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Thinking into the future: how a future time perspective improves self-control



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ABSTRACT

The dual motive model posits that self-control is the prioritization of distal motives over proximal motives when the two compete. A logical extension of this view is that any factor that increases the incentive value of a distal motive or decreases the incentive value of a proximal motive will make self-control more likely. Here it is proposed that time perspective, or an individual's tendency to attend to thoughts of the past, present, or future, is one factor that influences the incentive value of competing motives. Three studies were conducted to show that time perspective influences the incentive value of competing motives, and thus influences self-control. Study 1 probes correlations and indirect effects between time perspective, incentive value, and self-control. Study 2 replicates and extends study 1 by examining additional dimensions of the future time perspective. Study 3 shows that manipulating time perspective produces changes in self-control, establishing causality. The results suggest that time perspective influences the incentive value of individuals' motives and thus self-control. The results also add support to the dual motive model of self-control, since only the dual motive model predicted these relationships.

One of the most important skills that humans possess is the ability to identify long-term goals and regulate behavior in the present to accomplish them. Due to its important role in guiding human behavior, much research has focused on the nature of self-control (Ainslie, 1975; Bandura, 1991; Mischel, 1996; Muraven & Baumeister, 2000). In this article it will be proposed that time perspective (Zimbardo & Boyd, 1999) – the way an individual attends to the past, present, and future – is a factor that plays an important role in determining self-control outcomes. More specifically, it is proposed that time perspective influences the incentive value of short-term and long-term goals, thus influencing self-control. Importantly, this research also helps to differentiate the dual motive model from other models of self-control, such as the strength model (Baumeister, Vohs, & Tice, 2007). Under the strength model, which views self-control as synonymous with response inhibition, it is not clear that self-control should bear any relationship with time perspective since it is conceivable that individuals with past, present, and future time perspectives could all be equally adept at suppressing impulses. Only the dual motive model (detailed below) predicts that time perspective, working through the incentive value of motives, should influence self-control. Moreover, we argue that self-control is domain-specific but often appears to operate across domains due to the pervasive influence of time perspective.

1. Self-control

The present study adopts the dual-motive model of self-control (Fujita, 2011). In this conceptualization, the need for self-control arises when an individual identifies a conflict between immediate, proximal motives and more abstract, distal motives. Individuals frequently encounter mutually exclusive motives of this nature, whereby acting on one motive renders the attainment of another unlikely or impossible. For example, one cannot frequently consume junk food and simultaneously lose weight. Self-control is successful when an individual engages in behavior that promotes distal goals at the expense of proximal goals. When a dieter resists a tempting slice of cake, they are furthering their distal goal of losing weight at the expense of their proximal motive to eat cake. This act of sacrificing a proximal motive to pursue a distal goal is what defines an act as self-control.

One of the important predictions of the dual motive model is that the relative incentive value of proximal and distal motives is important for determining the expression of self-control. In particular, highly valued distal motives are likely to lead to successful self-control and, by contrast, highly valued proximal motives are likely to lead to self-control failure. It follows that factors that increase the incentive value of distal motives should make self-control more likely, whereas factors that increase the incentive value of a proximal motives should make

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self-control less likely. Consider someone who is on a diet. Having them clarify their weight loss goal and activate thoughts related to body image (distal motive) makes them more likely to regulate their caloric intake (Ige, DeLeon, & Nabors, 2017; Marszał-Wiśniewska & Jarczewska-Gerc, 2016). On the other hand, increasing the salience of the proximal motive to eat (for example, taking them to a bakery or ice cream shop) would make them more likely to act on the proximal motive and thus fail at self-control (Cleobury & Tapper, 2014). Importantly, the *relative* incentive value of proximal and distal motives is the driving force behind successful (or unsuccessful) self-control. If the incentive value of the distal motive outweighs the incentive value of the proximal motive, self-control will likely be successful. This is similar to one of the claims of goal theory, which states that the relative intensity across goals determines resource allocation (Austin & Vancouver, 1996).

There are many strategies, biases, and situational factors that may adjust the relative incentive value of these competing motives. In classic delay of gratification tasks, the proximal motive to obtain an immediate reward (say, a marshmallow) is pitted against the distal motive to obtain a larger delayed reward (2 marshmallows). However, researchers have shown that when participants have another task to work on during the delay period, delay times increase (Mischel, Ebbesen, & Raskoff Zeiss, 1972; Sethi, Mischel, Aber, Shoda, & Rodriguez, 2000). Distracting oneself from the tempting stimuli increases delay time, regardless of the nature of the distracting task. In contrast, attending to proximal rewards (staring at the marshmallow) reliably decreases delay times. In the context of the dual-motive model, distraction can be considered a factor that reduces the salience of the proximal reward, thus making self-control more likely.

