Research Article

Psychological Science
2015, Vol. 26(6) 816–825

DOI: 10.1177/0956797615572231
pss.sagepub.com

When Does the Future Begin? Time Metrics Matter, Connecting Present and Future Selves

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Abstract

People assume they should attend to the present; their future self can handle the future. This seemingly plausible rule of thumb can lead people astray, in part because some future events require current action. In order for the future to energize and motivate current action, it must feel imminent. To create this sense of imminence, we manipulated time metric—the units (e.g., days, years) in which time is considered. People interpret accessible time metrics in two ways: If preparation for the future is under way (Studies 1 and 2), people interpret metrics as implying when a future event will occur. If preparation is not under way (Studies 3–5), they interpret metrics as implying when preparation should start (e.g., planning to start saving 4 times sooner for a retirement in 10,950 days instead of 30 years). Time metrics mattered not because they changed how distal or important future events felt (Study 6), but because they changed how connected and congruent their current and future selves felt (Study 7).

Keywords

motivation, future, judgment, time, situated cognition, open materials

Received 7/30/13; Revision accepted 1/19/15

People often delay taking action toward future events, finding the present more pressing and assuming that their future self can always take action later, only to find that time has run out when the future arrives. Failure to act soon enough has enormous real-word consequences: People fail to save enough for retirement (e.g., Munnell, Webb, & Golub-Sass, 2007, 2009), fail to sufficiently engage in preventive health behaviors (Sirois, 2004), and fail to invest enough time studying for school (e.g., Oyserman, 2015). Instead of delaying current gratification, they act as if they prefer their current self's needs and desires to those of their future self. This pattern of discounting future relative to current costs and rewards is termed *temporal discounting* in studies that examine the extra amount people require in order to be willing to wait for financial gains and how much they are willing to pay in the present to avoid future losses (Ballard & Knutson, 2009; Chapman & Elstein, 1995).

Explanations for differences in rates of temporal discounting range from structural to psychological to linguistic. Structural accounts focus on poverty (e.g., Bertrand, Mullainathan, & Shafir, 2004) and the structure of "defaults" that are set unless one opts out of them, for example, whether employers automatically enroll employees in future-focused options such as direct deposit or retirement accounts (Thaler & Sunstein, 2008). Psychological accounts focus on situational or dispositional variance in self-control (e.g., Ariely & Wertenbroch, 2002) and in the connection between the current and future self (e.g., Oyserman, 2007). Linguistic accounts focus on differences between languages in whether present and future events are necessarily distinguished, with more discounting when they are required linguistically to be distinguished than when they are not (e.g., Chen, 2012).

Given this array of explanations, it is plausible to assume that the rate at which people discount the future compared with the present is multiply determined; this implies that a number of solutions are possible to the problem of insufficient future investment. We focus here

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on one possibility in particular, which is to increase the psychological relevance of the future self for the current self. Studies to date have focused on manipulating images of the self directly (e.g., Hershfield et al., 2011). For example, Nurra and Oyserman (2015) asked children to imagine the adult they would be in the future and how old they would be then, varying the connection implied between the current and adult self. For some children, the adult future was tagged as connected to the current self; for others, it was tagged as separate. The tag was either visual or verbal. In the visual version, children saw two circles representing their current self and adult future self that were shown as overlapping or separate. In the verbal version, they read that their adult self was in the near future or in the far future. Across studies, whether the visual or verbal tag was used, children who were assigned to the condition in which their current and adult future selves were connected outperformed their peers both immediately and over time, obtaining better grade point averages. Neither verbal nor visual tags influenced the content of children's adult self (occupations) or the age they would be when they attained their adult future self (early 20s), which implies that effects were due to felt rather than chronological nearness.

To better understand these effects and because the studied connection tags may not be present in real-world settings, we considered a different kind of tag in the current studies. We chose a tag that is omnipresent, time metric—the units (e.g., days, months, years) in which time is considered. We predicted that changing the metric used to frame when the future begins should make the future feel psychologically relevant to the current situation by making it connected to and congruent with the current self. Our prediction was constructed in three steps. First, people have a lay theory about time as distance (e.g., Casasanto & Boroditsky, 2008). This implies an experience of temporal granularity. That is, because the farther away something is in space, the fewer details can be seen, people should experience future events the same way. The farther away a future event is, the fewer details can be imagined; the closer a future event is, the more details can be imagined. Hence, compared with closer events, farther events are typically considered using a more gross-grained time metric (e.g., years rather than days).

