will pick up the slack after the New Year. We test our theoretical model across one archival study and four experiments, which robustly demonstrate a self-defeating effect of temporal landmarks on one's motivation: Individuals reduce effort in anticipation of a temporal landmark but may not compensate for the lost progress after the landmark.

Figure 1. Theoretical Model



The current research makes several important contributions to the existing literature. First, past research has focused on the positive effects of temporal landmarks on motivation (Ayers, Althouse, Johnson, & Cohen, 2014; Beshears, Milkman, Dai, & Benartzi, 2019; Dai et al., 2014; 2015; Davydenko & Peetz, 2019; Peetz & Wilson, 2013; for a review, see Dai & Li, 2019). Specifically, temporal landmarks that have just occurred can spur goal initiation and increase engagement in goal-related activities by allowing people to relegate imperfections to their past selves (the "fresh start effect"; Dai et al., 2014, 2015); temporal landmarks in between the present and an ideal future state can stimulate actions toward the ideal state (e.g., exercise to become healthier) by enlarging the perceived gap between their current state and their ideal post-landmark state (Peetz & Wilson, 2013). By showing that anticipated temporal landmarks can have a detrimental effect on motivation to persist in the pursuit of an *ongoing goal*, we advance

the field's understanding of how motivation dynamically changes before or after temporal landmarks.

Second, our research identifies a mechanism that has important implications for the literature on social loafing (Ingham, Levinger, Graves, & Peckham, 1974; Karau & Williams, 1993; Latané, Williams, & Harkins, 1979). Our mechanism can be viewed as "intrapersonal loafing," whereby a goal pursuer shirks her obligations when she believes that a separate temporal self (i.e., her future self) can take on the responsibility for a current goal. Thus, our findings suggest that loafing occurs not only with other individuals, but also with other temporal selves within an individual.

Third, our research contributes to the literature on self-regulation and licensing (Fishbach & Dhar, 2005; Jordan, Mullen, & Murnighan, 2011; Khan & Dhar, 2006, 2007; Monin & Miller, 2001; Zhang et al., 2007) by identifying a novel antecedent of licensing behavior. Specifically, we show that anticipating an upcoming temporal landmark licenses one to relax one's current goal pursuit by evoking optimistic beliefs about the future self.

Temporal Landmarks Separate Temporal Selves

People can construe multiple temporal selves, such that they view their past self, present self, and future self independently of one another and make temporal comparisons in self-appraisals (e.g., comparing their past self with the present one; Wilson & Ross, 2000; 2001). People even treat their past and future selves as different agents from their current self and make more observer-like (vs. actor-like) attributions to their past and future selves (Pronin & Ross, 2006). Importantly, such perceptions of separate temporal selves can be amplified by temporal landmarks.

Temporal landmarks are defined as "special dates that stand in marked contrast to the seemingly unending stream of trivial and ordinary occurrences" (Shum, 1998, p, 423). They include transition points on the calendar or other timetables shared by many people (e.g., the start of a new week, month, year, or academic semester; national holidays; and school breaks; Robinson, 1986). Temporal landmarks also include personal milestones (e.g., college graduation, job promotions, moving to a new city) as well as recurring significant occasions (e.g., birthdays, anniversaries; Shum, 1998).

The reason that temporal landmarks can create psychological separation between temporal selves is related to people's fundamental tendency to contrast objects in separate mental categories and assimilate objects in the same category (Mishra & Mishra, 2010; Peetz & Wilson, 2013; Schwarz & Bless, 2007; Tverksy, 1992). For example, two points depicted in the same spatial group are perceived as closer than two points depicted in different spatial groups, despite the fact that the objective distance between two points is the same in both cases (Tversky, 1992). Similarly, two cities in the same state can be perceived as having a similar likelihood of undergoing natural disasters than two cities located in two different states, even when the distance between the latter two cities is smaller than the distance between the former two cities (Mishra & Mishra, 2010). In a similar vein, by creating boundaries between temporal periods (Dai et al., 2015; Peetz & Wilson, 2013; Tu & Soman, 2014), temporal landmarks can induce people to view two temporal selves as more distant and different from each other if the selves are on two sides of a temporal landmark (i.e., in two mental categories) than if they are on the same side of the temporal landmark (i.e., in the same mental category; Bartels & Rips, 2010; Dai et al. 2015; Peetz & Wilson, 2013; 2014). Particularly related to our research, when a future temporal landmark (e.g., graduation next month) becomes salient, people are more likely to view their

future self after the landmark (e.g., post-graduation) as dissimilar and disconnected from who they are now (Peetz & Wilson, 2013).

Following this logic, temporal landmarks that are more salient and feel more like a new beginning, such as those that mark the first day of a calendar period (e.g., New Year's Day), the start of a new era (e.g., one's 30th birthday), and first experiences (e.g., a move to one's first apartment), should be more likely to demarcate category boundaries and thus can create a stronger separation between temporal selves as compared to temporal landmarks that feel less like a new beginning (e.g., Thanksgiving, one's 32nd birthday, a move to one's fifth apartment). Indeed, prior research has shown that temporal landmarks signaling new beginnings induce a stronger separation between temporal selves (Dai et al., 2015).

In this research, we propose that psychological separation of temporal selves caused by upcoming temporal landmarks has important implications for individuals' goal motivation, especially when temporal landmarks are salient and signal new beginnings. In contrast to the focus of prior research on motivation to initiate a goal (e.g., Beshear et al. 2019; Dai et al., 2014, 2015; Hennecke & Converse, 2017; Peetz & Wilson, 2013), we focus our investigation on individuals' motivation to work toward an ongoing goal that they have already been pursuing.

The Effect of Anticipated Temporal Landmarks on Continued Goal Pursuit

Integrating research on the diffusion of responsibility (Bem et al., 1965; Karau & Williams, 1993; Latané & Darley, 1968) and the dynamics of self-regulation (Fishbach & Dhar, 2005; Fishbach, Koo, & Finkelstein, 2014; Zhang et al., 2007), we propose that anticipated temporal landmarks can lead people to form an optimistic belief that their future self can take on the responsibility for their goal pursuit, which in turn undermines their current motivation to expend effort on an ongoing goal.

The literature on the diffusion of responsibility (Bem et al., 1965; Karau & Williams, 1993; Latané & Darley, 1968) suggests that the presence of others in a situation (e.g., as when a stranger needs help or a group task needs to be completed) leads people to believe that others will share the responsibility, which reduces their likelihood of taking action (e.g., bystander effect; Fischer et al., 2011; social loafing; Karau & Williams, 1993; 1995). This is especially the case when people believe that others might perform better than they themselves (e.g., Kerr, 1983; Kerr & Bruun, 1983). In contexts that require self-regulatory resources, as in goal pursuit, the presence of others induces an individual to delegate responsibility to others and exercise less self-control in joint goal pursuit (vanDellen & Baker, 2011). Even anthropomorphizing a tempting food product can create another agent in the situation and reduce a dieter's perceived responsibility for exercising self-control, which in turn decreases her motivation to pursue a diet goal (Hur, Koo, & Wilhelm, 2015).

We expect that the dilution of responsibility in shared goal pursuit can occur not only when other people are present but also when another temporal self comes into the picture. As an anticipated temporal landmark creates a psychological separation between their current and future selves (Dai et al., 2015; Peetz & Wilson, 2013), people may believe that their current self has another temporal agent (the future self) to share the responsibility for a goal. Moreover, the presence of a separate future self may intensify people's tendency to make optimistic predictions about their future goal pursuit and to believe more goal progress will be accomplished in the future (Buehler, Griffin, & Ross, 2002; Taylor & Brown, 1994; Weinstein, 1989; Zhang et al., 2007). As a result, people anticipating a temporal landmark may form an optimistic belief that the post-landmark future self can take on the responsibility of current goal pursuit.

We expect this process to further affect people's current goal motivation and lead to "intrapersonal loafing." Specifically, the literature on the dynamics of self-regulation suggests that when people plan or expect to make more progress in the future, they are less motivated to work in the present (Fishbach & Dhar, 2005; Fishbach et al., 2014; Zhang et al., 2007). People often justify their present choice of goal-inconsistent actions by "borrowing" from expected future goal progress (Fishbach & Dhar, 2005). For example, people are more likely to consume fatty foods once they indicate positive expectations about their future workouts. Building on this literature, we predict that as temporal landmarks activate an optimistic belief that the future self can take on the responsibility for ongoing goal pursuit, people will feel licensed to relax their goal pursuit in the present. Overall, we theorize that as an upcoming temporal landmark becomes salient, people tend to view their future self as a separate agent and to optimistically believe that their future self will do the work required to meet their goal, thus allowing them to slack off in the present.

Overview of Studies

To test our predictions about how and why anticipating a temporal landmark changes current motivation for continued goal pursuit, we conducted five studies, including an archival study (Study 1), a longitudinal field experiment (Study 2), a laboratory experiment (Study 4), and two online experiments (Studies 3 and 5). Because people are more likely to anticipate a salient landmark (Peetz & Wilson, 2013), in Studies 1, 2, 3, and 5, we compare situations where a future temporal landmark is more versus less salient. The salience of a temporal landmark depends on how close it is to the present moment (Study 1; Dai et al., 2014), whether people's attention is drawn to it or not (Study 2; Hennecke & Converse, 2017), and whether it is viewed

as signaling a new beginning (Studies 1, 3 and 5; Dai et al., 2015). In Study 4, we compare situations where a future temporal landmark exists or not.

In Study 1, using Google search data, we examined how searches for popular terms related to health goals naturally change with (1) the distance to a future temporal landmark and (2) the extent to which the future temporal landmark feels like a new beginning. In Studies 2–5, we experimentally tested how the anticipation of a temporal landmark affected individuals' motivation to pursue their ongoing goals, and we examined goals that people were already pursuing (Studies 3 and 5) or goals that we introduced (Studies 2 and 4). In addition, Studies 3 and 4 tested the underlying mechanism that anticipated temporal landmarks reduce motivation for current goal pursuit because people optimistically believe that their future self can take responsibility for goal pursuit. In Study 3, we measured this optimistic belief and tested its role via mediation analysis. In Study 4, we directly manipulated the optimistic belief about the future self and tested its role via a moderation approach (Spencer, Zanna, & Fong, 2005). Finally, in Study 5, we explored a potential remedy for the demotivating effect of anticipated temporal landmarks. For all experiments, we determined sample size in advance of data collection.

Study 1: Field Study of Google Search Behavior

Social psychology and micro-organizational researchers increasingly endorse archival methodology as a means of uncovering real-world phenomena with consequential outcomes across a long period of time (Barnes, Dang, Leavitt, Guarana, & Uhlmann, 2018; Heng, Wagner, Barnes, & Guarana, 2018). Thus, in Study 1, we tested our hypothesis by analyzing a longitudinal, archival dataset tracking online searches about a general and popular goal shared by many people: *being healthy* (ComRes, 2015; Armstrong, 2018). We have two key predictions. First, since a temporal landmark (e.g., New Year's Day) is more salient in the period right before

it (e.g., in December) than in the period far in advance of it (e.g., in July), we predicted that Internet searches for health-goal-related information would be lower during the period right before temporal landmarks as compared to the average search volume during other periods. Second, we predicted that this demotivating effect would be stronger for temporal landmarks that feel more (vs. less) like a new beginning (e.g., New Year's Day vs. Columbus Day).

Methods

Data

Our data source is "Google Trends" (http://www.google.com/trends), a Google service that shows how frequently a particular search term is entered in the Google search engine. Google Trends data are gaining popularity among researcher and practitioners (e.g., Baldwin & Mussweiler, 2018; Carneiro & Mylonakis, 2009; Choi & Varian, 2012; Dai et al., 2014; Wagner, Barnes, Lim, & Ferris, 2012) because they track the search behavior of a large portion of Internet users unobtrusively (which reduces concerns about representativeness and social desirability bias that survey data commonly face) and reflect Internet users' shifting interests in a timely manner.[1]

Notably, Google Trends does not provide the absolute frequency at which a search term is entered in Google. Instead, to account for general Internet traffic, Google Trends first normalizes the search volume for a given term in a given area (e.g., the United States) in a given time period relative to the total search volume for any and all terms in Google in the same area during the same period. Thus, by design, Google Trends shows people's *relative* interest in a given search term as compared to all other things they may search for on Google. This design

[1] Prior research has validated that Google search data are indicative of what people are relatively more or less interested in (e.g., Choi & Varian, 2012; Carneiro & Mylonakis, 2009). For example, automotive-related searches positively correlate with actual automobile sales; searches related to crime negatively correlate with indices of consumer confidence (Choi & Varian, 2012); and searches for influenza-related topics are strongly correlated with the share of the population that have influenza symptoms and can be used to detect regional outbreaks of influenza 7–10 days before conventional Centers for Disease Control and Prevention surveillance systems (Carneiro & Mylonakis, 2009).

feature makes Google Trends data useful in comparing the general population's interest in a given activity across time periods and regions.[2] Further, Google scales the data such that the day in each extraction period with the highest number of searches for a given term (relative to total Google queries) is assigned a scaled value of 100, and other days receive values that are scaled accordingly to fall between 0 and 100.[3]

We used the relative frequency of people searching for health-goal-related information on Google as a proxy measure of their motivation to pursue the health goal. We first conducted a survey to systematically determine popular search terms related to the goal of being healthy. Using a two-stage recruitment process (Wessling, Huber, & Netzer, 2017), we recruited 61 MTurk participants who were currently pursuing a health goal (42.6% female, M_{age} = 37.25). We asked participants to list three terms they had searched for or would search for on Google to facilitate the pursuit of their health goal. Given that many participants provided search terms that were a phrase or sentence (rather than a word), we computed the frequency of words appearing in the 181 valid terms participants listed using a text-analysis tool (Textalyser) that has been used in prior research (Krishnamurthy & Kucuk, 2009; Rosha, 2013). We examined Google searches for the top three terms that appeared most frequently: "health" (43 times), "exercise" (23 times), and "diet" (17 times). Hereafter, we refer to these terms as "health-goal-related terms."