Other strategies to enhance self-control instead work by increasing the incentive value of distal motives. Research on goal pursuit consistently shows that priming goal-related thoughts enhances performance. In one study, participants were instructed to rank 11 goals in order of personal importance (financial success, social status, academic accomplishments, artistic achievements, excitement, career success, security, community respect, power, stable family life, and good health/physical fitness) and then write for 5 min about why their top ranked goal was important to them. Participants who had activated their goals prior to a difficult math test performed better than either participants who had self-affirmed or the control group (Wieland & Burnham, 2016). Additional studies have found that priming goals produces significant improvements on a number of diverse tasks such as intellectual tasks, resource management tasks, persistence tasks, as well as decreases in caloric intake and smoking (Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001; Chiou & Wu, 2017; Daniel, Said, Stanton, & Epstein, 2015; Dassen, Jansen, Nederkoorn, & Houben, 2016; Stein et al., 2016; Stein et al., 2017). Studies such as this show that priming people with certain goals, and thereby increasing the salience of distal motives, has an effect on behavior.

2. Differentiating the dual motive model from the strength model

It is important to point out a few of the differences between the dual motive model of self-control and the strength model of self-control (Baumeister et al., 2007). As Baumeister et al. (2007, p. 351) define self-control, self-control is the capacity that “enables a person to restrain or override one response, thereby making a different response possible”. In this definition of self-control, the central feature is the act of overriding or inhibiting a response. Furthermore, a keystone claim of the strength model is that self-control is a single resource that influences behavior in domains as diverse as health behaviors, financial stability, emotional regulation, persistence on difficult mental tasks, and physical stamina (Baumeister, 2002; Baumeister, Bratslavsky, Muraven, & Tice, 1998). As Muraven et al. (1998, p. 777) state, “if we could indeed find effects that carried over from one sphere of self-regulation to a very different sphere, this would indicate that the same

common resource is used for widely different acts of self-control”. Due to the fact that the strength model conceptualizes of self-control as a single resource, the strength model also allows researchers to use indicators of self-control interchangeably. According to the strength model, measures of mental persistence, physical stamina, pain tolerance, and caloric intake can all be used to assess self-control across different individuals, regardless of the personal goals of the individuals.

These claims are in stark contrast to the dual motive model, which presumes that self-control is exercised on a situation-by-situation basis and is dependent upon the individual's subjective evaluation of competing motives in a given scenario. Under the dual motive model, it is conceivable for an individual to have high self-control in some domains (e.g., academics) but low self-control in other domains (e.g., financial management), depending on the individual's subjective evaluation of competing motives. This fact also has implications for the measurement of self-control. Unlike the strength model, where anything that could conceivably require response inhibition is a measure of self-control (Baumeister et al., 1998; Baumeister et al., 2007; Muraven et al., 1998; Schmeichel & Vohs, 2009), under the dual motive model only tasks that elicit motive conflicts will count as tasks that require self-control. For example, the food taste test would only assess self-control in those individuals who are simultaneously motivated to eat cookies (proximal motive) and motivated to lose weight (distal motive). If self-control in fact depends on how individuals subjectively value competing motives, then different measures would not assess self-control equally well across all individuals because a certain task might elicit a motive conflict in some individuals but not others.

When distinguishing between these two models of self-control, it is important to note where each of them diverge in their predictions. First, the strength model predicts that because self-control is domain independent, exertion in one domain will lead to deficits in other domains. This is the major assumption of ego-depletion paradigms (Muraven et al., 1998). By contrast, the dual motive model makes no such prediction, since self-control depends on the individual's moment-to-moment evaluation of competing motives.

Second, the strength model predicts that due to sharing a common cause, indicators of self-control (e.g., Stroop task, handgrip task, taste test, persistence measures) can be used interchangeably. According to the strength model, any task that requires response inhibition assesses self-control. This is the rationale provided for using diverse measures such as taste tests (Baumeister et al., 1998), the handgrip (Baumeister et al., 2007), unsolvable puzzles (Muraven et al., 1998), and the cold pressor (Schmeichel & Vohs, 2009). As Baumeister et al. (2007, p. 352) state, the handgrip task counts as a measure of self-control because it involves “resisting fatigue and overriding the urge to quit”. By contrast, the dual motive model posits that in order to measure self-control, a specific goal conflict must be elicited. For example, the taste test is only a measure of self-control for those individuals who simultaneously possess the proximal motive to eat candies and the distal motive to regulate weight. Therefore, the dual motive model does not predict that such measures could be used interchangeably across individuals because they ignore the specific goal conflicts of the individual. For a review of how these various measures of self-control relate to one another, see Duckworth and Kern (2011).