Second, following Grice's logic of conversation (Schwarz, 1996), people assume that the time metric used relates to how much time is being discussed, and following Higgins's (1998) "aboutness" principle, once a particular time metric is on people's mind, they will assume it is relevant to the task at hand. Yet having a metric brought to mind does not necessarily cause people to act. Knowing when people will act requires a third step, which is knowing the circumstances in which people experience the future as imminent, relevant to the present self, rather than irrelevant to it. Identity-based motivation theory (Oyserman, 2007, 2015) predicts that if the future self is experienced as more connected to the current self, people should be more willing to act in support of that self and discount future rewards less. Taken together, people should infer from the use of a fine-tuned time metric that the future is near; this should influence their willingness to start saving for the future and reduce the extent to which they discount the future, in part because they will experience their future self as more connected to and congruent with their current self.

Synthesizing these three steps yields three predictions about people induced to consider the future with a fine-grained versus a gross-grained time metric. First, if people do not know when a future event will occur, they should interpret current action as implying that the event will occur sooner. Second, if people know when a future event will occur, they should plan to act sooner to prepare for it. Third, one reason they will act sooner to prepare in these latter situations is that an accessible time metric changes perceived connection to and congruence with one's future self. This effect should be robust to other factors relevant to self-control (e.g., income; education; age; interpretation of experienced difficulty; determined character, or "grit"; Duckworth & Seligman, 2005; Smith & Oyserman, 2015).

Once a future event is understood as having a greater relevance to the present, people should be more willing to take action. Indeed, temporal-construal theory predicts that in the far future, people will focus on *whether* one would like to act, whereas in the near future, they focus on *how* to act (e.g., Trope & Liberman, 2010). That shift from state (should I?) to action (how will I?) is well documented (e.g., Gollwitzer & Sheeran, 2006), and temporal-construal theory (Trope & Liberman, 2010) predicts that near events produce action tendencies. The question we raise is different. We ask whether people can be induced to act in support of objectively distal events without necessarily making the event itself feel closer by making the future feel psychologically relevant. In the current studies, we tested the three core predictions about interpretation (and misinterpretation) of time metric derived from our model. The first prediction involves when events occur: We predicted an effect of time metric on estimates of when an event will occur given that preparations are under way. The second involves when preparations start: We predicted an effect of time metric on estimates of when to start preparation given that the time when the event will occur is known. The final prediction involves a mediational process: We predicted a mediating effect of identity in starting to act for distal future events with known start times.

Table 1. Study 1: Effect of Assigned Time Metric (Fine-Grained, Gross-Grained) on When Participants Estimated a Future Event Would Occur

Scenario	Fine-grained time metric	Gross-grained time metric	Raw difference between metrics	*t*	*d*
"John/Jane is shopping for a present for his/her friend's birthday party. When do you think the party is?"	*M* = 5.3514 days, *SD* = 3.5136, range = 0–14	*M* = 31.5789 days, *SD* = 6.7888, range = 0–60	26.2276 days, *SD* = 10.7787	*t*(73) = –23.47**	–5.82
"Dan/Elizabeth is preparing his/her presentation for work. When do you think the presentation is?"	*M* = 5.6410 days, *SD* = 4.3498, range = 0–15	*M* = 38.8462 days, *SD* = 16.0370, range = 15–90	33.2051 days, *SD* = 23.3475	*t*(76) = –12.66**	–3.14
"Mark/Sarah is saving money for his/her wedding. When do you think the wedding is?"	*M* = 9.1579 months, *SD* = 3.7238, range = 3–18	*M* = 17.8378 months, *SD* = 7.2783, range = 12–36	8.6799 months, *SD* = 11.4395	*t*(73) = –6.48**	–1.61

Note: The overall effect size was –3.52. Participants were randomly assigned to respond to each scenario using either a fine-grained or a gross-grained time metric. For the first and second scenarios, the metrics were days or months, respectively; for the third scenario, the metrics were, respectively, months or years. Results are converted here to the fine-grained measure for ease of comparison.
**$p < .001$.