Our study period ranged from January 1, 2009 to December 31, 2018 (3,652 days), covering the ten complete years before our data collection. Since daily data can only be extracted

[2] For example, without such normalization, if users of Google Trends see the absolute search volume for a term increases over time, they cannot conclude whether the increase occurs because the general population has become more and more interested in that term or because the number and frequency of people using Google increases over time. Thus, measuring relative popularity by adjusting for people's general tendency to search on Google is valuable.

[3] Google Trends reports a value of "zero" when the actual search volume falls below a given, undisclosed threshold. Such data transformation does not affect the validity of our results, since our data do not contain zeros.

in intervals of 269 days or less at time of our data collection, we downloaded data on daily Google searches in the United States for each of the three goal-related terms at 251-day intervals. As mentioned earlier, Google Trends scales data in each extraction period based on the highest relative daily search volume during that period. Thus, we rescaled the data to make it comparable across different 251-day extraction periods (see Appendix A for detail). The mean (and standard deviation) of the adjusted relative daily search volumes for "health," "exercise," and "diet" is 65.69 (*SD* = 16.34), 81.49 (*SD* = 11.01), and 77.08 (*SD* = 11.42), respectively.

Analysis Strategy

Our overall analysis strategy is to use ordinary least squares (OLS) regressions to predict our adjusted relative daily search volumes (hereafter, "daily search volume" for simplicity) for the terms "health," "exercise," and "diet." First, to test whether people are less motivated to pursue their health goals when anticipating temporal landmarks, we regressed daily search volume for each term on predictor variables that indicate the short period right before a series of temporal landmarks (i.e., when the landmarks are salient). Past research suggests that the first day of the week (Monday), the first day of the month, the first month of the year, and public holidays are temporal landmarks for people in the United States (Dai et al., 2014; 2015; Hennecke & Converse, 2017). Accordingly, we created the following binary predictor variables: *weekend* equals one if a given day was a Saturday or Sunday and zero, otherwise; *last week of the month* equals one if a given day fell into the last seven days in a month and zero, otherwise; *last month of the year* equals one if a given day was in December and zero, otherwise; *the week before a federal holiday* equals one if a given day happened within seven days before any of the ten annual U.S. federal holidays was observed and zero, otherwise.[4]

[4] The ten annual U.S. federal holidays are New Year's Day, Martin Luther King Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day, and Christmas Day.

Second, we test whether motivation to pursue health goals decreases more substantially right before temporal landmarks that more strongly signal new beginnings. Dai et al. (2015) reported a study that assessed the extent to which a list of days felt like a new beginning to the general U.S. population, and the list included all temporal landmarks examined in our Study 1. Thus, we used the new-beginning ratings collected by Dai et al. (2015) and standardized the ratings across our temporal landmarks of interest (see Online Appendix A for the raw and standardized ratings for each temporal landmark).

We created a binary variable, *indicator for the pre-landmark period*, which equaled one if a day in our Google search data was right before any of the temporal landmarks and zero, otherwise. In other words, this variable equaled one if any of our aforementioned binary predictor variables—*weekend*, *the last week of a month*, *the last month of a year*, or *the week before a federal holiday*—equaled one. We then constructed *maximum standardized new-beginning rating* by assigning the standardized new-beginning rating associated with each temporal landmark to the period right before it and assigning zero to other days. If a day was right before multiple temporal landmarks, this variable equaled the maximum of the standardized new-beginning ratings across these temporal landmarks. For example, if a day fell on a weekend but was not right before any other temporal landmarks, its *maximum standardized new-beginning rating* equaled 1.01 whereby 1.01 was the standardized new-beginning rating for the first day of the week. If a day fell on the last weekend of the year, it was right before three temporal landmarks—the first day of a new week, the first day of a new month, and the start of a new year; thus, its *maximum standardized new-beginning rating* equaled 2.64 whereby 2.64 was the standardized new-beginning rating for the start of a new year, which is the highest across three temporal landmarks.

Results

Table 1 presents the results of regressions that predicted daily search volume as a function of *weekend*, *the last week of a month*, *the last month of a year*, and *the week before a federal holiday*. Models 1, 3, and 5 show that for all of the three health-goal-related terms, the coefficients on all of these predictor variables were negative and statistically significant (all *p*s < .01), indicating that daily search volume for these terms was lower right before the temporal landmarks under our investigation, as compared with the average volume in other calendar periods. Specifically, daily search volumes for the terms "health," "exercise," and "diet" were all significantly lower on weekends (vs. on weekdays), in the last week of a month (vs. in earlier weeks of the month), in the last month of a year (vs. in earlier months of the year), as well as in the week right before a federal holiday (vs. other days further before the holiday). Our results remain meaningfully unchanged if we use a robust standard error to address potential heteroskedasticity (Hayes & Cai, 2007; Online Appendix A).

These results are consistent with our hypothesis that people are less motivated to work for their goal when anticipating a temporal landmark. However, an alternative explanation for our regression results is the "fresh start effect" (Dai et al., 2014); that is, daily search volume for "health," "exercise," and "diet" may appear lower *before* temporal landmarks simply because people are more likely to search for these terms *after* temporal landmarks than in any other period—including the period right before a temporal landmark. For example, a negative coefficient on the weekend may be driven by search volume being higher on Monday than on every other day of the week, rather than by search volume being particularly lower on the weekend than on other days of the week.

To address this possibility, we added to our regressions control variables for days immediately following (or on) a temporal landmark, including Monday, the first week of the month, the first month of the year, as well as the first workday after a federal holiday. Thus, we can compare periods before temporal landmarks with other periods *excluding* days following (or on) temporal landmarks. Our results basically remain robust after we control for the "fresh start effect" (Models 2, 4, and 6 in Table 1). Specifically, we observe a significantly lower search volume for all three health-goal-related search terms on the weekend, in the last month of the year, and the week before a holiday, as compared to other periods, excluding the fresh-start periods that we control for (all *p*s < .001). Search volume, on average, was lower in the last week of the month than in the second and third weeks of the month, which was significant for the terms "health" and "exercise" (both *p*s ≤ .02) and became insignificant for the term "diet" (*p* = .39).

Table 1. OLS Regressions Predicting Daily Google Searches for Health-Goal-related Terms

Google Search Term	**Health**		**Exercise**		**Diet**	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Weekend	-29.82***	-29.28***	-9.03***	-8.48***	-3.22***	-1.96***
	(0.32)	(0.33)	(0.35)	(0.35)	(0.38)	(0.35)
Last Week of the Month	-1.76***	-1.82***	-1.16**	-0.88*	-1.11**	-0.33
	(0.35)	(0.36)	(0.38)	(0.38)	(0.41)	(0.38)
Last Month of the Year	-8.38***	-8.14***	-10.46***	-9.58***	-14.69***	-13.26***
	(0.53)	(0.53)	(0.58)	(0.56)	(0.62)	(0.56)
The Week Before a Federal Holiday	-2.21***	-2.28***	-3.37***	-3.67***	-4.13***	-4.58***
	(0.38)	(0.38)	(0.41)	(0.40)	(0.44)	(0.40)
Control Variables[a]	No	Yes	No	Yes	No	Yes
Observations	3,652	3,652	3,652	3,652	3,652	3,652
R^2	0.71	0.71	0.24	0.29	0.19	0.35

$^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$

[a] Control variables include indicators for Monday, the first week of the month, the first month of the year, and the first workday after a federal holiday.

Lastly, we tested whether the demotivating effect shown above would be greater for temporal landmarks that more strongly signal a new beginning. Table 2 reports the results of regressions that predicted daily search volume as a function of *indicator for the pre-landmark*

period and *maximum standardized new-beginning rating,* the latter of which is the key variable of interest. The coefficient on *indicator for the pre-landmark period* was negative for all three terms and statistically significant for "health" and "exercise" (both *p*s ≤ .02). A negative coefficient means that daily search volume was lower before a temporal landmark whose new-beginning rating was *at the mean level* (since we standardized new-beginning ratings), relative to a normal period that was not before any temporal landmark.[5] More importantly, the coefficient on *maximum standardized new-beginning rating* was negative and significant for all three search terms (all *p*s < .001). This result suggests that daily search volume for these health-goal-related terms decreased to a greater extent right before temporal landmarks that felt more (vs. less) like a new beginning, consistent with our prediction.

Table 2. The Moderating Effect of Temporal Landmarks Signaling a New Beginning

Google Search Term	**Health**	**Exercise**	**Diet**
Indicator for the Pre-Landmark Period	-9.38***	-1.10*	-0.11
	(0.62)	(0.45)	(0.48)
Maximum Standardized New-Beginning Rating	-6.77***	-5.46***	-5.83***
	(0.40)	(0.29)	(0.31)
Observations	3,652	3,652	3,652
R-squared	0.30	0.17	0.15
* p < 0.05; ** p < 0.01; *** p < 0.001			

Discussion

Study 1 provides initial correlational evidence for our hypothesis that anticipating a future temporal landmark undermines motivation to pursue a goal. We found that internet searches for health-goal-related information were lower during the period right before temporal landmarks as compared to other periods. We also found that this demotivating effect was stronger for temporal landmarks that felt more like a new beginning, which set a foundation for

[5] In a regression without *maximum standardized new-beginning rating*, the coefficient on *indicator* for *the pre-landmark period* was significant and negative for all terms. This suggests that on average daily search volume for each term was lower right before temporal landmarks than in other periods, consistent with our theory and results in Table 1.

us to experimentally compare temporal landmarks that more versus less strongly signal new beginnings in subsequent studies.

Although Google search data set has its own merits, in terms of providing high external validity and reducing the concerns about representativeness and social desirability bias that survey data commonly face, we acknowledge its inability to identify causality. Also, since Google Trends data, by design, capture the relative popularity of a search term, we could not cleanly differentiate whether our observed effect was driven by changes in the total number of searches for all terms or changes in the number of searches for "health," "exercise," and "diet," although we believe it is still informative to understand how the general population's relative interest in pursuing health-related goals changes over time.

To complement Study 1, we next turn to more controlled settings to test our hypothesis. In a series of field, online, and laboratory experiments, we manipulate either the salience or presence of an upcoming temporal landmark while holding temporal distance constant.

Study 2: A Seven-Day Field Experiment

In Study 2, we sought to provide causal evidence that anticipating a temporal landmark would impede people's motivation to work on their current goal. Specifically, we conducted a seven-day field experiment in which we recruited people who wanted to raise money for a charity and manipulated the salience of a temporal landmark (i.e., the first day of a new month) during the experimental period. We predicted that drawing attention to an upcoming temporal landmark would decrease participants' effort investment in their prosocial goal.

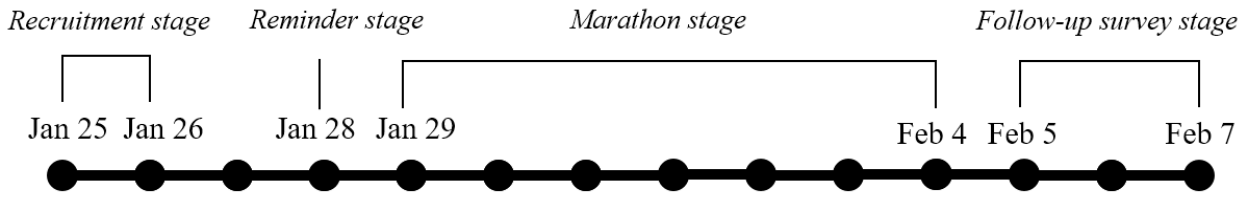
Methods

Participants. We predetermined that we would use however many participants we could get by the end of our two-day recruitment period. A total of 131 undergraduate students at a large

U.S. university on the West Coast (71% females, two unspecified; M_{age} = 20.21) completed the sign-up process.

Procedure. This study employed a two-cell (anticipating temporal landmark vs. control) between-subjects design. It consisted of four stages, and Figure 2 depicts the timeline.

Figure 2. Timeline of a Seven-Day Click Marathon (Study 2)



At the *recruitment stage* (January 25–26, 2019), undergraduate students affiliated with the behavioral lab at the university were invited to participate in a seven-day Click Marathon. They were informed that to sign up for the Click Marathon, they had to first complete a three-minute online survey by the end of January 26 (in exchange for $1.00) as part of the sign-up process. They were also told that signing up for the Click Marathon meant that they would agree to receive a notification email every morning from January 29, 2019 to February 4, 2019, which would ask them to choose whether to enter the Marathon that day. They would receive $0.30 for indicating their choice, regardless of what it was. They further learned that if they chose to enter the Marathon on a given day, they would be directed to a webpage on which they could click a button. Every time they clicked that button, it would be counted as 0.2 cents and be donated to the Make-A-Wish Foundation.[6] They would have up to five minutes (before the link expired at midnight) to click as many or as few times as they wanted on a given day. Finally, students were told that by signing up for the Click Marathon, they agreed to complete another three-minute online survey by the end of February 7, 2019 (in exchange for $1.00), which would be sent to

[6] To keep our promise, we eventually donated to the Make-A-Wish Foundation based on participants' performance.

them on February 5, 2019. At the bottom of the recruitment email was the link to the sign-up page. We required participants to sign up for the study and take part in the Click Marathon only on their computers but not on their mobile phones (because touching a screen, rather than clicking a button, would also be counted as a click on mobile devices).

Students who clicked the sign-up link were directed to take the first three-minute survey. It consisted of a 30-second practice trial of the clicking task and questions about their demographics. During the practice trial, participants learned that the clicking task only worked with a mouse but not with a keyboard. In addition, we asked participants how important it was for them to raise money for the Make-A-Wish Foundation and help children in need (two items: 1 = *not at all*; 7 = *very much*; $r = .79$, $p < .001$), which were averaged to create a composite measure of goal importance (see Online Appendix B for additional questions collected in this survey). Then they left contact information that we could use to send them daily notifications about the Click Marathon. All students who completed this survey on time were considered our study participants and randomly assigned to one of two conditions.