Third, the dual motive model makes specific predictions about factors that will tend to make self-control more likely. Namely, any factor that increases the incentive value of the distal motive relative to that of the proximal motive will make self-control more likely. Under the strength model, where self-control is a trait that individuals are either high or low in, it is not clear why certain factors such as incentive value should change an individual's self-control. This final point is the focus of the present research.

Regarding the present study, the dual motive model predicts that as the incentive value of distal motives increases as a function of time perspective, individuals will tend toward behaviors that further distal motives at the expense of proximal motives (e.g., higher self-control).

By contrast, under the strength model it is not clear why time perspective should bear any relationship to response inhibition, since it is conceivable that individuals with widely varying time perspectives could be equal in their ability to inhibit responses. According to the dual motive model, the pursuit of long-term goals is absolutely crucial for defining a behavior as an act of self-control. As a result, it is a natural extension of the dual-motive model to expect that, as the incentive value of long-term goals increases as a function of time perspective, individuals will become more likely to prioritize distal motives. This point is discussed in greater detail below.

There is one more difference between the strength model and the dual motive model that deserves mentioning before proceeding. This is how each of the models would differentiate between state and trait self-control. Under the strength model, state self-control refers to self-control in the moment, namely at the time of a measurement. This is typically assessed via behavioral measures such as caloric intake, reaction time, or persistence and can be influenced by factors like hunger, fatigue, or stress (Hofmann, Baumeister, Förster, & Vohs, 2012). Trait self-control instead refers to a relatively stable trait that exists within the individual, namely one's capacity for inhibiting responses. Under the strength model, it makes sense to talk about trait self-control since it is thought to be a single, pervasive resource that individuals can be high or low in. This is typically assessed via self-report measures, which allow participants to reflect upon their behaviors over many times and places (Tangney, Baumeister, & Boone, 2004). Under the dual motive model, there is in some sense no trait-level self-control, but rather the aggregate of an individual's moment-to-moment motive evaluations. This is because the dual motive model does not posit that there is a single resource that individuals do or don't have (e.g., a trait), but rather the aggregate of individual's moment-to-moment motive evaluations. This is not to say that the dual motive model predicts no consistency in the way that individuals resolve motive conflicts. We argue that individual's moment-to-moment motive evaluations may be systematically biased by certain factors, such as rates of temporal discounting or the individual's personal values, giving consistency across circumstances and providing the appearance of a stable trait or construct. For example, someone who consistently values hard work and honesty will, when they encounter goal conflicts, tend to act in accord with these distal motives and appear as having high trait self-control. Below, it will be argued that time perspective is one such pervasive factor that systematically biases how individuals evaluate motive conflicts, and thus gives consistency to behavior across circumstances.

To summarize, the dual motive model posits that a primary determinant of self-control outcomes is the relative incentive value of proximal and distal motives. Strategies for improving self-control work by either decreasing the amount of attention given to proximal motives (e.g., distraction, situation selection, situation modification) or increasing the amount of attention given to distal motives (e.g., goal-priming). Importantly, self-control under this model depends not on a single resource but rather the individual's evaluation of the two (or more) competing motives in question. However, there could still be factors (e.g., cognitive orientations) that systematically bias the ways that individuals evaluate motive conflicts, thus leading to the appearance that self-control is a single construct that operates consistently across domains. In the following section, it is proposed that time perspective is one such pervasive factor that adjusts the relative incentive value of proximal and distal motives and thus influences self-control.

3. Time perspective

Time perspective refers to the way that an individual attends to thoughts of the past, present, or future. According to [Zimbardo and Boyd \(1999\)](#), individuals can tend to overemphasize one of these temporal frames when making decisions. For some individuals, decision making may be primarily motivated by thoughts of the past, such as ruminating on mistakes they have made. Other individuals tend to

make decisions based on how they feel in the present moment. Still others make decisions based on their considerations of future outcomes. [Zimbardo and Boyd \(1999\)](#) defined time perspective as an “often nonconscious process whereby the continual flows of personal and social experiences are assigned to temporal categories, or time frames, that help to give order, coherence, and meaning to those events” ([Zimbardo & Boyd, 1999](#), p. 1271). Broadly, individuals may experience three types of time perspective. These are past, present, and future. One assumption of this theory is that time perspective is a central trait that subtly operates in many domains such as goal setting, motivation, rumination, and guilt and has a dynamic influence on judgements, decisions, and actions. These time perspectives are expected to be relatively stable individual differences across people.