When Events Will Occur: Studies 1 and 2

Method

Sample and procedure. To test Prediction 1, we manipulated time metric between subjects and asked adult participants when an event (a wedding, birthday, work presentation, or midterm exam) that the protagonist was already preparing for would occur. Our goal was to obtain about 40 participants per cell. In Study 1 ($N = 82$; 40.2% female, 59.8% male; 80% Caucasian; 82.9% had at least some college; age range = 19–61 years, $M = 31.27$, $SD = 10.72$), we recruited adults with U.S. IP addresses from Amazon's Mechanical Turk to read vignettes about gender-matched people. In Study 2 ($N = 80$; 50% female, 50% male; 41% Caucasian; 78.8% were juniors and seniors in college; age range = 18–26 years, $M = 20.54$, $SD = 1.91$), undergraduate research assistants approached undergraduates in public areas around the University of Michigan campus and asked them if they were willing to fill out a brief paper-and-pencil survey about everyday decisions.

Participants read six scenarios: Three had time metrics, and three were fillers without metrics. Scenarios were the same in both studies except that adults received a work scenario (Study 1), and university students received a studying scenario (Study 2). In the first time-metric scenario, participants were told that someone was shopping for a birthday present, and they were asked when they thought the party would occur. In the second time-metric scenario, adults were asked when someone would have to give a presentation he or she was preparing for, whereas students were asked when someone would have to take a midterm he or she was studying for. The last time-metric scenario involved a wedding, and participants were asked to guess when the wedding would occur (full text of the three key scenarios can be found in Tables 1 and 2).

In the filler scenarios, the time metric of answer was not manipulated. The first filler scenario asked participants about the class level of a student who meets with an advisor to check on graduation requirements (freshman, sophomore, junior, or senior), the second asked about the age in years of a person meeting with an attorney to establish a last will and testament, and the third asked when a 22-year-old who was saving for retirement planned to retire.

In both studies, the time metric was fine-grained for half of respondents and gross-grained for the other half of respondents. The fine-grained metric was days in the first two scenarios and months in the third scenario. The gross-grained metric was months in the first two scenarios and years in the third scenario. Questionnaires were randomized (online or by presorting questionnaires), and all questions were open ended.

Preliminary analyses. To create a common metric for analysis, we transformed responses in gross-grained units to the finer-grained unit, so that months were converted to days and years were converted to months. Responses were then standardized.[1] Results without controls yielded the same patterns and are presented in the Supplemental Material available online. No participants were dropped from analysis; however, the sample size for analysis was reduced because of nonresponse. Thus in Study 1, we had complete data from 69 participants who gave a response to all three scenarios and partial data from others: 75 to 78 participants gave a response to at least one of the three scenarios. In Study 2, we had complete data from 63 participants who gave a response to all three scenarios and partial data from others: 68 to 71 gave a response to at least one of the scenarios.

Table 2. Study 2: Effect of Assigned Time Metric (Fine-Grained, Gross-Grained) on When Participants Estimated a Future Event Would Occur

Scenario	Fine-grained time metric	Gross-grained time metric	Raw difference between metrics	*t*	*d*
"John/Jane is shopping for a present for his/her friend's birthday party. When do you think the party is?"	*M* = 3.8056 days, *SD* = 2.2274, range = 1–7	*M* = 23.5227 days, *SD* = 14.4409, range = 0–60	19.7172 days, *SD* = 20.0901	$t(69) = -7.11^{***}$	–1.85
"Dan/Elizabeth is preparing for his/her midterm. When do you think the midterm is?"	*M* = 5.4000 days, *SD* = 3.5990, range = 1–14	*M* = 18.2391 days, *SD* = 10.1752, range = 0–30	12.8391 days, *SD* = 14.9743	$t(68) = -6.25^{***}$	–1.63
"Mark/Sarah is saving money for his/her wedding. When do you think the wedding is?"	*M* = 10.4571 days, *SD* = 4.1256, range = 2–24	*M* = 21.8700 days, *SD* = 13.7250, range = 0–60	11.4129 days, *SD* = 20.2080	$t(71) = -4.05^{***}$	–1.05

Note: The overall effect size was –1.51. Participants were randomly assigned to respond to each scenario using either a fine-grained or a gross-grained time metric. For the first and second scenarios, the metrics were days or months, respectively; for the third scenario, the metrics were, respectively, months or years. Results are converted here to the fine-grained measure for ease of comparison. Unlike Studies 1 and 3 through 7, which were computerized so data entry was not a separate step, Study 2 used paper questionnaires; data were therefore double-entered (κ = 1.00) prior to analysis to ensure that there were no data-entry errors (Landis & Koch, 1977).
$^{***}p < .0001$.