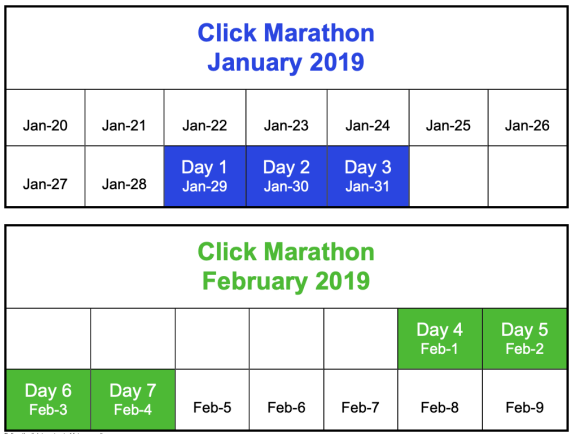
At the *reminder stage* (January 28, 2019), we reminded participants via email that from the next day on, they would receive a notification every morning for seven days and that they could choose whether to join the marathon each day. We presented participants with a calendar for the Click Marathon (see Figure 3). In the anticipating-temporal-landmark condition, the calendar showed January 2019 on top of February 2019. The calendar highlighted the first three days of the Click Marathon (i.e., January 29–January 31) in blue and the next four days (i.e., February 1–February 4) in green. For the seven days in our experiment, the calendar displayed both the number of each day and its date (e.g., “Day 1 Jan-29,” “Day 2 Jan-30”). In the control

condition, the calendar only showed the seven days involved in the Click Marathon, highlighted them in blue, and displayed the number of each day (e.g., “Day 1,” “Day 2”).

Figure 3. Manipulation of Anticipating Temporal Landmark (Study 2)

Control

Anticipating temporal landmark



At the *marathon stage* (January 29–February 4, 2019), we sent participants a notification every morning. Every notification, except the notification for January 31 in the anticipating-temporal-landmark condition, said, “Today is Day [Number] of the Click Marathon for the Make-A-Wish Foundation.” On January 31, 2019, the notification in the anticipating-temporal-landmark condition highlighted the fact that it was the last day before February (“New month is right around the corner! Today is the last day before February, Day 3 of the Click Marathon for the Make-A-Wish Foundation.”). In all notifications, the calendar that we described in the previous paragraph (i.e., Figure 3) was included for the corresponding condition, and the day in question was circled. Every notification also contained a link to the webpage on which participants chose if they would like to enter or skip the Marathon that day. If they chose to enter, they had five minutes to raise money for the Make-A-Wish Foundation by clicking a button, as explained in the recruitment email. If they chose to skip or if they did not respond, they did not need to take any further action.

At the *follow-up survey stage* (February 5–7, 2019), participants were invited to take the second survey, in which we presented them with the calendar of the Click Marathon corresponding to their experimental condition and asked them several questions. The first three questions intended to address the alternative explanation that thinking about an upcoming temporal landmark (the start of February, in this case) created anxiety or distraction, which further reduced motivation. Specifically, we asked participants to think back to how they felt and what they did on "Day 3 of the Click Marathon (last Thursday)" in the control condition or "Day 3 of the Click Marathon (January 31, last Thursday)" in the anticipating-temporal-landmark condition.[7] Participants then rated how anxious they felt, how distracted they were from normal work, and how much they changed their daily activities on Day 3 (1 = *not at all*, 7 = *very much*). The latter two measures were collapsed to form a composite score of distraction ($r = .74$, $p < .001$). As a manipulation check, we also asked participants to rate the extent to which Day 4 of the Click Marathon felt like the beginning of a new time period to them (1 = *not at all*, 7 = *very much*).

Results

We first confirmed that participants on average thought it was important to raise money for the Make-A-Wish Foundation and help sick children ($M = 5.41$ > the midpoint of the scale, $p < .001$), suggesting that participants in our sample indeed had a prosocial goal of helping the charity. Next, we confirmed that our manipulation was successful.[8] Specifically, participants in the anticipating-temporal-landmark condition felt that Day 4 of the Click Marathon was more

[7] We mentioned "last Thursday" to address the concern that participants in the control condition could not remember what day "Day 3" referred to.

[8] More than 90% of participants responded to the second survey in which our manipulation check was placed. A response rate of 91.6% is similar to response rates observed in other week-long sampling studies (e.g., field experience sampling studies; Ilies & Judge, 2002). The results on the number of clicks that we report next are robust if we exclude participants who did not respond to our second survey.

like a new beginning (M = 2.68, SD = 1.87) than did those in the control condition (M = 1.87, SD = 1.10), $F(1, 118) = 8.40$, $p = .004$, $\eta_p^2 = .066$.

Our key outcome measure of interest was the number of clicks each participant had on a given day at the marathon stage. We performed an intent-to-treat analysis, such that all participants who completed the sign-up process were included in our analysis because they were exposed to our manipulation in our email notifications regardless of whether they entered the marathon each day. For all of our analyses reported, we excluded one participant who clicked 34,358 times on Day 7 (which was more than three standard deviations from the mean and humanly impossible in five minutes),[9] but including this participant does not change the magnitude or statistical significance of our results. Participants who did not enter the marathon on a given day received a score of zero that day.

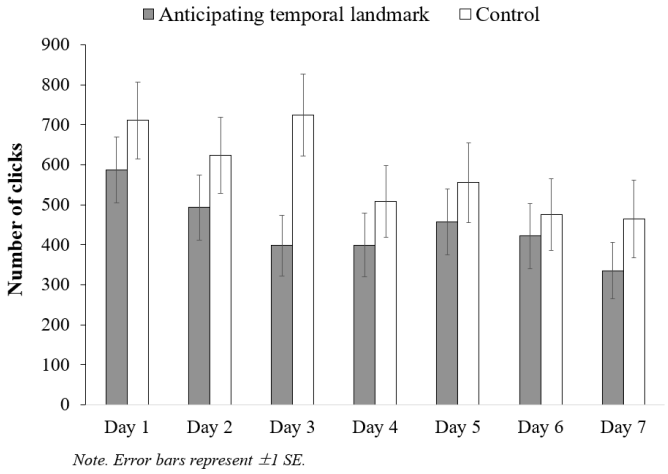
Figure 4 shows the average number of clicks per person by condition each day. Our focal day of interest was Day 3 (January 31), which we operationalized as the pre-landmark period by manipulating the salience of the upcoming landmark (the start of a new month) via a unique text that day (as described in the Methods section). We found that the number of clicks on Day 3 was significantly lower in the anticipating-temporal-landmark condition (M = 397.98, SD = 608.89) than in the control condition (M = 725.03, SD = 825.26), $F(1, 128) = 6.61$, $p = .011$, $\eta_p^2 = .049$. This result suggests that making an upcoming temporal landmark salient significantly reduced participants' motivation to work on a prosocial goal (raising money for a charity), consistent with our hypothesis. Further analyses revealed that this effect was driven by significant performance differences among those who participated in the Click Marathon on Day 3

[9] It may happen because this participant figured out an automatic program to click the button. In addition, we identified two minor abnormal cases: although the maximum allotted time was 300 seconds each day, one participant spent 370 seconds on Day 2, and another participant spent 311 seconds on Day 6. According to Qualtrics technical support, these participants may accidently refresh the page during the clicking task. Our results were robust to excluding two participants. We note that Day 3, our focal day of interest, had no abnormal cases.

($M_{anticipating\text{-}temporal\text{-}landmark}$ = 783.91, SD = 655.37 vs. $M_{control}$ = 1309.08, SD = 677.45), $F(1, 67)$ = 10.67, p = .002, η_p^2 = .137, not by whether participants decided to participate on Day 3, as participation rate did not significantly differ between the anticipating-temporal-landmark condition (50.77%) and the control condition (55.38%), $\chi^2(1)$ = .28, p = .60. See Online Appendix B for robustness checks.

The difference between two conditions was not significant on other days: Day 1 ($M_{anticipating\text{-}temporal\text{-}landmark}$ = 587.45 vs. $M_{control}$ = 710.80; $F(1, 128)$ = .94, p = .334), Day 2 ($M_{anticipating\text{-}temporal\text{-}landmark}$ = 493.37 vs. ($M_{control}$ = 623.68; $F(1, 128)$ = 1.08, p = .302), Day 4 ($M_{anticipating\text{-}temporal\text{-}landmark}$ = 399.60 vs. $M_{control}$ = 508.46; $F(1, 128)$ = .82, p = .368), Day 5 ($M_{anticipating\text{-}temporal\text{-}landmark}$ = 457.51 vs. $M_{control}$ = 555.54; $F(1, 128)$ = .58, p = .450), Day 6 ($M_{anticipating\text{-}temporal\text{-}landmark}$ = 421.71 vs. $M_{control}$ = 476.22; $F(1, 128)$ = .20, p = .653), or Day 7 ($M_{anticipating\text{-}temporal\text{-}landmark}$ = 335.38 vs. $M_{control}$ = 465.29; $F(1, 128)$ = 1.18, p = .281).[10]

Figure 4. Click Performance across Seven Days in the Click Marathon (Study 2)



Note. Error bars represent ±1 SE.

[10] Although the difference between conditions was the largest and only significant on Day 3, we note that the number of clicks was directionally (but not statistically significantly) higher in the control condition than in the anticipating-temporal-landmark condition on other days. We confirmed that the effect of anticipating temporal landmark on Day 3 held when we controlled for each participant's average performance on Days 1-2, $F(1, 127)$ = 5.22, p = .024, η_p^2 = .04, or for each participant's average performance on Days 1-2 and 4-7, $F(1, 127)$ = 5.54, p = .020, η_p^2 = .04, suggesting the robustness of our effect. Also, we confirmed that the two conditions were comparable in demographic variables ($\chi^2(1)$ = .15, p = .70 for the proportion of females; $F(1, 128)$ = .03, p = .86 for age) and baseline clicking speed (as measured by the number of clicks during the 30-second practice trial at the recruitment stage), $F(1, 128)$ = 1.12, p = .29, which suggests that the directional difference in means between conditions was unlikely to be caused by failures in randomization.

Finally, we tested the alternative explanations about anxiety and distraction. Based on participants' responses in the second survey, the level of anxiety was similar between the anticipating-temporal-landmark condition (M = 2.95, SD = 1.90) and the control condition (M = 2.85, SD = 1.80), $F(1, 117) = .08$, $p = .78$. The level of distraction was also similar between the anticipating-temporal-landmark condition (M = 3.10, SD = 1.86) and the control condition (M = 3.21, SD = 1.66), $F(1, 117) = .10$, $p = .75$. We also conducted an ANCOVA on the number of clicks on Day 3 by including anxiety and distraction as covariates, which yielded similar results as the ANOVA analysis without covariates, $F(1, 115) = 7.88$, $p = .006$, $\eta_p^2 = .064$. These results suggest that the demotivating effect of anticipated temporal landmark was unlikely to be caused by greater distraction or anxiety associated with the salience of an upcoming temporal landmark.

Discussion

Using a behavioral measure of effort investment on an ongoing prosocial goal, Study 2 supports our hypothesis that anticipating a temporal landmark impairs one's motivation to work on a current goal. We found that participants exerted less effort on the day before a landmark (the first day of a new month) when the landmark was made salient than when it was not.

We further found that this salience manipulation did not affect participants' post-landmark performance (Days 4–7; February 1–4). If participants in the anticipating-temporal-landmark condition compensated for the slacked performance on Day 3 by exerting more effort on later days, they should have outperformed those in the control condition during the post-landmark period. However, the fact that performance did not differ between two conditions on any day of the post-landmark period highlights that anticipation of temporal landmarks can be self-defeating: the optimistic belief that the future self would pick up the slack caused motivation

to decrease right before the temporal landmark but did not lead people to actually pick up the slack after the landmark.

Study 2 helps address a potential alternative explanation for why goal motivation decreases when people anticipate a temporal landmark. Specifically, past research suggests that disconnection from the future self can lead people to make myopic decisions without considering the long-term consequences for their future self (Bartels & Urminsky, 2011; Bryan & Hershfield, 2012; Hershfield et al., 2011). If anticipated temporal landmarks make people feel less connected with their future self, they may not care about a current goal anymore and thus may stop engaging in it, provided that the goal benefits their future self (as for most long-term goals such as diet, weight loss, and workout). Yet, the prosocial goal examined in Study 2 did not have direct benefits to the future self, so less caring for the future self could not have explained our findings.

Study 3: The Mediating Effect of Optimistic Beliefs about a Future Self

In Study 3, we tested one mechanism underlying the detrimental effect of anticipating a temporal landmark on current goal pursuit: Individuals optimistically believe that their future self in the post-temporal-landmark period will take responsibility for their goal pursuit. We manipulated the salience of an upcoming temporal landmark by prompting people to view their next birthday as a new beginning (vs. not).

Method

Participants. To capture a mediation effect with 80% power, we aimed for a sample size of 300, based on the conservative estimates of mediation paths and our planned use of bias-corrected bootstrap (Fritz & MacKinnon, 2007, Table 3, first column) for the mediation analysis (PROCESS version 2; Hayes, 2017). To recruit participants with a workout goal, we adopted a

two-stage recruitment process (Wessling et al., 2017). First, considering that not all participants had a workout goal, we recruited 500 participants from Prolific Academic (prolific.ac) to take our first screening survey without telling them about the second survey (our main study). All participants responded to a list of filter questions regarding their daily activities and personal preferences (e.g., "Do you like to watch movies?"; "Do you watch any of the NFL games?"), including a question asking whether they currently had a goal of working out regularly. Upon completion of the first survey, 321 participants who indicated that they had an ongoing workout goal were offered to take part in the second survey (our main study) in exchange for £.50; all of them completed the second survey. After excluding one respondent who failed the attention-check questions, we obtained 320 participants (69.1% female, M_{age} = 37.3).

Procedure. The study employed a two-cell (anticipating temporal landmark vs. control) between-subjects design. Participants first completed a filler task (simple brand evaluation) to avoid the potential carryover effect of responding to the initial screening question of whether they currently had a workout goal.