In what follows, time perspective is argued to be one of the systematically biasing factors that influences the ways in which individuals resolve motive conflicts. As we will argue later, time perspective is expected to adjust the relative incentive value of competing proximal and distal motives. As a result, when individuals encounter motive conflicts, we expect the influence of time perspective to show up in the way that individuals resolve such motive conflicts. To be clear, we are proposing a mediation model. First, we expect time perspective to predict the incentive value of goals. Second, we expect the incentive value of goals to predict self-control. This is a unique prediction of the dual motive model and, if the prediction holds, will help to validate the dual motive model of self-control. Importantly, proposing mediation requires justifying two relationships: the X to M path (time perspective to goal value) and the M to Y path (goal value to self-control) ([Baron & Kenny, 1986](#)). In what follows, we will provide rationale for each of these relationships.

First, it is necessary to show that time perspective predicts the incentive value of different goals. Theorists have long noted a relationship between future-oriented thinking and goal pursuit and, in fact, it has been argued that the ability to mentally project oneself into the future is a necessary precondition for humans to pursue long-term goals ([Suddendorf & Busby, 2005](#)). Without the ability to simulate and anticipate future events, humans would have no need for self-control. It is precisely because individuals pursue distal motives that they must often consider and control temptations in the present moment. Indeed, there is evidence suggesting the time perspective does predict the attainment of long-term goals. Researchers using the [Zimbardo and Boyd Time Perspective Inventory](#) found that a future time perspective is positively associated with both college GPA and self-control, whereas present hedonism is negatively associated with college GPA ([Barber, Munz, Bagnby, & Grawitch, 2009](#); [Ein-Gar & Sagiv, 2014](#)).

Exploring the future time perspective further, [Husman and Shell \(2008\)](#) developed a scale that identifies four distinct dimensions of future time perspective. These dimensions are value, extension, speed, and connectedness. Value refers to the importance that individuals place on goals that can be attained in the future. Extension refers to how far ahead in time an individual projects his or her thoughts. Speed refers to the rate at which individuals feel time is passing. Finally, connectedness refers to the ability to connect present actions with future outcomes or goals. Using this framework, [Eccles and Wigfield \(2002\)](#) found that individuals high in connectedness tended to perceive their actions as having more utility and instrumentality. Similarly, it has been demonstrated that students with a future time perspective place more value on academic activities ([Hilpert et al., 2012](#)).

[Lens, Paixao, Herrera, and Grobler \(2012\)](#) have also proposed that individuals with a future time perspective are better able to anticipate the consequences of present behavior and, as a result, the incentive value of delayed goals is higher. Showing this, [De Volder and Lens \(1982\)](#) found that students with a distant future time perspective attached greater instrumental value to their schoolwork. Similarly, [Lens, Simons, and Dewitte \(2001\)](#) found that students with a distant future time perspective were more motivated than students with a near future time perspective, and that students with a distant future time

perspective anticipated greater value attached to long-term goals. In sum, individuals with a future time perspective tend to experience a greater incentive value attached to temporally distant goals. This provides some preliminary evidence for the X (time perspective) to M (goal value) path in the proposed mediation model.

Next, based on goal setting literature, we propose that the increased incentive value of distal goals will lead to an increase in goal relevant behaviors (M to Y path). Of relevance to this point, [Locke and Latham \(2002\)](#) show that having concrete goals increases attention toward goal-relevant activities, increases both cognitive and physical effort devoted to goal-relevant activities, and increases persistence on goal-relevant activities. For example, it has been shown that when students have clear learning objectives, they pay better attention to and have a better memory of goal-relevant information ([Rothkopf & Billington, 1979](#)). Similarly, it has been shown that setting high goals leads to increased effort devoted to goal relevant tasks, whether this is physical effort or cognitive effort ([De Vet, Nelissen, Zeelenberg, & De Ridder, 2013](#); [Locke & Latham, 2002](#)). Finally, it has been shown that high performance goals tend to increase measures of physical persistence ([Ntoumanis et al., 2014](#)) and the amount of time spent on a task ([LaPorte & Nath, 1976](#)). In sum, individuals who experience the incentive value of distal motives as higher will tend to direct more attention, effort, and persistence toward these goals ([Locke & Latham, 2002](#)). In the context of the dual motive model of self-control, this will result in a greater tendency to prioritize distal motives over proximal motives when the two compete, thus constituting more self-controlled behavior.