Results

Repeated measures analyses of covariance showed that time metric mattered in the three critical scenarios—main effect of time metric: Study 1, $F(1, 65) = 334.875$, $p < .001$, $d = 4.54$; Study 2, $F(1, 59) = 64.805$, $p < .001$, $d = 2.10$. Time-metric condition did not affect response to any of the fillers (Study 1: ps > .489, Study 2: ps > .711), which allowed us to focus on the critical scenarios in which the time metric of answer units was manipulated (see Tables 1 and 2). For adults, events seemed 29.7 days sooner when considered in days rather than months and 8.7 months sooner when considered in months rather than years (average $d = 3.52$). For students, events seemed 16.3 days sooner when considered in days rather than months and 11.4 months sooner when considered in months rather than years (average $d = 1.51$).

Scenario itself did not influence how far in the future the event seemed (Study 1: $p = .856$, Study 2: $p = .997$). As can be seen in Tables 1 and 2, gross-grained estimates in Study 1 did not always cover the full range starting from 0 (the time of the study), whereas gross-grained estimates did cover this full range in Study 2. Indeed, time metric mattered more in some scenarios than in others for adults—Time Metric × Scenario: Hotelling's trace[2] $F(2, 64) = 3.022$, $p = .056$, but was equally powerful across scenarios for students—Time Metric × Scenario: Hotelling's trace F statistic was not significant, $p = .264$.

Studies 1 and 2 support the prediction that when current action is combined with a fine-grained time metric, people understand that action is being taken for a more proximal event. But what if action is not yet occurring? Does time metric influence one's plan to act (Prediction 2), and if it does, does it do so by making the future event more psychologically relevant (connected to and congruent with the present self), as Prediction 3 posits? We tested these predictions in Studies 3 through 7.

When Preparation Should Start: Studies 3 Through 7

Method

Sample. Adults with U.S. IP addresses were recruited from Amazon's Mechanical Turk. Demographics for each study are presented in Table 3; the only demographic that differed significantly by study was age. Participants in Study 7 were significantly older than those in the other studies. Age, education, and income were included as covariates (controls) in all analyses because all are relevant to saving.

Procedure. To test Predictions 2 and 3, we manipulated time metric between participants such that half saw a fine-grained metric (days) and half saw a gross-grained metric (years). In each study, the time at which the future event would occur was fixed, and in both time-metric conditions, the event occurred at exactly the same time (participants in each condition just saw a different time measurement). However, the dependent variable varied in each study.

To test Prediction 2, we asked participants in Studies 3 to 5 when they planned to start taking action (saving) with an open-ended question containing the same time metric as the prime. In Study 3, each participant received one of two scenarios, in which he or she was asked to imagine his or her own child attending college in either

Table 3. Studies 3 Through 7: Demographics

						Age (years)		
Study	*N*	Final *n*	White	Some college	Earn < $50,000	Range	*M*	*SD*
3	140	138	74.3%	87.1%	68.6%	18–62	30.91	10.03
4	127	126	78.0%	92.9%	78.7%	18–61	31.48	10.04
5	124	122	71.8%	88.7%	74.2%	18–67	31.72	11.44
6	402	400	81.8%	88.1%	74.9%	18–72	31.27	9.96
7	324	316	80.2%	81.8%	75.0%	18–73	35.55	11.25

Note: The total sample size varied because of the difference across studies in the number of conditions being tested. There were two conditions in Studies 3, 4, and 5; six conditions in Study 6; and four conditions in Study 7.

18 years or 6,570 days. In Study 4, each read a scenario in which he or she was asked to imagine retiring in either 30 years or 10,950 days. In Study 5, each read a scenario in which he or she was asked to imagine retiring in 40 years or in 14,600 days. In each study, the question asked matched the scenario in content and metric. For example, participants in Study 3 who were exposed to the year time metric read, "Imagine you have a newborn child. You realize your child will be ready for college in only 18 years. When should you begin saving for their college education? In ____ years." Similarly, participants in the Study 3 who were exposed to the day time metric read, "Imagine you have a newborn child. You realize your child will be ready for college in only 6,570 days. When should you begin saving for their college education? In ____ days."