Next, all participants imagined that, in three days, they were about to celebrate their birthday. Participants were randomly assigned to either the anticipating-temporal-landmark condition or the control condition. Our manipulation of the salience of a future temporal landmark consisted of two elements. The first element involved framing the upcoming birthday as either one that marked the start of a new decade in age (a 30th birthday) or a regular birthday (a 32nd birthday; adapted from Study 3 in Dai et al., 2015). The second element involved indicating on the calendar that the upcoming birthday was the first day of a month or in the middle of the month (adapted from Study 4 in Tu & Soman, 2014). Specifically, participants in the anticipating-temporal-landmark condition read, "In three days, you are about to celebrate your

30th birthday. The 30th birthday is very meaningful. Becoming 30 is a very significant stage in one's life because you are now officially a mature adult. In biblical times, the age of 30 was a year of major breakthroughs when individuals came into the limelight and began to reign." To strengthen the manipulation, we also presented a calendar that marked "Today" with a green box and "Your 30th Birthday" with a red box, in which the birthday was the first day of next month. In contrast, those in the control condition read, "In three days, you are about to celebrate your 32nd birthday, another birthday of yours." They also were presented with a calendar in which "Today" and "Your 32nd Birthday" were marked with green boxes, and the birthday was in the middle of the month (17th; see Figure 5). In both conditions, the dates of "today" and "birthday" were imaginary dates rather than the actual dates on which the study was run.

Figure 5. Temporal Landmark Manipulation used in Study 3

A. Control Condition

B. Anticipating-Temporal Landmark Condition

Our theory is built on prior research showing that anticipating a temporal landmark psychologically separates one's future self from one's current self (i.e., (A)–(B) in Figure 1; Peetz & Wilson, 2013). To verify whether the manipulation of anticipating a temporal landmark indeed elevated psychological disconnection between the current and future selves in our study, we conducted a separate study on Prolific Academic (N = 100; 53% females; M_{age} = 35.4). Participants read either the scenario in the anticipating-temporal-landmark condition or the scenario in the control condition, and then reported their perceptions of the relationship between their current and future selves using measures adapted from Dai et al. (2015). Specifically, we asked participants to pick a pair of Euler circles among seven possible pairs that best described how similar they felt their current self was to their future self after their birthday, which would occur in three days. We reverse-coded the scale such that higher scores indicated greater disconnection with one's future self. In addition, participants rated how different they felt their current self was from their future self after the birthday on a seven-point scale (1 = *very similar*, 7 = *very different*). Our analyses on the combined measures (r = .77, p < .001) revealed that participants in the anticipating-temporal-landmark condition perceived their current and future selves to be more disconnected (M = 2.73, SD = 1.82) than did those in the control condition (M = 1.68, SD = 1.23), $F(1, 98) = 11.79$, p = .001, η_p^2 = .107, confirming our prediction.

Going back to the main study, we presented participants with the following scenario involving a self-regulation dilemma: "You usually take the bus to a nearby gym to work out because you don't like to work out at home. *Today*, due to the heavy rain, the bus service is shut down. It will take you about 25-30 min to walk to the gym." Participants then reported their motivation to work out by answering four questions ("Your 30th [32nd] birthday is approaching in 3 days. Just today, how likely is it that you will work out?"; "How much are you willing to work

out?"; "How motivated are you to work out?"; "How much do you feel it is okay not to work out?"[11] (reverse-coded); $\alpha = .97$).

In addition, to measure participants' optimistic beliefs about responsibility shift to the future self, we asked them to rate the extent to which they agreed with the following statements (1 = *strongly disagree*, 7 = *strongly agree*): "I felt that I can easily make up for the skip later" and "It feels okay to skip the workout today because I can do it more later" ($r = .55$, $p < .001$). To address the alternative explanation that the effect of anticipated temporal landmarks was due to people caring less about the workout goal (which had long-term benefits for their future self; e.g., Hershfield et al., 2011), we measured participants' commitment to the goal: "How committed are you towards your workout goal?" (1 = *not at all*, 7 = *very much*). As a manipulation check, participants also rated the extent to which the upcoming birthday in the scenario felt like a new beginning to them (1 = *not at all*, 7 = *very much*). Lastly, we collected demographic information.

Results

First, participants in the anticipating-temporal-landmark condition indicated that their upcoming birthday felt more like a new beginning to them ($M = 3.62$, $SD = 2.20$) than did those in the control condition ($M = 1.94$, $SD = 1.35$), $F(1, 318) = 68.82$, $p < .001$, $\eta_p^2 = .178$, confirming the effectiveness of our manipulation.

In support of our hypothesis, participants in the anticipating-temporal-landmark condition were less motivated to work out ($M = 3.48$, $SD = 1.84$) than were those in the control condition ($M = 4.16$, $SD = 1.97$), $F(1, 318) = 9.92$, $p = .002$, $\eta_p^2 = .030$.[12] Also, as predicted, participants in

[11] This reverse item yielded the same results as the other three items.

[12] To examine whether the scenario in this study provided a better fit for participants 30 and under, we separately analyzed participants 30 and under ($N = 109$, 69.72% female, $M_{age} = 26.13$) versus those above 30 ($N = 211$, 68.72% female, $M_{age} = 43.14$). We found consistent results for both groups, $F(1, 107) = 3.36$, $p = .069$, $\eta_p^2 = .030$ and $F(1, 209) = 6.46$, $p = .012$, $\eta_p^2 = .030$ respectively. See Online Appendix D for more detail.

the anticipating-temporal-landmark condition were more optimistic that their future self would take the responsibility of goal pursuit (M = 4.99, SD = 1.28) than were those in the control condition (M = 4.65, SD = 1.39), $F(1, 318) = 5.19$, $p = .023$, $\eta_p^2 = .016$.

Next, we tested whether this optimistic belief mediated the effect of the anticipated temporal landmark on motivation to work out, using a bias-corrected bootstrapping procedure (Hayes, 2017). Consistent with our theory, a 10,000-sample bootstrap analysis indicated a significant indirect effect of anticipating a temporal landmark on current goal pursuit through the belief that the future self could take the responsibility (*indirect effect* = -.25, SE = .12, 95% CI = [-.50, -.04]).

Finally, we addressed the alternative explanation that individuals reduced their effort towards their current workout goal due to their decreased commitment to the goal. Contrary to this alternative explanation, participants' commitment to the workout goal was basically the same between the anticipating-temporal-landmark (M = 3.33, SD = 1.69) and control conditions (M = 3.41, SD = 1.72), $F(1, 318) = .18$, $p = .67$, $\eta_p^2 = .001$. In other words, anticipating a temporal landmark, and the resulting psychological separation of the current and the future selves, did not influence participants' goal commitment. Further mediation analysis also failed to show a significant indirect effect of anticipating a temporal landmark on current goal pursuit through goal commitment (*indirect effect* = -.02, SE = .05, 95% CI = [-.12, .07]).

Discussion

Study 3 provides converging evidence for the demotivating effect of anticipating a temporal landmark on current goal pursuit. In addition, through a mediation test, we find that one reason people feel less motivated to pursue their ongoing goal in anticipation of a temporal landmark is that they believe their future self can pick up the slack. Furthermore, we find that

this effect cannot be explained by participants' commitment to the goal, which helps us rule out the alternative explanation that anticipated temporal landmarks reduce motivation by leading people to care less about goals with long-term benefits (Bartels & Urminsky, 2011; Bryan & Hershfield, 2012; Hershfield et al., 2011).

Study 4: Moderation by Optimistic Belief about Future Self

The main objective of Study 4 was to test our proposed mechanism via moderation. To achieve this objective, we simultaneously manipulated the presence of a future temporal landmark and the optimistic belief that one's future self can take responsibility. If an anticipated landmark reduces motivation by making people feel more optimistic that their future self can take responsibility, then directly inducing such optimistic beliefs should attenuate its demotivating effect by lowering everyone's motivation regardless of whether or not they anticipate a temporal landmark. In addition, we measured actual effort investment as in Study 2 and used a different, subtle manipulation of anticipating a temporal landmark that was unlikely to evoke confounds such as distraction or anxiety.

Methods

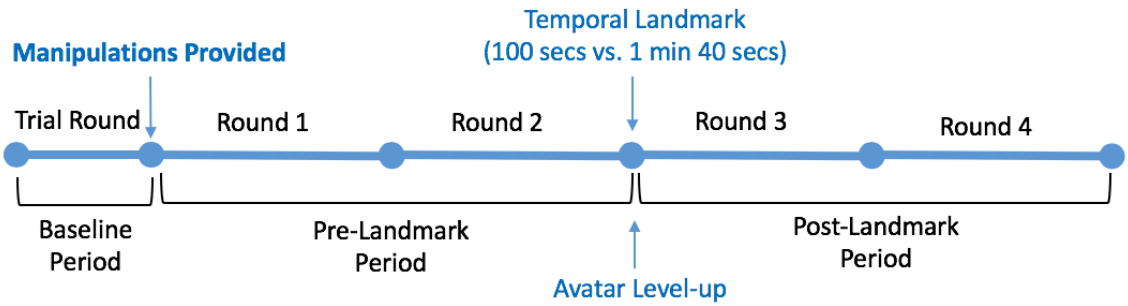
Participants. Based on the effect size observed in Study 2 (which used a similar dependent variable; $d = .42$), we predetermined the minimum sample size to be 240 participants across four cells in order to have 90% power for a two-way ANOVA. A total of 263 undergraduate students at a large U.S. university on the East Coast (63.5% females, $M_{age} = 19.75$) signed up for our lab sessions and participated in the study for course credit.

Procedure. This study employed a 2 (anticipating temporal landmark vs. control) × 2 (anticipating level-up vs. not) between-subjects design. Participants were asked to work on a game called the Pokémon Click Game, in which they assumed the role of a Pokémon hunter who

hatched an egg to get a new Pokémon. They were informed that in order to hatch an egg, they had to click the picture of the egg 1,000 times within 200 seconds. The game consisted of four rounds, and each round lasted 50 seconds. Participants were then asked to choose an avatar from two options (one female and one male) to represent them in the game. Both options were labeled as a "Level 1" avatar.

The experimental procedure is summarized in Figure 6. The game started with a trial round for 10 seconds to help participants understand how the game worked, which also served as a baseline period. In this period, the screen showed a text box at the top indicating the number of clicks participants made ("You've clicked: [__] times to hatch your egg"), a picture of an egg in the middle that participants clicked on using a mouse, and a timer at the bottom indicating how much time had passed (see Online Appendix C). The same task interface was used later after participants officially started the game.

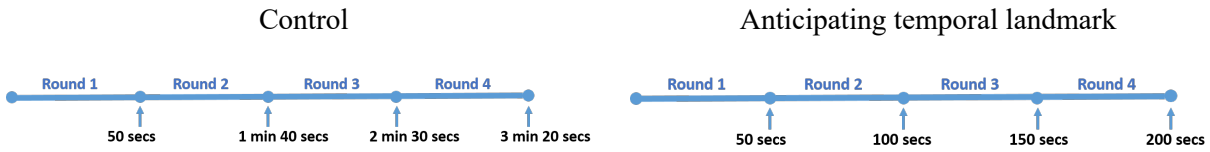
Figure 6. Summary of the Experimental Procedure (Study 4)



After the trial round but before Round 1, we implemented manipulations of both anticipating a temporal landmark and anticipating level-up. Regarding the former, participants were reminded that each round would last 50 seconds and were shown a figure depicting when each round would start, at which point we manipulated the anticipation of a temporal landmark (Figure 7). In the anticipating-temporal-landmark condition, the starting time of each round was

described in seconds (i.e., 50 seconds, 100 seconds, 150 seconds, and 200 seconds), whereas in the control condition, the starting time was described in minutes and seconds (i.e., 50 seconds, 1 minute 40 seconds, 2 minutes 30 seconds, and 3 minutes 20 seconds). Here, the key temporal landmark manipulation was the framing of the starting point of Round 3 as either "100" seconds or "1 minute 40 seconds." This manipulation is based on prior research showing that people consider "100" to be a significant round number that creates a discontinuity in perceptions of number sequence and time (Alter & Hershfield, 2014; Gunasti & Ozcan, 2016; Huang & Gong, 2018; Pope & Simonsohn, 2011; Yan & Pena-Marin, 2017).

Figure 7. Manipulation of Anticipating Temporal Landmark (Study 4)



To verify the effectiveness of the temporal-landmark manipulation, we conducted a separate pre-test on Mturk (N = 100, 39% females, M_{age} = 33.84). In this pre-test, after presenting the same manipulation described earlier (Figure 7), we asked a question about the starting time of Round 3: "To what extent do you feel that in 100 seconds (vs. 1 minute and 40 seconds), a new part of the game will start?" (1 = *not at all*, 7 = *very much*). Confirming the efficacy of the manipulation, participants were more likely to consider the starting time of Round 3 as signaling a new start in the game when it would occur in "100 seconds" (M = 4.54, SD = 2.17) than when it would occur in "1 minute and 40 seconds" (M = 3.66, SD = 1.92), $F(1, 98)$ = 4.61, p = .034, η_p^2 = .045.

In the main study, before Round 1, we also manipulated participants' optimistic beliefs about the future self. Specifically, we informed half of the participants that their avatar would level up after Round 2; the other half did not receive such information. We intentionally left the

meaning of level-up ambiguous without giving any specific information, as our purpose was to create the general impression that their avatar (the representation of themselves in the game) would be more powerful and capable in the future. To verify the effectiveness of this manipulation, we conducted another pre-test on Mturk (N = 100, 39% females, one unspecified; M_{age} = 35.68). After presenting the same manipulation,[13] we asked pre-test participants to rate their agreement with this statement: "I feel that my avatar will become better and more competent in Round 3 than in Rounds 1–2" (1 = *strongly disagree*, 7 = *strongly agree*). Confirming the efficacy of the manipulation, participants who were informed that their avatar would level up had more optimistic expectations about their avatar (the representation of themselves in this game) in Round 3 (M = 5.16, SD = 1.27) than did those in the control condition (M = 4.36, SD = 1.51), $F(1, 98) = 8.24$, $p = .005$, $\eta_p^2 = .078$.