To be explicit about the predictions of the current study, we expect that a future time perspective will lead to a higher subjective importance placed on distal motives. This is, as outlined above, because individuals with a future time perspective are better able to anticipate the results of their actions and perceive actions as more instrumentally valuable for reaching desired future states ([De Volder & Lens, 1982](#); [Eccles & Wigfield, 2002](#); [Lens et al., 2001](#)). It is then expected that, because of the increased incentive value associated with distal motives, individuals will direct more attention, effort, and persistence to distal motives when faced with motive conflicts ([Locke & Latham, 2002](#)). As a result, future-oriented individuals will tend to favor resolutions that prioritize distal motives over proximal motives (e.g., self-control). In this way, we expect a future time perspective to systematically bias individuals toward prioritizing distal motives, thus leading to the appearance of higher trait self-control.

Importantly, this research helps to differentiate the dual motive model from other models of self-control, such as the strength model ([Baumeister et al., 2007](#)). Under the strength model it is not clear that impulse inhibition should have any relationship with time perspective, since it is conceivable that individuals with past, present, and future time perspectives could all be equally adept at suppressing impulses. Only the dual motive model predicts that time perspective, working by adjusting the incentive value of competing motives, should influence self-control. To show this, a series of studies are presented in which time perspective was either measured or manipulated and its effect on the incentive value of motives and self-control was observed. It is demonstrated that time perspective is one factor (among many possible other social, cognitive, affective, and situational factors) that predicts the relative incentive value of competing motives and thus self-control.

4. Study 1: Probing the relationship between time perspective, motives, and self-control

4.1. Method

4.1.1. Participants

Participants were recruited from psychology courses at a university in the Southeastern United States. Participants received one research credit which they could exchange for extra credit in a course. The

sample included 335 participants, of which 68.4% were female, 30.7% were male, and 0.6% were transgender. The mean age of the participants was 21 (SD = 5.3). The majority (80.6%) of participants were Caucasian, and 8.1% were black.

4.1.2. Procedure & materials

Two subscales from the [Zimbardo Time Perspective Inventory \(Zimbardo & Boyd, 1999\)](#) were used to measure the present hedonistic and future time perspectives. These particular subscales were of interest because the present hedonistic and future time perspectives correspond most closely with proximal and distal motives. Whereas an individual with a present hedonistic time perspective would be expected to attach greater incentive value to proximal motives, an individual with a future time perspective would be expected to attach greater incentive value to distal motives. In order to assess these time perspectives, respondents were presented with statements and then asked, “how characteristic or true is this of you?” (example item: “It upsets me to be late for appointments”). Responses were recorded using a 5-point Likert scale (1 = *very uncharacteristic*, 2 = *uncharacteristic*, 3 = *neutral*, 4 = *characteristic*, 5 = *very characteristic*). Both subscales showed acceptable reliability (present hedonism, $\alpha = 0.82$; future, $\alpha = 0.83$).

A measure of motive incentive value was adapted from the [Inventory of Motivational Objects \(Nuttin, 2014\)](#). This scale presented participants with a list of activities and goals (example items: “having lots of possessions,” “finding a good job,” “being physically attractive”). Participants then indicated how important each of the items on this list was to them (*not important at all*, *of little importance*, *rather important*, *very important*). Each item was classified as either a proximal motive (e.g., using drugs or alcohol) or a distal motive (e.g., graduating). The average score was computed for all 15 proximal items and all 15 distal items. The proximal subscale ($\alpha = 0.76$) and the distal subscale ($\alpha = 0.85$) showed acceptable reliability.

The [Brief Self-Control Scale \(Tangney et al., 2004\)](#) was used to assess trait self-control. This scale contains 13 items, with each item being ranked on a 5-point scale (example item: “I am good at resisting temptation”) where lower scores indicate lower self-control. This scale showed acceptable reliability in the present study ($\alpha = 0.82$). The astute reader may recall that earlier it was argued that under the dual motive model, self-control is not a singular trait, as with the strength model. Therefore, the use of a self-report measure of trait self-control may be confusing. In this case, we take “trait self-control” to indicate the presence of systematically biasing factors (such as a future time perspective) that bias the resolution of motive conflicts in favor of the distal motive. For example, someone who consistently behaves in accord with distal motives will tend to resist temptation, refrain from engaging in behaviors they will later regret, and not allow pleasure and fun to keep them from getting things done. What we take this measure to be assessing here is the frequency of behaviors associated with the prioritization of distal motives over proximal motives. For example, the item “I am good at resisting temptation” implicitly assumes that there is a proximal motive (e.g., the temptation) that is being forgone in favor of a distal motive. Under the dual motive model, it is the aggregate of such behaviors across time and due to systematically biasing factors that constitute trait self-control. Moreover, some might argue that this scale lacks domain specificity, so it cannot assess how individuals navigate their own unique motive conflicts. However, it should be noted that the vagueness of the questions allows respondents to self-insert examples from their own lives that are relevant to goal conflicts unique to them. For instance, the example item provided does not specify what the temptation is, nor why the respondent is resisting the temptation. This allows respondents to reflect on how they resolve their own unique motive conflicts whether these be food-related, work-related, money-related, or something else.