Because starting to save sooner might involve doing more, we explored whether participants planned to do more by manipulating chance for action (incremental, overall) as a second factor. To do this, we asked a second question: "How much would you save?" In the incremental condition, participants were offered a chance for action using the time-metric condition to which they were randomized. In the overall condition, they were not offered a chance for action. For example, in the incremental condition in Study 3 participants were asked, "How much should you save (in U.S. dollars) per day for your child's college education?" In the overall condition in Study 3, participants were asked, "How much should you save (in U.S. dollars) overall for your child's college education?" Then we obtained demographic covariates.

In Study 6, each participant was randomly assigned to one of the three scenarios used in Studies 3, 4, and 5 (college in 18 years or 6,570 days, retirement in 30 years or 10,950 days, retirement in 40 years or 14,600 days) and to one of the two time-metric conditions used in these studies (days, years). They were then asked (in order) "How important is saving for college [retirement]?" (1 = *not at all important*; 10 = *very important*) and "How close does college [retirement] feel?" (1 = *very near*; 10 = *very far*) before we obtained the demographic covariates.

In Study 7, each participant was randomly assigned to one of two scenarios: college in 18 years or 6,570 days and retirement in 30 years or 10,950 days. They were asked about their sense of connection and congruence between their present and future selves. These posited mediators were followed by a standard set of questions to calculate temporal discounting generally (not related to saving for their child's college or to their own retirement). Then we obtained demographic and self-control covariate controls (interpretation of experienced difficulty as importance, Oyserman, Destin, & Novin, 2015; and grit, Duckworth & Seligman, 2005). Mediation was tested via identity connection (four items, $\alpha = .81$),[3] identity congruence (four items, $\alpha = .71$),[4] and temporal discounting. Identity connection and identity congruence were rated on a scale from 1, *strongly disagree*, to 7, *strongly agree*, and temporal discounting was assessed using the Kirby Monetary Choice Questionnaire (Kirby, Petry, & Bickel, 1999). Kirby's temporal discount rate (k) was calculated with the aid of the macros used by Duckworth and Seligman (2005; A. Duckworth, personal communication, June 16, 2014) and by Carter, McCullough, Kim-Spoon, Corrales, and Blake (2012; J. Kim-Spoon, personal communication, June 16, 2014).

Results

Time metric influences when people plan to start. As predicted, the granularity of the time metric matters. As can be seen in Figure 1, participants planned to start saving four times sooner in the days condition compared with the years condition, after we controlled for their age, income, and education, $F(1, 371) = 17.969$, $p < .001$, $d = 0.44$.[5] Imagining distal future events with a fine-grained metric (participants' newborn's college in 6,570 days, their retirement in 10,950 or 14,600 days) rather than a gross-grained metric (their newborn's college in 18 years, retirement in 30 or 40 years) jump-started planned start time.

Starting to save sooner might also have resulted in planning to save more, particularly if participants were

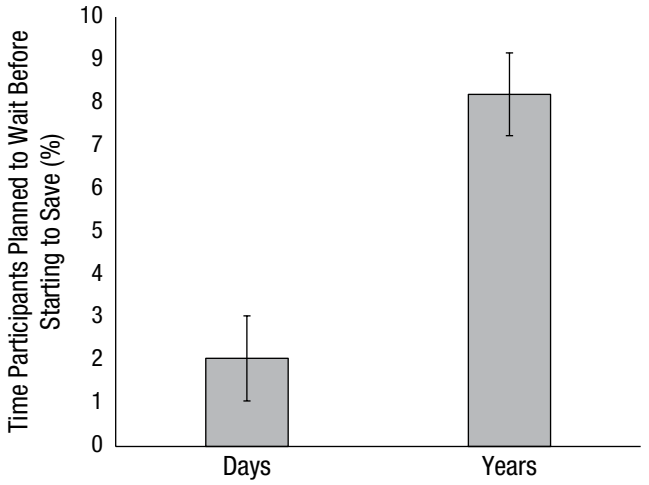

Fig. 1. Results from Studies 3, 4, and 5: time at which participants planned to start saving as a percentage of the total time available, separately for each time-metric condition. Error bars indicate ±1 *SEM*.