In the main study, after our manipulations were implemented, participants formally started the game. After they finished Round 1, we reminded participants of the temporal landmark manipulation by displaying the same timeline figure again (Figure 7). We also reminded participants in the anticipating-level-up condition that their avatar would level up after Round 2. After Round 2 but before Round 3, all participants (not just those in the anticipating-level-up condition) were informed that their avatar leveled up and were presented with the picture of their Level 2 avatar. Therefore, we only manipulated the expectations of levelling up while holding the actual level-up action constant between conditions. It is worth noting that we used the wording "level-up" to create the impression that one's avatar would become more powerful, but we only changed the picture of the avatar, not its capability.

[13] Participants in this pre-test were not exposed to the manipulation of anticipating a temporal landmark in Figure 7.

After participants finished Rounds 3 and 4, participants received feedback on their total number of clicks across four rounds. If they clicked more than 1,000 times, they received the message "You hatched the egg! Your Pokémon is Vaporeon" along with a picture of Vaporeon. If they clicked fewer than 1,000 times, they did not receive any message. Lastly, participants were asked to think back and report how anxious they were and how distracted they were during Round 2 (1 = *not at all*, 7 = *very much*). Participants responded to some final questions, including demographic information (see Online Appendix C for a full list of measures).

Results

We first analyzed the number of clicks during the trial round, which served as a baseline before the manipulations were implemented. There were no main effects of anticipating a temporal landmark or anticipating level-up, nor their interaction, Fs < .10, ps > .40, confirming that there were no differences in clicking speed across conditions before our manipulations were introduced.

We operationalized Rounds 1 and 2 as the pre-landmark period because our key manipulation was implemented before Round 1. Specifically, participants received the same timeline containing our temporal landmark manipulation before Round 1, during Round 1, and during Round 2. Thus, we expected participants to anticipate the upcoming landmark in both Round 1 and Round 2. We had two predictions about participants' effort investment in Rounds 1 and 2. First, when participants did not anticipate avatar level-up from Round 3, their effort investment in Rounds 1 and 2 would be lower in the anticipating-temporal-landmark condition than the control condition. Second, such a difference between conditions would be attenuated when participants expected avatar level-up, such that effort investment in both conditions would be similarly lower than that in the control condition without anticipation of avatar level-up.

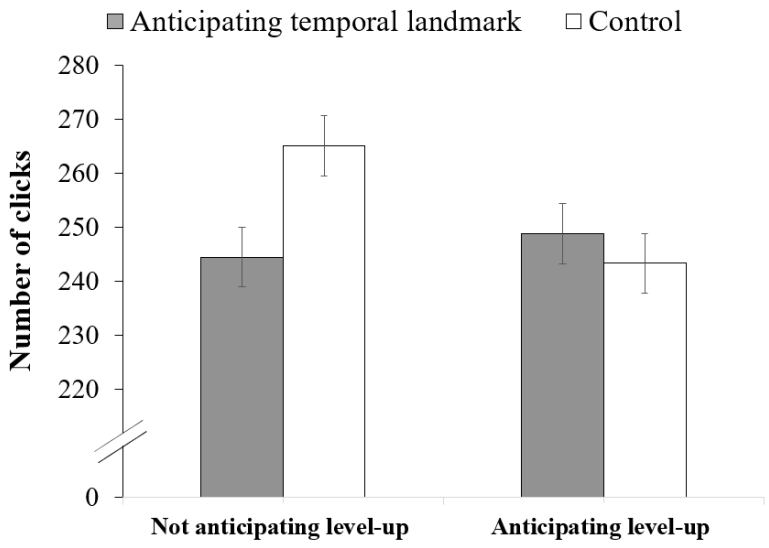
To test these predictions, we analyzed the average number of clicks in Rounds 1 and 2. A two-way (anticipating temporal landmark vs. control) × (anticipating level-up vs. not) ANOVA yielded a predicted interaction, $F(1, 259) = 5.49$, $p = .02$, $\eta_p^2 = .021$ (Figure 8).[14] Specifically, when participants did not anticipate avatar level-up, the number of clicks during the pre-landmark period was lower in the anticipating-temporal-landmark condition ($M = 243.38$, $SD = 49.66$) than in the control condition ($M = 265.18$, $SD = 43.81$), $F(1, 259) = 7.65$, $p = .006$, $\eta_p^2 = .029$, replicating our previous findings. When participants expected their avatar to level up and thus believed that their future self would become better at pursuing the goal, the number of clicks did not differ between the anticipating-temporal-landmark ($M = 248.80$, $SD = 48.63$) and control conditions ($M = 244.53$, $SD = 37.36$), $F(1, 259) < 1$, $p > .50$; in fact, performance was lower in these two conditions than performance in the control condition without anticipation of avatar level-up, $F(1, 259) = 4.29$, $p = .039$. $\eta_p^2 = .016$ and $F(1, 259) = 6.92$, $p = .009$, $\eta_p^2 = .026$, respectively. There were no main effects of anticipating temporal landmark, $F(1, 259) = 2.48$, $p = .12$, or anticipating level-up, $F(1, 259) = 1.87$, $p = .17$.

To examine how our manipulations affected post-landmark performance, we conducted a two-way ANOVA on the average number of clicks in Rounds 3 and 4 (see Online Appendix C for separate analyses). Participants' post-landmark performance did not differ across conditions, as there were no main effects of anticipating a temporal landmark, $F(1, 259) = .83$, $p = .36$, or anticipating level-up, $F(1, 259) = 1.43$, $p = .23$, or their interaction, $F(1, 259) = 1.15$, $p = .29$. Specifically, the number of clicks did not differ between the anticipating-temporal-landmark and control conditions regardless of whether people anticipated avatar level-up ($M_{anticipating\text{-}temporal\text{-}}$

[14] The patterns of results in Rounds 1 and 2 were generally similar (see Online Appendix C). Interestingly, we noticed that for participants without anticipation of level-up, the demotivating effect of anticipating a temporal landmark was stronger in Round 2 than in Round 1. This pattern makes great sense and is consistent with our argument that upcoming temporal landmarks have a stronger demotivating effect when they are more salient (e.g., when they are more proximal).

$_{landmark}$ = 244.18, *SD* = 55.83 vs. $M_{control}$ = 243.10, *SD* = 47.68; *F*(1, 259) = .01, *p* = .91) or not ($M_{anticipating\text{-}temporal\text{-}landmark}$ = 245.04, *SD* = 59.38 vs. $M_{control}$ = 258.56, *SD* = 57.64; *F*(1, 259) = 1.96, *p* = .16).

Figure 8. Number of Clicks in Pre-landmark Period as a Function of Anticipating Temporal Landmark and Anticipating Level-up (Study 4).



Note. Error bars represent ±1 SE.

Finally, as in Study 2, we tested the alternative explanations about distraction and anxiety. A two-way ANOVA on distraction yielded no main effects of anticipating temporal landmark, *F*(1, 259) = .04, *p* = .85, or anticipating level-up, *F*(1, 259) = .55, *p* = .46, and no interaction, *F*(1, 259) = .01, *p* = .91. A two-way ANOVA on anxiety revealed no main effects of anticipating temporal landmark, *F*(1, 259) = .68, *p* = .41, or anticipating level-up, *F*(1, 259) = .08, *p* = .77, and a marginally significant interaction, *F*(1, 259) = 3.12, *p* = .08 (see Online Appendix C for more detail). We also conducted a two-way ANCOVA on the number of clicks in the pre-landmark period by including anxiety and distraction as covariates, which yielded similar results as the ANOVA analysis without covariates (for the interaction, *F*(1, 257) = 6.63, *p*

= .01, η_p^2 = .025). This confirmed that our results were not driven by differences in anxiety and distraction.

Discussion

In a real-effort lab experiment involving a subtle manipulation of temporal landmark, we again found that anticipating a temporal landmark could reduce effort investment in an ongoing goal. By simultaneously manipulating participants' beliefs about their future self (i.e., whether their avatar would level up), we demonstrated that one's optimistic belief that one's future self can take responsibility underlies the detrimental effect of an anticipated temporal landmark on current goal pursuit.

As in Study 2, we again found no effect of an anticipated temporal landmark (relative to the control condition) on post-landmark performance. This suggests that participants who reduced their effort investment in anticipation of the temporal landmark did not work harder to compensate for the lost progress after the landmark as compared to those in the control condition. In fact, considering the overall performance of participants who had no expectation of avatar level-up, those in the anticipating-temporal-landmark condition made fewer clicks across four rounds (M = 976.83, SD = 210.47) than did those in the control condition (M = 1047.48, SD = 186.36), $F(1, 259) = 4.78$, $p = .03$, $\eta_p^2 = .018$ (see Online Appendix C for full analyses). This suggests that anticipating a temporal landmark can harm one's overall progress toward ongoing goals.

Notably, Study 4 examined a goal that did not have long-term benefits for one's future self, since participants pursued an artificial goal that was only relevant to the experiment and had no personal benefits at all (i.e., clicking a button 1,000 times in a game). The fact that we found that anticipating a temporal landmark reduced participants' performance on the experiment-

specific goal suggests that reduced investment in the future self (Bartels & Urminsky, 2011; Hershfield et al., 2011) is unlikely to explain our results.

Study 5: A Remedy for the Demotivating Effect of an Anticipated Temporal Landmark

In Study 5, we explore a potential remedy for the demotivating effect of an anticipated temporal landmark. If, as we theorize, motivational deficiency caused by optimistic beliefs about one's post-landmark future self reflects licensing behavior (Fishbach & Dhar, 2005; Khan & Dhar, 2006, 2007; Monin & Miller, 2001; Zhang et al., 2007), how can we prevent people from engaging in licensing? We draw from prior research suggesting that people desire to behave consistently with their past actions and attitudes (Arkes & Blumer, 1985; Bem, 1972; Festinger, 1957; Heider, 1946; Freedman & Fraser, 1966) and that activating consistency motivation weakens licensing (Conway & Peetz, 2012; Fishbach & Dhar, 2005; Merritt, Effron, & Monin, 2010). We reason that reminding people of goal-directed behavior they consistently perform everyday (e.g., what they do every day for a goal) may evoke consistency motivation, which attenuates their tendency to license in anticipation of a temporal landmark. Thus, we test whether reminding participants of everyday activities that they consistently do to meet their goal attenuates the negative effect of anticipated temporal landmark using a 2 (anticipating temporal landmark vs. control) × 2 (reminder vs. no reminder) between-subjects design.

Methods

Participants. Based on the effect size observed in Study 3 (which used a similar procedure and dependent variable; $d = .35$), we predetermined the minimum sample size to be 348 participants across four cells in order to have a 90% power for a two-way ANOVA. Similar to Study 3, Study 5 also adopted a two-stage process to select participants who currently had a workout goal (Wessling et al., 2017). Considering that the prescreening rate of having a workout

goal was 64% in Study 3, we recruited 520 participants via MTurk to take our initial screening survey. They responded to a list of filter questions, including one that asked whether they currently had a goal of working out regularly. In total, 434 MTurkers (54.14% females, one unspecified; M_{age} = 38.01) indicated that they had a workout goal, and were offered and agreed to take part in our second survey (our main study). All of them completed the second survey and were paid $.70.

Procedure. Participants first completed a filler task (involving evaluating several brands) to avoid the potential carryover effect of responding to the initial screening question of whether they currently had a workout goal. We then manipulated consistency motivation by varying whether or not participants were reminded of what they consistently did for their goal. Participants in the reminder condition were asked to write down how many hours they usually worked out per day and what they usually did for their workout goal. Examples of responses included "I usually do cardio, either one hour on the bike, or one hour on the elliptical" and "I walk around my neighborhood or on the treadmill for a half hour a day." Participants in the no-reminder condition did not receive any question at this point and instead answered these questions at the end of the survey. We confirmed that there were no differences across conditions in the average number of hours participants reported working out per day (no interaction: $F(1, 430) = .84$; no main effect of anticipating temporal landmark: $F(1, 430) = .09$; no main effect of reminder: $F(1, 430) = .53$; all ps > .36).

Next, we presented participants with the same scenario as in Study 3 and manipulated the salience of the upcoming temporal landmark (either the 30th or 32nd birthday) using the same design and procedure as in Study 3. Participants then reported their intentions to skip the workout today by responding to two measures: "How likely is it that you are going to skip the

workout *today*?" (1 = *very unlikely*, 9 = *very likely*) and "How much do you feel it is okay to skip the workout *today*?" (1 = *completely not okay to skip*, 9 = *completely okay to skip*). The measures were collapsed to form a composite score ($r = .54$, $p < .001$), with a higher score indicating stronger intentions to skip the workout. At the end of the survey, we used the same manipulation check as in Study 3.

Results

We confirmed that our manipulation of anticipating a temporal landmark was effective: participants in the anticipating-temporal-landmark condition viewed the birthday as more like a new beginning ($M = 4.31$, $SD = 1.83$) than did those in the control condition $M = 3.60$, $SD = 1.72$), $F(1, 432) = 17.68$, $p < .001$, $\eta_p^2 = .039$.