Table 1
Correlations between time perspective, motive incentive value, and self-control.

Variable	1	2	3	4	5
1. Self-control	(0.824)*				
2. Proximal incentive value	-0.388**	(0.758)			
3. Distal incentive value	0.365**	0.051	(0.849)		
4. Present hedonistic	-0.313**	0.440**	0.084	(0.817)	
5. Future	0.471**	-0.280**	0.524**	-0.272**	(0.825)

* $p < .05$.
** $p < .001$.

4.2. Results and discussion

The results show that individuals higher in the future time perspective report both greater motivation to pursue distal goals and higher self-control. First, a future time perspective was positively correlated with distal incentive value ($r = 0.52, p < .001$) and self-control ($r = 0.47, p < .001$). This suggests that individuals who endorse a future time perspective report higher motivation for distal goals and higher self-control. Second, a present hedonistic time perspective was positively correlated with proximal incentive value ($r = 0.44, p < .001$) and negatively correlated with self-control ($r = -0.31, p < .001$). This suggests that individuals who are present-oriented are more motivated by proximal rewards and have lower self-control. All zero-order correlation coefficients are presented in Table 1. Note that the reliability coefficients for all scales are shown on the diagonal of the correlation table.

A second goal of Study 1 was to examine the effect of time perspective on self-control mediated through goal content. Given theoretical considerations, we predicted that individuals who endorsed a future time perspective would also report greater motivation for distal motives. Subsequently, we expected that the higher incentive value of distal motives would predict higher self-reported self-control. By contrast, we expected that individuals with a more present-oriented time perspective would report greater motivation for proximal goals, thus predicting lower self-reported self-control.

To test for indirect effects, the PROCESS macro for SPSS was used (Hayes, 2012). The PROCESS macro is designed to test for evidence of mediation by looking at regression coefficients before controlling for a potential mediator variable (e.g., total effect) and after controlling for a potential mediator variable (e.g., direct effect). If the relationship between two variables is reduced after controlling for a potential mediator, then that could be evidence of mediation. In the context of the current study, for example, PROCESS will first estimate the regression

coefficient between present hedonism and self-control, and then estimate the regression coefficient between present hedonism and self-control while controlling for the incentive value of proximal motives (e.g., the mediator). If the magnitude of the relationship between present hedonism and self-control is reduced after controlling for the mediator, then that is evidence that at least part of the effect that present hedonism has on self-control is being transmitted through (e.g., is explained by) the incentive value of distal motives.

In the current study, two separate tests of indirect effects were conducted. First, the indirect effect of present hedonism on self-control through proximal incentive value was tested. The bootstrapped indirect effect of present hedonism on self-control was $b = -0.20$ (95% CI: $-0.33, -0.08$). The amount of variance in self-control explained by both present hedonism and proximal incentive value was approximately 19% ($R^2 = 0.19, p < .001$). Next, the indirect effect of a future time perspective on self-control working through distal incentive value was examined. The bootstrapped indirect effect of future time perspective on self-control was $b = 0.42$ (95% CI: $0.30, 0.54$). The amount of variance in self-control that was explained by both future time perspective and distal incentive value was approximately 27% ($R^2 = 0.27, p < .001$). Both indirect effects were tested using a bootstrap estimation approach with 5000 samples. Figs. 1 & 2 display coefficients for the indirect effects. Of note, all variables were standardized and mean centered prior to this analysis, so the interpretation of regression coefficients is straightforward. For example, the coefficients in Fig. 1 can be interpreted as every 1 unit of change in present hedonism predicts 0.42 units of change in the incentive value of proximal motives, which in turn predicts -0.38 units of change in self-control.

The results of Study 1 show that time perspective predicts both motive incentive value and self-control. In particular, individuals who are more future-oriented report both greater motivation for distal goals and greater trait self-control. By contrast, individuals who are more present-oriented tend to be motivated by proximal rewards and have lower trait self-control. This suggests that time perspective could be one determinant of the incentive value of goals, which in turn predicts the likelihood of one regulating behavior in the present moment.