given a chance to save incrementally. However, we did not find evidence for this; an analysis of covariance showed no effect of incremental saving or time metric on amount to be saved (scenario: $p = .894$, time metric: $p = .458$, chance for action: $p = .207$, Chance for Action × Time Metric: $p = .378$).[6] Estimates of how much to save varied widely, as might be expected given that saving toward these goals is dependent not only on the psychological relevance of the future event but also on current circumstance (e.g., income, age) and goals (e.g., saving for public or private university, saving for a plush or sparse retirement). Further, people may not actually know how much they need to save.

Time metric influences psychological relevance of the future self, not how far away or how important saving for college or retirement seems. Prediction 3 was tested in two parts. First, in Study 6, we showed that time metric does not influence goal importance or distance (if the time when an event will occur is distal but fixed) using an analysis of covariance (controlling for participant age, education, and income). Participants rated saving for college or retirement as important (combined $M = 8.623$, $SD = 1.805$) no matter which of the three scenarios they read, $F(2, 394) = 1.971$, $p = .177$, $d = 0.15$, or to which time metric they were assigned, $F(1, 394) = 0.000$, $p = .937$, $d = 0.02$. They also rated college and retirement as seeming farther away rather than closer (combined $M = 7.965$, $SD = 2.423$) regardless of which scenario they read, $F(2, 394) = 1.940$, $p = .148$, $d = 0.15$, or to which time metric they were assigned, $F(1, 394) = 1.253$, $p = .255$, $d = 0.10$. These null effects are important because the scenarios actually presented differentially distal events 18 years (6,570 days), 30 years (10,950 days), and 40 years (14,600 days) in the future. Moreover, the actual amount of money needed should differ if one is saving for college or for retirement in 30 years or for retirement in 40 years. Hence, effects of time metric on starting to act in response to future events that will occur in a known but distal future are unlikely to be due to the granularity of the metric making a future event feel closer or more important.

In Study 7, we tested the prediction that time metric influences temporal discounting via its effect on experienced connectedness between the present and future selves and hence the congruence of the present and future self. We tested this prediction, controlling for demographic variables and self-control measures, using PROCESS for SPSS Version 2.12, Model 6, with a bootstrap sample of 10,000 reiterations (Hayes, 2013). We found the predicted mediation, which showed a significant indirect effect of time metric on temporal discounting (the 95% bias-corrected confidence interval excluded zero [−0.0163, −0.0005]) through feeling connected with the future self and the congruence between the present and future self (see Fig. 2). The model, $F(8, 307) = 4.932$, $p < .001$, controlled for participants' level of education ($p < .001$), income ($p = .092$), age ($p = .058$), interpretation of difficulty as importance ($p = .078$), and grit ($p = .712$). The total adjusted R^2 for the model was 11%. Table 4 presents the raw correlation matrix.

Thinking about the future in days makes people feel that their future self is more connected to their current self. The more connected people feel their current self is to their future self, the more congruent their present and future selves feel. The more congruent the present and future selves feel, the less people are willing to discount future rewards in favor of current ones. As noted by Zhao, Lynch, and Chen (2010), the sole criteria of mediation is documentation of an indirect effect. Hence, connection and congruence between the current and future self mediates the effect of temporal granularity on temporal discounting.

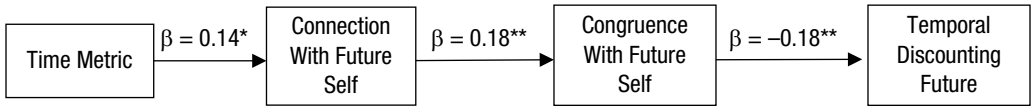

Fig. 2. Results from Study 7: model showing the effect of time metric on temporal discounting, as mediated by connection and congruence between the current and future self. Asterisks indicate significant paths (*$p < .05$, **$p < .01$).