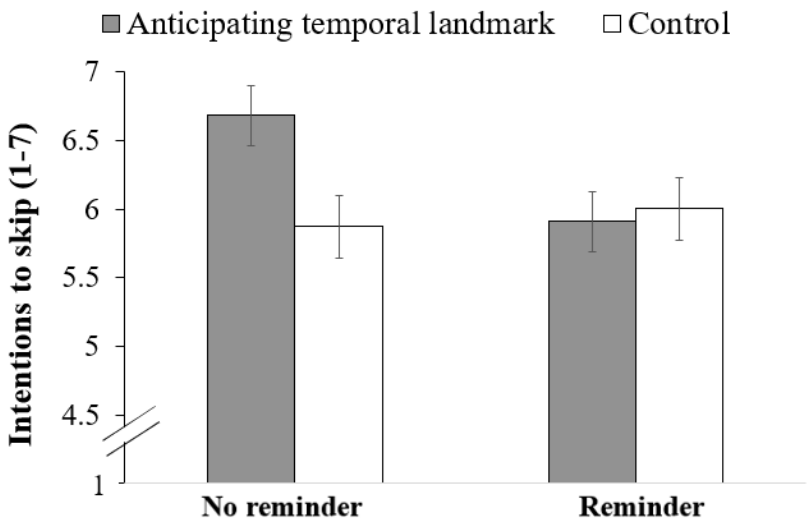
A two-way (anticipating temporal landmark vs. control) × (reminder vs. no reminder) ANOVA with participants' intentions to skip the workout as the dependent variable yielded the predicted interaction, $F(1, 430) = 4.05$, $p = .045$, $\eta_p^2 = .01$ (Figure 9).[15] Specifically, when there was no reminder, we again observed the demotivating effect of anticipating a temporal landmark: Participants in the anticipating-temporal-landmark condition were more likely to skip the workout that day ($M = 6.68$, $SD = .22$) than those in the control condition ($M = 5.88$, $SD = .232.38$), $F(1, 430) = 6.47$, $p = .011$, $\eta_p^2 = .02$. This effect disappeared when participants were reminded of what they consistently did for their workout goal ($M_{anticipating\text{-}temporal\text{-}landmark} = 5.91$, $SD = .22$ vs. $M_{control} = 6.01$, $SD = .23$), $F(1, 430) = .09$, p = .77, $\eta_p^2 < .001$. There were no main effects of anticipating a temporal landmark, $F(1, 430) = 2.52$, $p = .113$, $\eta_p^2 = .006$, and reminder, $F(1, 430) = 1.99$, $p = .16$, $\eta_p^2 = .005$.

Discussion

[15] As in Study 3, we separately analyzed participants 30 and under versus above 30. See Online Appendix D for detail.

Study 5 again provides converging evidence for the demotivating effect of anticipating a temporal landmark on motivation to pursue a current goal. Importantly, we find a potential remedy for this detrimental effect: When participants are reminded of everyday goal-related activities they consistently engage in, it activates consistency motivation and reduces their tendency to relax their effort investment in anticipation of a temporal landmark.

Figure 9. Intentions to Skip the Workout Today as a Function of Anticipating a Temporal Landmark (vs. Control) and Receiving a Reminder (vs. not) in Study 5.



Note. Error bars represent ±1 SE.
**Because our DV captured participants' intentions to skip the workout, higher means indicate lower motivation*

General Discussion

Across five studies, we show that when anticipating a temporal landmark, people tend to perceive their future self as a distinct agent from their current self, optimistically believing that their future self will take responsibility for a current goal and thus procrastinate on their current goal pursuit. This effect exists when we use archival data to study searches for goal-related information by the general population (Study 1), when we measure participants' real effort investment in a longitudinal field experiment (Study 2) and a lab experiment (Study 4), and when

we assess online respondents' motivation (Studies 3 and 5). This effect also holds when we measure the salience of a temporal landmark based on the distance between a given day and the landmark as well as how strongly the landmark is viewed as signaling a new beginning (Study 1), when we experimentally manipulate the salience of a temporal landmark by drawing people's attention to it (Study 2) or framing it as a new beginning (Studies 3 and 5), as well as when we compare situations where a future temporal landmark exists or not (Study 4).

In addition, we provide evidence for one underlying mechanism. First, using a mediation analysis (Study 3), we show that one's optimistic belief about their future self taking up the goal-pursuit responsibility mediates the effect of anticipating a temporal landmark on motivation to pursue an ongoing goal. Then, using an experimental-causal-chain approach (Study 4), we show that the effect of anticipating a temporal landmark on current motivation is moderated by optimistic beliefs about the future self. We also identify a potential remedy for the demotivating effect of anticipated temporal landmarks (Study 5): Reminding people of everyday goal activities they consistently engage in prevents them from feeling licensed and attenuates the demotivating effect.

Notably, in Studies 2 and 4, which assessed real effort investment before and after a temporal landmark, we find no effect of temporal landmark on post-landmark performance, which suggests that participants who reduce effort in anticipation of a temporal landmark may not work harder to compensate for the lost progress after the landmark as compared to those in the control condition. This finding suggests that the effect of an anticipated temporal landmark on pre-landmark performance can be self-defeating in the sense that the optimistic belief about the future self picking up the slack causes motivation to decrease in the pre-landmark period but does not lead people to pick up the slack after the landmark.

Theoretical and Practical Implications

The current research makes two important contributions to the existing literature on temporal landmarks. First, prior research on temporal landmarks has focused on their positive effects on motivation, suggesting that temporal landmarks can motivate people to initiate goals (Ayers et al., 2014; Beshears et al., 2019; Dai et al., 2014; 2015; Davydenko & Peetz, 2019) and start taking self-improvement actions (Peetz & Wilson, 2013). Extending this stream of research, the current research examines how a future temporal landmark affects *continued* pursuit of an existing goal and shows that the anticipation of a temporal landmark could *decrease* current motivation for an existing goal. By documenting when temporal landmarks harm motivation, we advance the field's understanding of how motivation dynamically changes before versus after landmarks. Second, we propose and show a novel mechanism via which the psychological separation of temporal selves induced by temporal landmarks affects motivation. Dai et al. (2014, 2015) examine the relegation of failure to the past as a mechanism of goal initiation, and Peetz and Wilson (2013) focus on the discrepancy between the current self and the hoped-for future state as a mechanism of heightened motivation for self-improvement. We highlight a different mechanism, whereby people optimistically believe that their separate future self can take the responsibility, which reduces their motivation to pursue the goal in the present.

We also contribute to the literature on social loafing (Ingham et al., 1974; Karau & Williams, 1993; Latané et al., 1979). The underlying mechanism we document can be viewed as intrapersonal loafing, in which people shirk when they believe that a separate temporal self will pick up the slack. This suggests that people loaf not only when they work with other individuals toward a shared goal (e.g., Mulvey & Klein, 1998), but also when they perceive that separate temporal selves exist and can work together toward a current goal.

Furthermore, our research contributes to the literature on self-regulation and licensing (Fishbach & Dhar, 2005; Jordan et al., 2011; Khan & Dhar, 2006, 2007; Monin & Miller, 2001; Zhang et al., 2007) by identifying a novel antecedent of licensing behavior: anticipating a future temporal landmark. Prior research on the dynamics of self-regulation has shown that focusing on past and projected progress toward a goal liberates people to engage in goal-unrelated or even goal-inconsistent actions (Fishbach & Dhar, 2005; Fishbach et al., 2014). In a similar vein, the literature on moral licensing and moral credits has shown that both good deeds that people have done and moral actions that people anticipate performing liberate them to behave less morally in the present (Cascio & Plant, 2015; Khan & Dhar, 2006, 2007; Merritt et al., 2010; Monin & Miller, 2001). Adding to these literatures, we show that anticipating a temporal landmark can create a licensing effect by evoking optimistic beliefs that one's future self will take on the goal-pursuit responsibility.

Our findings carry a number of practical implications. First, they suggest that goal pursuers need to be aware of the demotivating effect that upcoming temporal landmarks may have on their current goal pursuit. While their current self may be tempted to rely on their future self in the post-landmark era to carry the weight for an ongoing goal, their future self may not be able to exert extra effort and make up for the lost progress (as suggested by our Studies 2 and 4). Even worse, for goals that require persistence, even temporarily reducing goal engagement could derail people from forming good habits (Cochran & Tesser, 1996; Soman & Cheema, 2004). Second, for professionals who constantly set and monitor others' goals (e.g., managers, coaches, and trainers), our findings suggest that they should be more careful about leveraging temporal landmarks to motivate others (e.g., employees, athletes, and trainees). While highlighting a future temporal landmark might boost others' motivation to initiate a goal *on* or *after* the

landmark event (Dai et al. 2015; Beshears et al., 2019), our research suggests that making a future temporal landmark salient could decrease current motivation to persist in an ongoing goal. Furthermore, professionals who are concerned about their subordinates or trainees slacking off right before a temporal landmark may want to remind them of everyday activities they consistently engage in toward the goal, which could be an effective strategy for curbing the negative effects of anticipated temporal landmarks, as shown in Study 5.

Limitations and Directions for Future Research

Despite making a number of contributions, our paper is not without its limitations, which highlight potential directions for future research. First, we have primarily examined near-future temporal landmarks. Specifically, we predicted and found a demotivating effect of anticipated temporal landmarks one day (Study 2), three days (Studies 3 and 5), and two game rounds before a landmark (Study 4). An exception is Study 1, in which we examined as few as two days and as long as one month before a temporal landmark (depending on the landmark). We speculate that the effect of an anticipated temporal landmark is more applicable to near-future temporal landmarks because people do not pay close attention to far-future temporal landmarks. Future research can more systematically explore whether our results extend to situations where a far-future temporal landmark is made salient (e.g., when people are prompted to think about their 30^{th} birthday in one year).

Second, we mostly studied goal pursuits that have no clear deadlines (e.g., losing weight, sticking to a diet, making donations to help others). An interesting avenue for future research would be to explore how our observed effect changes in the presence of a clear deadline. Tu and Soman (2014) have shown that motivation to initiate a task varies based on whether a task deadline is before versus after a temporal landmark. They find that when the deadline is before

(vs. after) the temporal landmark, people have a stronger implemental mindset and are more likely to initiate the task. Future research can further explore how the presence of a deadline affects motivational dynamics before and after a landmark, especially for the continued goal pursuit studied by the current research (rather than task initiation, as in Tu and Soman, 2014).

Another interesting question for future research is whether and when people may adopt a future temporal landmark as a deadline for current goal pursuit. If people adopt an upcoming temporal landmark (e.g., their wedding, turning 30) as a deadline that the current self has to meet (e.g., to lose weight before a wedding, to run their first marathon before turning 30), anticipating the landmark may increase rather than decrease motivation. This premise awaits future research. In a similar vein, it would be interesting to explore whether reminders of an ideal future state change our observed effect of anticipated temporal landmarks. For example, Peetz and Wilson (2013) asked people to describe a hoped-for future state and found they were more motivated to take action to achieve it if a future temporal landmark between the current self and the hoped-for future state was highlighted. Comparing this finding with ours, we believe it would be valuable for future research to determine whether a clear vision for an ideal future state turns the demotivating effect of anticipated temporal landmarks into a positive effect.

In addition, we have focused on examining the effect of a single temporal landmark on individuals' pursuit of a single goal. Although research about antecedents of goal motivation commonly examines one particular goal in a given study (e.g., Dai, 2018; Fishbach & Dhar, 2005; Zhang et al., 2007), people often simultaneously pursue multiple goals at a given point in time (Ballard, Vancouver, & Neal, 2018; Barron & Harackiewicz, 2001; Louro, Pieters, & Zeelenberg, 2007). Understanding how temporal landmarks affect resource and effort allocations across multiple ongoing goals would be a valuable contribution.

It would also be useful for future research to explore what happens if people encounter multiple temporal landmarks in order (e.g., Christmas, then New Year; one Monday, then another Monday). Due to optimistic biases, people may keep finding excuses to delegate responsibility to their post-landmark future self; thus, our observed effect may repeatedly arise across temporal landmarks, as long as upcoming landmarks are salient and feel like a new beginning, and people can still pursue their goals after temporal landmarks (i.e., no deadline before the landmarks).

Furthermore, due to our interest in temporal landmarks that commonly occur in people's daily lives and thus have a broad practical relevance, our research has primarily examined general temporal landmarks that have no direct connections to the goals in question (e.g., the first day of a new month vs. a prosocial goal). It is worth examining how the relationship between a temporal landmark and the focal goal affects our observed effect. For example, when people are anticipating a temporal landmark that has the potential to facilitate their goal pursuit (e.g., people with a fitness goal may view a special upcoming yoga retreat as a temporal landmark), they might have a more legitimate excuse to pursue the goal during or after the landmark and reduce their effort to a greater extent now (e.g., "I will exercise more at the retreat so I can relax now").

Conclusion

Anecdotal evidence and academic research have portrayed temporal landmarks as refreshing moments for goal pursuit. Going beyond prior research that has focused on the positive effect of temporal landmarks on goal initiation, the current research documents a negative effect of anticipating temporal landmarks on continued goal pursuit. When anticipating a temporal landmark, people perceive their current and future selves as two separate agents, optimistically believe that their future self can take responsibility for goal achievement, and thus

exert less effort in pursuit of their ongoing goals. Though anticipating a temporal landmark can boost individuals' motivation to start positive changes, it may come at the cost of reduced motivation for existing goals because of an illusion that the lost effort will be made up for in the future.

Disclosure

The data and experimental materials are available as Online Supplementary Materials at https://osf.io/naq3d/?view_only=1d5324334ad140518d675cdf542ae27b. Additionally, all the reported experiments received IRB review and approval.

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Appendix A. Adjustment of Google Search Data (Study 1)

We used the Google API Python Library to download data on the daily number of Google searches in the United States for the terms "health," "exercise," and "diet" from January 1, 2009 to December 31, 2018. We downloaded data at 251-day intervals backward from December 31, 2018 and had every two adjacent extraction periods overlap by one day. Specifically, our last extraction period was from April 25, 2018 to December 31, 2018, the second-to-last period was from August 18, 2017 to April 25, 2018, the third-to-last was from December 11, 2016 to August 18, 2017, and so on so forth. Our earliest period was January 1, 2009 to June 2, 2009, which contained fewer than 251 days since we ended our data collection at January 1, 2009. We used data about the overlapping day (e.g., April 25, 2018) to create a scaling factor between two adjacent periods, which equals the value on the overlapping day in the later extraction period (e.g., 93) divided by the value on the overlapping day in the earlier extraction period (e.g., 94). Then we multiplied daily values in the earlier extraction period by the scaling factor (e.g., 0.99) to make them comparable to the later extraction period. The logic behind this approach is that the same day should have the same value for a given search term, representing the general population's interest in the search term (relative to all other things they may search for on Google). By repeating this adjustment process across all extraction periods, we adjusted data all the way from January 1, 2009 to April 24, 2018. Eventually, the values in the last extraction period (April 25, 2018 to December 31, 2018) remained the same as the original data we obtained from Google Trends, and the day with the highest relative daily search volume in the last extraction period had a final value of 100. For every day in other, earlier extraction periods, the adjusted final value reflected 100 × the public's relative interest in a given search term on the day / the public's relative interest in the search term on the day with the highest relative daily search volume in the last extraction period (April 25, 2018 to December 31, 2018).