The results of a mediation analysis supported the theory that time perspective has an indirect effect on self-control through the incentive value of goals. Individuals reporting a strong future time perspective tended to attach greater motivational value to distal goals. Due to the fact that self-control involves acting in accord with long-term goals despite the allure of immediate temptations, individuals who are more motivated by future goals have a greater need for – and tend to be better at – exerting self-control. One limitation of this mediation analysis is that the measurements lack temporal precedence. Since all of

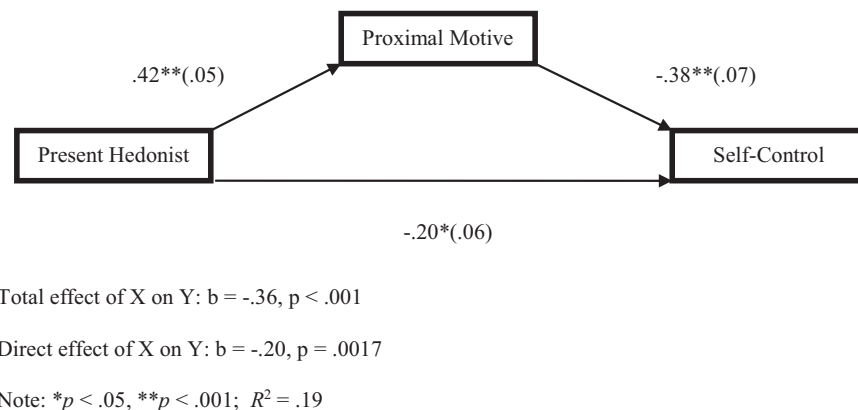
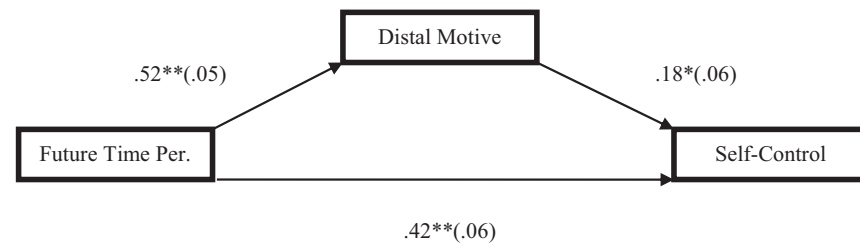


Fig. 1. Indirect effect of present hedonism on self-control through proximal motives
 Total effect of X on Y: $b = -0.36, p < .001$
 Direct effect of X on Y: $b = -0.20, p = .0017$
 Note: * $p < .05$, ** $p < .001$; $R^2 = 0.19$.



Total effect of X on Y: $b = .52, p < .001$

Direct effect of X on Y: $b = .42, p < .001$

Note: * $p < .05$, ** $p < .001$; $R^2 = .27$

Fig. 2. Indirect effect of future time perspective on self-control through distal motives

Total effect of X on Y: $b = 0.52, p < .001$

Direct effect of X on Y: $b = 0.42, p < .001$

Note: * $p < .05$, ** $p < .001$; $R^2 = 0.27$.

these variables were measured at the same time, it is impossible to show that one variable causes changes in the others. This limitation is addressed in Study 3.

5. Study 2: Correlational study replicating and extending study 1

The goal of Study 2 was to conduct a more fine-grained analysis of the relationship between time perspective, motive incentive value, and self-control. In particular, additional dimensions of time perspective were examined such as speed, value, extension, and connectedness. These were assessed using the Future Time Perspective Scale (Husman & Shell, 2008). Next, like in Study 1, a test of indirect effects was conducted to examine the role of motive incentive value in explaining the link between time perspective and self-control.

5.1. Method

5.1.1. Participants

Study 2 used a sample of 430 undergraduates from a Southeastern university. The participants were primarily female (74%), white (81.6%) and had a mean age of 20 (SD = 4.5). Participants completed this survey online through Sona Systems and were awarded 1 research credit for their participation.

5.1.2. Procedure & materials

After signing up, participants followed a link to the surveys. In total, the surveys took approximately 1 h to complete. Participants completed the three scales used in Study 1 (Zimbardo Time Perspective Inventory, Motives Inventory, Self-Control Scale). All scales showed acceptable reliability ($\alpha > 0.79$). In addition, participants completed the Future Time Perspective Scale (Husman & Shell, 2008). This scale measured four different dimensions of future time perspective. These dimensions were value, extension, speed, and connectedness. Respondents were asked to indicate how much they agree or disagree with various statements, and responses are scored on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Value refers to an individual's willingness sacrifice the present for future goals (example item: "Given the choice, it is better to get something you want in the future than something you want today"). Extension refers to how far ahead into the future an individual tends to think (example item: "It seems like the semester is never going to end"). Speed refers to a sense of being overwhelmed by approaching deadlines and a lack of planning (example item: "I find it hard to get things done without a deadline"). Finally, connectedness refers to an individual's ability to associate current behaviors with future outcomes (example item: "What will

happen in the future is an important consideration in deciding what action to take now"). All subscales showed acceptable reliability ($\alpha > 0.70$), with the exception of the value subscale ($\alpha = 0.68$).