Table 4. Study 7: Raw Correlations Among Key Variables

Variable	1	2	3	4	5	6	7	8
1. Time metric (independent variable)	—							
2. Connectedness to future self (mediator)	.087	—						
3. Congruence with future self (mediator)	.070	.267**	—					
4. Temporal discounting (dependent variable)	–.035	–.054	–.180**	—				
5. Age (covariate)	–.067	.149**	.236**	–.178**	—			
6. Income (covariate)	–.040	.043	.089	–.004	.188**	—		
7. Education (covariate)	.074	.029	.011	–.221**	.175**	.349**	—	
8. Interpretation of difficulty (covariate)	–.075	.035	–.031	.116*	–.121*	.145**	.094	—
9. Grit (covariate)	–.059	.329**	.303**	–.009	.210**	.145**	.105	.388**

Note: Time metric was coded 1 for year and –1 for days.
*$p < .05$. **$p < .01$.

General Discussion

Time, resources, and attention are limited. People allocate them to events that are pressing, the ones happening to them in a matter of days rather than the ones that may happen to them later, in a matter of months or years. This seemingly useful and common-sense approach has some unintended consequences; in particular, an ever-pressing present relegates insufficient attention to the future (e.g., Bertrand et al., 2004). What can be done? The possibility we focused on is that the future will loom large and be a focus of attention if it is considered in a fine-grained time metric because this creates a sense that the future and present selves are connected, hence congruent rather than conflicting.

There is evidence that people are ready to act in the service of a future self if it is presented as connected to the current self (Oyserman, 2007, 2009a, 2009b). For example, students work harder and get better grades when their present and future selves are connected with a picture of a physical path (Landau, Oyserman, Keefer, & Smith, 2014). In the current studies, we tested the novel prediction that another way to increase experienced connection and hence willingness to act is to use a fine-grained time metric to describe the future. We developed our prediction in three steps using people's lay theories about time as distance (Casasanto & Boroditsky, 2008), Grician conversational logic (Schwarz, 1996), the "aboutness" principle (Higgins, 1998), and the theory of identity-based motivation (Oyserman, 2007).

First, we demonstrated that if people do not know when a future event will occur, they are sensitive to time metric in estimating when it will occur if preparatory action is under way. We showed this effect for midterms, work presentations, weddings, and birthdays. When asked how many days away the event was, people said it was between 13 and 33 days sooner than if they were asked how many months away the event was. When asked how many months away it was, they stated that it was 9 to 11 months sooner than if asked how many years away it was. This time-metric effect is context sensitive, occurring only if time metric appears in the scenario.

Second, we demonstrated that if people know when a future event will occur but that time is distal, time metric influences plans to start action. We found that people say they will start saving four times sooner if told how many days rather than how many years they have until their child goes to college or until they want to retire. Third, we demonstrated that this latter effect is mediated by psychological relevance of the future self. Considering one's retirement or one's child's college education in days rather than years leads people to experience more connection between their present and future selves, which makes the identities linked to these future selves (e.g., "retiree") feel more congruent with their current self. This reduces the extent that people discount future over current rewards. Less discounting means that saving for the future may feel less painful. In situations in which the timing of the future event is known but distal, time metric does not influence how soon or how important a distal future event feels. This distinction is important both practically and theoretically. Practically, it reinforces prior findings that people fail to save not because they do not think it is important to save but because they do not start early enough (Thaler & Benartzi, 2004). Theoretically, it highlights that the effect of time metric on willingness to act is not solely due to Grician conversational logic, which would not predict that change in temporal discounting would be mediated by change in experienced connection and congruence between current and future selves. This effect of time metric is predicted by identity-based motivation theory (Oyserman, 2015).

Indeed, the effects of time metric depend on whether action is currently occurring and on whether the timing of the future event is known. If action is occurring in the

present but the timing of the future event is unknown, then the future feels nearer when a fine-grained time metric is used than when a gross-grained time metric is used, as was shown in Studies 1 and 2. The reverse is also true. If the time when a future event will occur is known, then people will plan to start working toward it sooner if a fine-grained time metric is used than when a gross-grained time metric is used, as was shown in Studies 3 through 5. These results complement related research showing that priming people with how to act increases the likelihood that they will act (Gollwitzer & Sheeran, 2006), because it makes the future seem near (Trope & Liberman, 2010).

Across the present studies, people responded to the implication that a future event discussed in terms of days will occur sooner than the same even discussed in terms of years and so will require sooner action, in contrast to the implication that they might have drawn from number magnitude: 6,570 (days) is a bigger number than 18 (years). Future research should consider when the number rather than the unit associated with the metric matters for action—for example, on learning that they need a million pennies, would participants plan to start saving sooner than if they learned that they needed $10,000 (see Furlong & Opfer, 2009)?