Online Appendix A. Additional Analyses (Study 1)

Part 1: Use robust standard errors to account for heteroscedasticity

Google Search Term	Health		Exercise		Diet	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Weekend	-29.82***	-29.28***	-9.03***	-8.48***	-3.22***	-1.96***
	(0.25)	(0.26)	(0.30)	(0.32)	(0.37)	(0.35)
Last Week of the Month	-1.76***	-1.82***	-1.16*	-0.88^	-1.11**	-0.33
	(0.36)	(0.38)	(0.52)	(0.52)	(0.42)	(0.42)
Last Month of the Year	-8.38***	-8.14***	-10.46***	-9.58***	-14.69***	-13.26***
	(0.61)	(0.61)	(0.53)	(0.52)	(0.58)	(0.56)
The Week Before a Federal Holiday	-2.21***	-2.28***	-3.37***	-3.67***	-4.13***	-4.58***
	(0.36)	(0.35)	(0.37)	(0.34)	(0.45)	(0.38)
Control Variables[a]	No	Yes	No	Yes	No	Yes
Observations	3,652	3,652	3,652	3,652	3,652	3,652
R^2	0.71	0.71	0.24	0.29	0.19	0.35

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; Robust standard errors are in parentheses.

[a] Control variables include indicators for Monday, the first week of the month, the first month of the year, and the first workday after a federal holiday.

Part 2: The raw and standardized new-beginning ratings of temporal landmarks

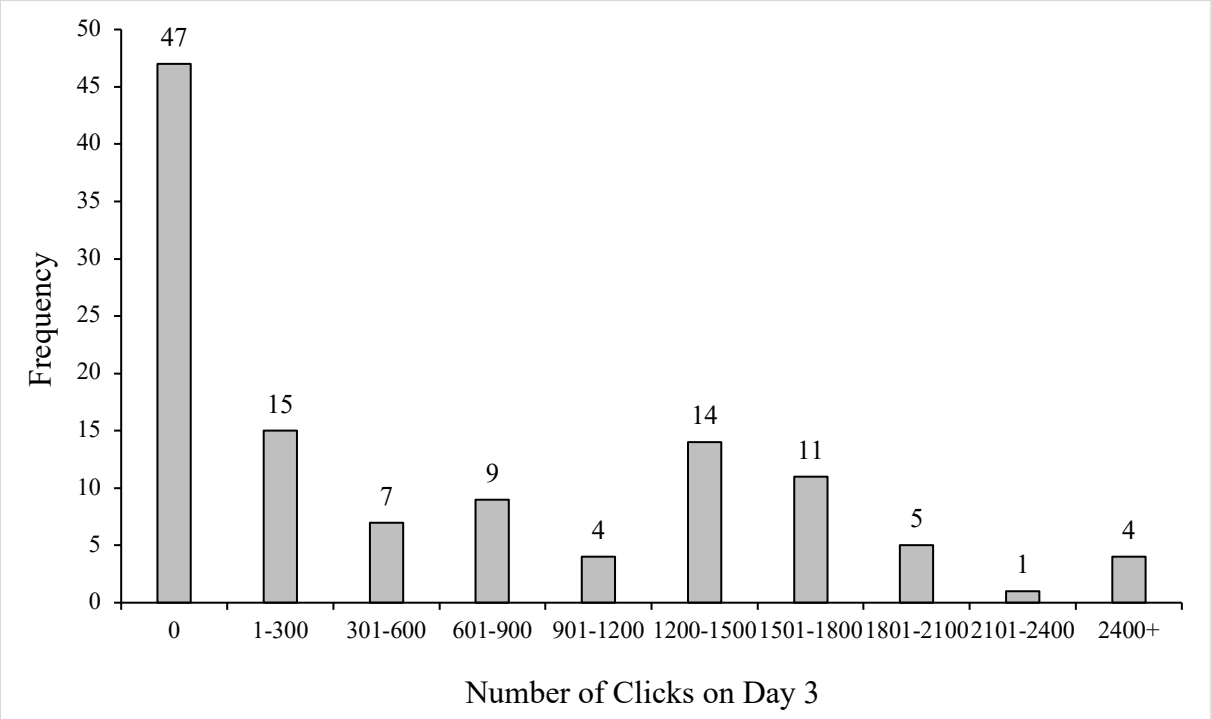
Temporal Landmark (Original Description in Dai et al. (2015))	Raw Rating	Standardized Rating
The first work day of a new week (Monday)	3.68	1.01
The first day of a new month (e.g., August 1st)	3.44	0.79
The first day of a new year (January 1st)/ New Year's Day (January 1st)	5.44	2.64
Martin Luther King Day	1.78	-0.75
President's Day	1.7	-0.82
Memorial Day	1.98	-0.56
Independence Day	2.14	-0.41
Labor Day	2	-0.54
Columbus Day	1.72	-0.80
Veteran's Day	1.94	-0.60
Thanksgiving Day	2.12	-0.43
Christmas Day	3.1	0.47

Note. Dai et al. (2015) collected new-beginning ratings for both "the first day of a new year (January 1st)" (average raw rating = 5.22) and "New Year's Day (January 1st)" (average raw rating = 5.44). Since these essentially point to the same temporal landmark and their ratings are very similar, we used the rating for "New Year's Day." Our results are robust if we use the rating for "the first day of a new year."

Online Appendix B. Robustness Checks, Analyses of Click Rates, and Full List of Measures (Study 2)

Part 1: Robustness checks

See the figures below for the distribution of the number of clicks on Day 3. There were a fair number of zero clicks (from people who did not participate in the Click Marathon on Day 3) that pulled the distribution towards the left.



Therefore, we performed a number of robustness checks as follows.

First, to address the issue of having many zero clicks, we conducted zero-inflated Poisson and zero-inflated negative binomial models and regressed the number of clicks on Day 3 on the indicator for our anticipating-temporal-landmark (vs. control) condition. Both models are designed to deal with an excessive number of zeros in a count variable. Our results are significant (with p-values ranging from < 0.001 to 0.02, depending on what controls we use to predict the zero-inflated part of the model), which suggests the robustness of our effect. See the table below.

Outcome Variable	Number of Clicks in Day 3			
	Zero-inflated poisson regression	Zero-inflated negative binomial regression	Zero-inflated poisson regression	Zero-inflated negative binomial regression
Anticipating temporal landmark	-0.51****	-0.51*	-0.51****	-0.51*
	(0.01)	(0.22)	(0.01)	(0.22)
Control Variables	Indicator for the condition		Indicator for the condition, gender, age, the number of classes being taken, whether the participant had heard about the charity, liking for the charity, and the importance of raising money[a]	
Observations	130	130	130	130

Note. The zero-inflated part of each regression model is not included in the paper since it is not of interest. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$, **** $p < 0.0001$

[a] These variables were collected from the first survey and were included because they might influence participants' decisions about whether to enter the marathon.

Second, since we found that our effect was driven by performance differences among people who participated in the marathon on Day 3 ($M_{anticipating\ landmark}$ = 783.91, SD = 655.37 vs. $M_{control}$ = 1309.08, SD = 677.45), $F(1, 67) = 10.67$, $p = .002$, $\eta_p^2 = .137$, but *not* by people's decision to participate on Day 3 (50.77% treatment vs. 55.38% control), $\chi^2(1) = .278$, $p = .60$, we separately performed a non-parametric test on all people versus only people who participated in the marathon on Day 3. For the latter sample of people who actually drove our effect, the Mann–Whitney test confirmed that our effect is significant, $Z = 2.95$, $p = .003$; and the test is marginally significant for all people, $Z = 1.69$, $p = .09$.

Third, since some of the excessive zeros may come from participants who did not have the goal of earning donations to the charity, we did a robustness check by further excluding participants who did not enter the marathon on all seven days (n = 21). We continued to find that performance was significantly worse on Day 3 in the anticipating-temporal-landmark condition than in the control condition, regardless of whether we used an ANOVA, $F(1, 107) = 8.07$, $p = .005$, $\eta_p^2 = .070$, or a non-parametric Mann–Whitney test, $Z = 2.141$, $p = .03$.

In addition, we considered other potential violations of basic assumptions for t-tests and ANOVA. We adjusted for heteroskedasticity by using robust standard errors (Hayes & Cai, 2007), and confirmed that our results hold on Day 3, $b = -327.05$, $p = .01$. Also, we winsorized data at either the 99th or 95th percentile to address the concern about potential outliers, and confirmed that our results hold either way, $b = -325.12$, $p = .01$ (99th), and $b = -298.12$, $p = .01$ (95th).

Part 2

We intended to operationalize Day 3 as the pre-landmark period, and implemented our key manipulation on Day 3 with a text that either made an upcoming temporal landmark salient or not. We realized that our manipulation may have prompted some people in the anticipating-temporal-landmark condition to anticipate the start of a month on Days 1 and 2, not just Day 3. Specifically, the calendar displayed in daily reminders sent to participants in the anticipating-

temporal-landmark condition (Figure 3) always showed the start of a new month (Feb 1) from Day 1 on. We did so because it would be strange and could create a confounding factor if we used the same calendar between two conditions on Days 1 and 2 and switched to a different calendar on Day 3 in the anticipating-temporal-landmark condition. However, it is possible that the calendar caused some participants to treat Days 1-3 (not just Day 3) as the pre-landmark period. This may be why performance looks directionally worse on Days 1 and 2 in the anticipating-temporal-landmark condition than in the control condition.

Part 3: Analyses of click rate

As the clicking task in Study 2 was conducted online, we conducted additional analyses on click rates to examine if there was any abnormal pattern. Specifically, we calculated the average number of clicks per second for people who participated in the marathon on a given day. The average click rate was stable and ranged from 4.3 to 4.6 across seven days (excluding the extreme outlier on Day 7), which is consistent with the average rate of 4.88 to 5.14 clicks per second in Study 4 (which involved a clicking task in a controlled lab environment). Besides the extreme outlier on Day 7, the highest click rate ranged from 8.9 to 10.7 across seven days, which is also comparable with the highest click rate of 8.34 to 9.16 across rounds in Study 4. We further note that the maximum rate of about 10 times per second observed in Study 2 is realistic: according to click rates reported by people who tested their click speed at https://www.click-test.com/, 65% of people (165,358 in total) can do better than 10 clicks per second.

Part 4: Measures in the first (sign-up) survey

Note. Each item is scored from 1 = not at all to 7 = very much, unless otherwise indicated.

Page 1

[Trial] First, please practice clicking the button below that says, "Click for the Make-A-Wish Foundation." It is the same button that you will click during the Click Marathon to raise money for the Make-A-Wish Foundation. This page will automatically submit when the time counts down to 0 in 30 seconds.

Page 2

Great! In the actual Click Marathon, you will have up to 5 minutes to do as many clicks as you want each day.

Now proceed to the next page to provide general information about yourself and your knowledge about the Make-A-Wish Foundation

Page 3[16]

[Familiarity] Have you heard of the Make-A-Wish Foundation before? (1 = Yes, 0 = No)
[General liking] How much do you like the Make-A-Wish Foundation? (If you have not heard of this foundation before signing up for our study, please answer this question based on what you read about the foundation in our study recruitment message.)
[Goal Importance 1] How important is it for you to raise money for the Make-A-Wish Foundation?
[Goal Importance 2] How important is it for you to raise money to help children diagnosed with critical illnesses?

Page 4

[Gender] What is your gender? (1 = Female, 2 = Male, 3 = Would rather not to say)
[Age] What is your age? (open-ended)
[# of classes taking] How many classes are you taking this quarter (i.e., Winter 2019)? (open-ended)
[General perceptions of common calendar transition points] Please think about the following days. To what extent does each day feel like the beginning of a new time period to you?

- The first day of a new week
- The first day of a new month
- The middle day of a month
- The first day of a new year

Part 5: Measures in the second (follow-up) survey

Note. Each item is scored from 1 = not at all to 7 = very much, unless otherwise indicated.

Page 1

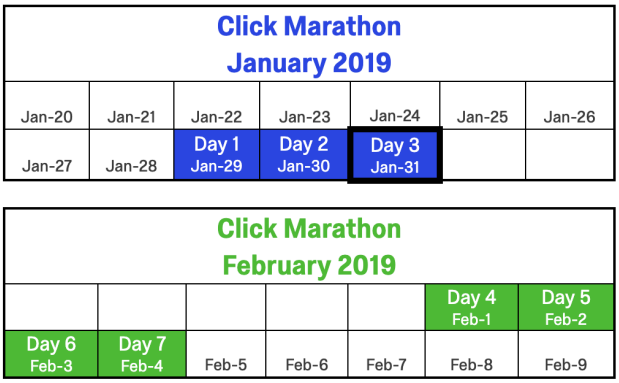
[Control condition]

Please think back about how you felt and what you did on **Day 3 of the Click Marathon (last Thursday)**. Then answer the following questions about your feelings and activities that day.

[Anticipating temporal landmark condition]

[16] Since we had to first identify participants who completed the first survey before our recruitment deadline, we had to randomize eligible participants into conditions manually (rather than using Qualtrics's randomizer). Therefore, we collected measures on Pages 3 and 4 to ensure that participants between conditions were comparable in their general perceptions of the charity, busyness, and perceptions of common calendar transition points. Indeed, confirming the success of our randomization, the two conditions did not significantly differ in any of these measures, $p \geq 0.27$.

Please think back about how you felt and what you did on **Day 3 of the Click Marathon (January 31, last Thursday)**. Then answer the following questions about your feelings and activities that day.



[Anxiety] How anxious did you feel on [Day 3 vs. Day 3, January 31]?
[Distraction] How distracted were you from your normal work on [Day 3 vs. Day 3, January 31]?
[Change in activities] How much did you change your daily activities on [Day 3 vs. Day 3, January 31]?