We focused on time as our metric and chose savings targets that were both distal and important, saving for one's children's college education and one's own retirement. Too little saving is both a problem in itself and also may reduce motivation to engage in other activities relevant to the future self, such as schoolwork. Getting to college requires both savings and investing effort. Learning that money for college is available increases middle school student's investment in homework (Destin & Oyserman, 2010). Low-income children with a bank account they self-marked as "for college" are more likely to attend college even though their savings are under $500 (Elliott, 2009). It is not the money; savings seems to make people feel that their future and present selves are more connected, which can also improve investment in schoolwork (Oyserman, 2013). Our results suggest another way to make the future seem connected—count days rather than years until the future arrives.

Author Contributions

Both authors share equal credit for this manuscript. D. Oyserman developed the study concept. Both authors contributed to the study designs. N. A. Lewis, Jr., managed data collection and analyzed and interpreted the data under the supervision of D. Oyserman. The authors discussed how to draft the manuscript, and N. A. Lewis, Jr., wrote a first draft that D. Oyserman revised. Both authors approved the final version of the manuscript for submission.

Acknowledgments

We thank Christopher Shu and Nida Ali for programming; Jenna Dehne, Haben Debessai, and Linsa Varghese for data collection; Angela Duckworth, Jungmeen Kim-Spoon, Evan Carter, and Julee Farley for help calculating temporal-discounting rates; and the Culture and Self Lab for comments on each manuscript version.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Supplemental Material

Additional supporting information can be found at http://pss.sagepub.com/content/by/supplemental-data

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Notes

1. Demographic controls were included in analyses of data from Studies 1 and 2 so results would be comparable with those of Studies 3 through 7, which focused on savings and thus would have been difficult to interpret without demographic controls. The demographic controls for Study 1 were age (p = .417) and education (p = . 277); for Study 2, they were age (p = .401) and years of college (p = .789).
2. Hotelling's trace is a statistic reported with repeated measures analyses. A significant Hotelling's trace statistic means that the manipulation (in this case, time metric) affected some dependent variables (in this case, time estimates) more than others. This was true for our online adult sample but not for our on-campus university-student sample.
3. Factor analysis showed that these four items loaded on the first factor without cross loading: "The person I am now and the person I will be in [18 years or 6,570 days; 30 years or 10,950 days] are pretty much the same person," "When I try to imagine the person I will be in [18 years or 6,570 days; 30 years or 10,950 days] it is as if I am imagining a person other than myself" (reverse-coded), "The person I will be in [18 years or 6,570 days; 30 years or 10,950 days] does not look like me at all" (reverse-coded), and "The person I will be in [18 years or 6,570 days; 30 years or 10,950 days] is a stranger to myself" (reverse-coded). Other items did not include the time metric and formed smaller factors so were not included.
4. The items were "I cannot imagine being [the parent of a college student; being a retiree]" (reverse-coded), "The identity of

a ["retiree"; "college mom or dad"] is just something I cannot imagine as me at all" (reverse-coded), "My identity as [a parent; an adult] includes saving for [college; retirement]," and "My identity as a person conflicts with some of the trappings of adulthood like saving for [college; retirement]" (reverse-coded).
5. Results for each study showed the same effect (see the Supplemental Material). An anonymous reviewer asked that the analysis be presented across Studies 3, 4, and 5. To do this, we transformed open-ended, responses regarding when participants planned to start saving to a percentage of the total time available. There was no significant effect of participant education ($p = .123$) or income ($p = .176$), but age mattered ($p = .008$). Older participants planned to start saving sooner than younger participants. Scenario did not have a main or moderating effect in the cross-studies analysis.
6. We looked for this possibility by transforming how much people said they would save daily or yearly into the amount this would be in 18, 30, or 40 years, then log-transforming and standardizing the results within each study. We log-transformed the results because responses were in dollars, and we standardized the results because the amount needed to save for college in 18 years, retirement in 30 years, and retirement in 40 years differs, and there was no correct response (meaning that simple metrics such as percentage of the total were not available). Results were the same in each study (see the Supplemental Material).

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