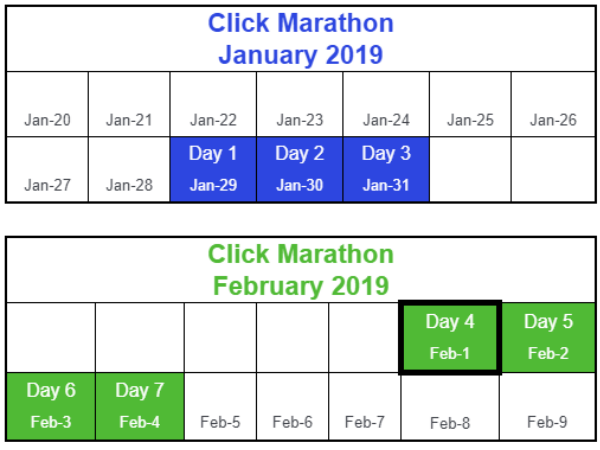
Page 2

[Control condition]

Now, think back about how you felt and what you did on **Day 4 of the Click Marathon.** Then answer the following questions about your feelings and activities that day.

[Anticipating temporal landmark condition]

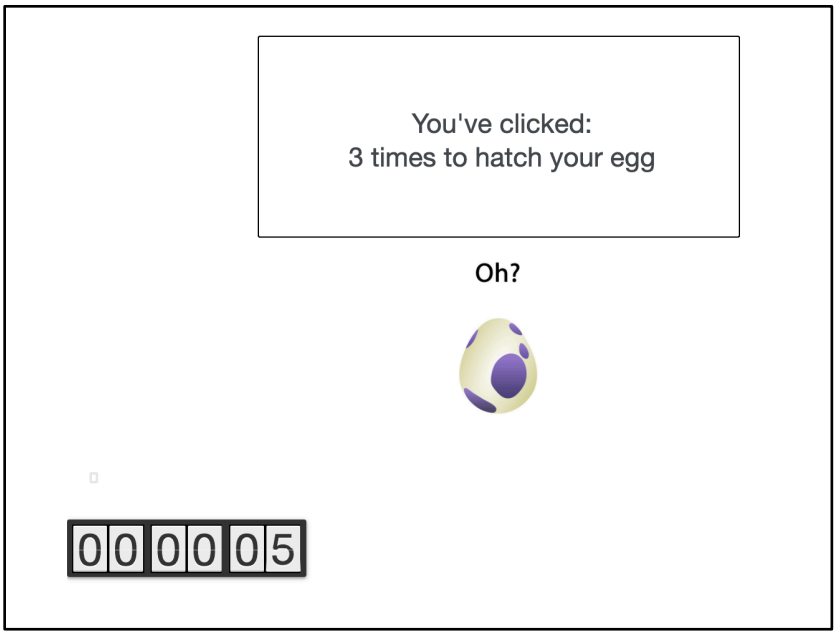
Now, think back about how you felt and what you did on **Day 4 of the Click Marathon (February 1)**. Then answer the following questions about your feelings and activities that day.



[Perceptions of temporal landmark – manipulation check] To what extent did [Day 4 vs. Day 4, February 1] feel like the beginning of a new time period to you?
[Perceived significance of the first day of a new month] To what extent did [Day 4 vs. Day 4, February 1] feel like a significant date, as compared to other days in the Click Marathon?

Online Appendix C. Study Instruments, Round-by-Round Analysis, and Full List of Measures (Study 4)

Part 1: Pokémon Click Game screen shot



Part 2: Separate analyses for Rounds 1-4

We conducted a two-way (anticipating temporal landmark vs. control) × (anticipating level-up vs. not) ANOVA to predict the number of clicks participants made each round. Both Round 1 and Round 2 showed a predicted interaction, $F(1, 259) = 4.88$, $p = .028$, $\eta_p^2 = .019$ and $F(1, 259) = 4.54$, $p = .034$, $\eta_p^2 = .017$, respectively. Specifically, when participants did not expect their avatar to level up from Round 3, the number of clicks in Round 1 was marginally lower in the anticipating-temporal-landmark condition ($M = 253.67$, $SD = 49.49$) than in the control condition ($M = 268.82$, $SD = 51.82$), $F(1, 259) = 3.41$, $p = .066$, $\eta_p^2 = .013$. When participants expected their avatar to level up, the number of clicks in Round 1 did not differ significantly between the anticipating-temporal-landmark ($M = 257.83$, $SD = 46.88$) and control conditions ($M = 247.39$, $SD = 38.68$), $F(1, 259) = 1.63$, $p = .20$.

Similar but stronger patterns emerged for Round 2; when participants did not expect avatar level-up, the number of clicks in Round 2 was lower in the anticipating-temporal-landmark condition ($M = 233.09$, $SD = 56.92$) than in the control condition ($M = 261.54$, $SD = 43.17$), $F(1, 259) = 10.38$, $p = .001$, $\eta_p^2 = .039$. When participants expected avatar level-up, the number of clicks did not differ significantly between the anticipating-temporal-landmark ($M = 239.77$, $SD = 59.85$) and control conditions ($M = 241.67$, $SD = 39.38$), $F(1, 259) < 1$, $p = .83$.

For Round 3, there were no main effects of anticipating temporal landmark, $F(1, 259) = .39$, $p = .53$, or anticipating level-up, $F(1, 259) = 1.00$, $p = .31$, or their interaction, $F(1, 259) = .47$, $p = .50$. Specifically, the number of clicks did not differ significantly between the anticipating-temporal-landmark and control conditions regardless of whether people anticipated avatar level-up ($M_{anticipating\text{-}temporal\text{-}landmark} = 242.32$, $SD = 55.45$ vs. $M_{control} = 241.93$, $SD = 46.58$),

$F(1, 259) = .002$, $p = .97$, or not ($M_{anticipating\text{-}temporal\text{-}landmark} = 244.58$, $SD = 59.02$ vs. $M_{control} = 253.83$, $SD = 66.70$), $F(1, 259) = .85$, $p = .36$.

For Round 4, there were again no main effects of anticipating temporal landmark, $F(1, 259) = 1.16$, $p = .28$, or anticipating level-up, $F(1, 259) = 1.54$, $p = .22$, or their interaction, $F(1, 259) = 1.72$, $p = .19$. Specifically, the number of clicks did not differ significantly between the anticipating-temporal-landmark and control conditions when people anticipated avatar level-up ($M_{anticipating\text{-}temporal\text{-}landmark} = 246.03$, $SD = 60.51$ vs. $M_{control} = 244.28$, $SD = 57.79$), $F(1, 259) = .028$, $p = .87$, and there was a marginally significant difference when people did not anticipate avatar level-up ($M_{anticipating\text{-}temporal\text{-}landmark} = 245.50$, $SD = 65.95$ vs. $M_{control} = 263.29$, $SD = 56.60$), $F(1, 259) = 2.85$, $p = .093$. To sum, for both of the two post-landmark rounds, we found no evidence that people who anticipated the landmark made up for the lost progress; if anything, it seems that in Round 4, they performed marginally significantly worse than those in the control condition.

Part 3: Analyses for total performance

We conducted a two-way ANOVA on the total number of clicks across Rounds 1-4, which yielded a marginally significant interaction, $F(1, 259) = .08$, $p = .084$, $\eta_p^2 = .012$. Specifically, when participants did not expect their avatar to level up from Round 3, those in the anticipating-temporal-landmark condition performed significantly worse ($M = 976.83$, $SD = 210.47$) than did those in the control condition ($M = 1047.48$, $SD = 186.36$), $F(1, 259) = 4.78$, $p = .03$, $\eta_p^2 = .018$. When participants expected their avatar to level up, the total number of clicks did not differ between the anticipating-temporal-landmark ($M = 985.95$, $SD = 200.67$) and control conditions ($M = 975.27$, $SD = 158.05$), $F(1, 259) < 1$, $p = .78$. There were no main effects of anticipating temporal landmark, $F(1, 259) = 1.64$, $p = .20$, or optimistic belief about a future self, $F(1, 259) = 1.82$, $p = .18$.

Part 4: Full list of measures

Notes. All these measures were collected after participants finished the game. Each item is scored from 1 = not at all to 7 = very much, unless otherwise indicated. Results are available upon request from the authors.

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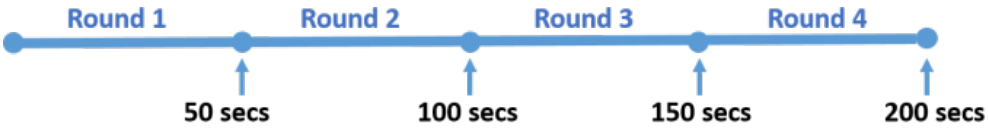
Please think back about how you felt while playing the Pokémon Click game and answer the following questions.

Think about the time, [Round 2 (50-100 seconds) vs. Round 2 (50 seconds-1 minute and 40 seconds)] while answering the questions.

[Control condition]



[Anticipating temporal landmark condition]

[Anxiety] How anxious did you feel in [Round 2 (50-100 seconds) vs. Round 2 (50 seconds-1 minute and 40 seconds)]?[17]
[Distraction] When playing the Pokémon Click game, how distracted were you in [Round 2 (50-100 seconds) vs. Round 2 (50 seconds-1 minute and 40 seconds)]?
[Perceptions of Round 3] To what extent did [Round 3 (after 100 seconds) vs. Round 3 (after 1 minute and 40 seconds)] feel like the beginning of a new time period to you?
[Familiarity] Do you play Pokémon Go game?
[Enjoyment] How much did you enjoy Pokémon Click game today?

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Now answer the following statements about your life and yourself and indicate to what extent you agree with each statement (1 = strongly disagree; 7 = strongly agree):
[Fresh start mindset] (Price, Coulter, Strizhakova, & Schultz, 2017; $\alpha = .84$).

- Regardless of present circumstances, someone can chart a new course in life.
- Anyone can make a new start if they want to.
- Whatever their past, people can look forward to a new future.

[Optimism] (Scheier, Carver, & Bridges, 1994; $r = .56$, $p < .001$)

- I'm always optimistic about my future.
- Overall, I expect more good things to happen to me than bad.

[Future temporal focus] (Shipp, Edwards, & Lambert, 2009; $r = .51$, $p < .001$)

- I focus on my future.
- I think about times to come.

[Self-efficacy] (Chen, Gully, & Eden, 2001; $r = .67$, $p < .001$)

- I will be able to successfully overcome many challenges.
- I will be able to achieve most of the goals that I have set for myself.

[Attention check]
If you are reading this, click 3.

[17] There was a marginally significant interaction between our manipulations on anxiety, $F(1, 259) = 3.12$, $p = .08$, but the pattern of the interaction could not explain the findings about performance reported in the paper. Specifically, for participants who did not anticipate avatar level-up, there was no effect of anticipating a temporal landmark on anxiety, $F(1, 259) = .44$, $p = .51$; for participants who anticipated avatar level-up, anticipating a temporal landmark marginally significantly reduced anxiety ($M = 3.09$, $SD = 1.73$), relative to the control condition ($M = 3.70$, $SD = 2.07$), $F(1, 259) = 3.37$, $p = .06$.

Online Appendix D. Separate Analyses for Different Age Groups (Studies 3 and 5)

Part 1: Study 3

We conducted separate analyses for participants under or at 30 (N = 109, 69.72% female, M_{age} = 26.13) versus above 30 (N = 211, 68.72% female, M_{age} = 43.14). We replicated the effect of anticipating a temporal landmark on motivation for both age groups. Specifically, anticipating a temporal landmark decreased motivation to work out for participants under or at 30 ($M_{anticipating\text{-}temporal\text{-}landmark}$ = 3.36 vs. $M_{control}$ = 4.40), $F(1, 107) = 3.36$, $p = .069$, $\eta_p^2 = .030$, and for participants above 30 ($M_{anticipating\text{-}temporal\text{-}landmark}$ = 3.55 vs. $M_{control}$ = 4.21), $F(1, 209) = 6.46$, $p = .012$, $\eta_p^2 = = .030$.

Part 2: Study 5

As in Study 3, we separately analyzed participants at 30 and under (N = 138, 44.20% female, M_{age} = 25.74) versus above 30 (N = 295, 58.98% female, M_{age} = 43.81), excluding one person who did not indicate age. A two-way (anticipating temporal landmark vs. control) × (reminder vs. no reminder) ANOVA on intentions to *skip* workout yielded a predicted interaction for participants under or at 30, $F(1, 134) = 8.52$, $p = .004$, $\eta_p^2 = .060$. Specifically, as predicted, when participants were not reminded of their everyday engagement in exercise-goal-related activities, anticipating temporal landmark increased their intentions to skip the exercise ($M_{anticipating\text{-}temporal\text{-}landmark}$ = 6.80 vs. $M_{control}$ = 5.63), $F(1, 134) = 4.80$, $p = .030$, $\eta_p^2 = .035$. When participants were reminded, the opposite pattern occurred ($M_{anticipating\text{-}temporal\text{-}landmark}$ = 5.43 vs. $M_{control}$ = 6.52), $F(1, 134) = 3.78$, $p = .054$, $\eta_p^2 = .027$. There was no main effect of anticipating a temporal landmark, $F(1, 134) = .009$, $p = .926$, or reminder, $F(1, 134) = .40$, $p = .530$.

For participants above 30, the two-way ANOVA did not yield a significant interaction, $F(1, 291) = .35$, $p = .55$. Nevertheless, analyses of simple effects revealed predicted patterns: when there was no reminder, anticipating a temporal landmark directionally increased participants' intentions to skip the exercise ($M_{anticipating\text{-}temporal\text{-}landmark}$ = 6.60 vs. $M_{control}$ = 5.97), $F(1, 291) = 2.54$, $p = .112$, $\eta_p^2 = .009$, whereas this difference was smaller when there was a reminder ($M_{anticipating\text{-}temporal\text{-}landmark}$ = 6.13 vs. $M_{control}$ = 5.83), $F(1, 291) = .63$, $p = .43$. There was a marginally significant main effect of anticipating a temporal landmark ($M_{anticipating\text{-}temporal\text{-}landmark}$ = 6.35 vs. $M_{control}$ = 5.90), $F(1, 291) = 2.88$, $p = .091$, $\eta_p^2 = .010$, and no main effect of reminder, $F(1, 291) = 1.27$, $p = .261$.

References for Online Appendix

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