5.2. Results and discussion

Replicating Study 1, time perspective was significantly related to motive incentive value and self-control. Individuals who scored high on the future subscale of the ZTPI reported greater distal incentive value ($r = 0.42, p < .001$) and higher self-control ($r = 0.43, p < .001$). Individuals who scored high on the present hedonistic time perspective reported greater proximal incentive value and ($r = 0.51, p < .001$) and lower self-control ($r = -0.36, p < .001$). In order to examine the effect of the incentive value of goals on self-control, correlations between motive incentive value and self-control were examined. Individuals who reported greater motivation for distal goals reported higher self-control ($r = 0.30, p < .001$), whereas individuals who reported greater motivation for proximal goals reported lower self-control ($r = -0.42, p < .001$). This suggests that self-control may be partially determined by the goals (proximal or distal) an individual considers important. All zero-order correlation coefficients are presented in Table 2.

Similarly, all of the dimensions of the future time perspective (connectedness, extension, value, and speed) correlated with self-control. Results suggest that individuals who have a strong ability to connect current actions with future goals will be more likely to enact self-control ($r = 0.317, p < .001$) and individuals who are able to extend their thought further into the future also report higher self-control ($r = 0.173, p < .001$). Individuals who reported greater value of long-term goals also reported higher self-control ($r = 0.172, p < .001$). Finally, individuals who lacked the ability to plan and felt overwhelmed by deadlines reported lower self-control ($r = -0.506, p < .001$). These findings support the idea that the way people think about and

Table 2

Correlations between time perspective, motive incentive value, and self-control.

Variable	1	2	3	4	5
1. Self-control	(0.843)*				
2. Proximal incentive value	-0.423**	(0.792)			
3. Distal incentive value	0.302**	0.308**	(0.866)		
4. Present hedonistic	-0.356**	0.512**	0.173**	(0.806)	
5. Future	0.428**	-0.204**	0.424**	-0.236**	(0.824)

* $p < .05$.

** $p < .001$.

Table 3
Correlations between various dimensions of future time perspective and self-control.

Variable	1	2	3	4	5
1. Self-control	(0.843)				
2. Connectedness	0.317**	(0.879)			
3. Value	0.172**	0.430**	(0.683)		
4. Extension	0.173**	-0.103*	-0.151*	(0.753)	
5. Speed	-0.506**	-0.203**	-0.030	-0.150*	(0.719)

* $p < .05$.
** $p < .001$.

orient themselves in time has consequences for self-control. Correlation coefficients between self-control and the different aspects of future time perspective are presented in Table 3.

Finally, we investigated the indirect effects of time perspective on self-control working through the incentive value of goals. As with Study 1, it was hypothesized that individuals with a stronger orientation toward future events would report higher motivation for distal goals, which would then predict higher self-control. By contrast, it was hypothesized that individuals scoring high on the present hedonistic time perspective would report greater motivation for proximal goals, which would then predict lower self-control.

The results from Study 2 were similar to the results of Study 1. First, it was found that the relationship between present hedonism and self-control was partially explained by proximal incentive value. The bootstrapped indirect effect of present hedonism on self-control was $b = -0.19$ (95% CI: $-0.26, -0.13$). The amount of variance in self-control explained by present hedonism and proximal incentive value was approximately 26% ($R^2 = 0.26, p < .001$). Thus, the indirect effect was statistically significant. Second, it was found that the relationship between future time perspective and self-control was partially explained by distal incentive value. The bootstrapped indirect effect of future time perspective on self-control was $b = 0.07$ (95% CI: $0.02, 0.11$). The amount of variance in self-control that was explained by future time perspective and distal incentive value was approximately 18% ($R^2 = 0.18, p < .001$). Although small, the indirect effect was statistically significant. Both indirect effects were tested using a bootstrap estimation approach with 5000 samples. Figs. 3 & 4 display coefficients for the indirect effects.

The results of Study 2 support the hypothesized relationships between time perspective, motive incentive value, and self-control. First, time perspective is related to the goals that individuals endorse. In particular, individuals who were future-oriented reported stronger

distal goals, whereas people who were more present-oriented reported stronger proximal goals. Second, goals were related to self-control. Individuals who reported having stronger distal goals had higher self-control and individuals who reported having stronger proximal goals had lower self-control. Third, time perspective was related to self-control with future-oriented individuals reporting higher self-control and present-oriented individuals reporting lower self-control.

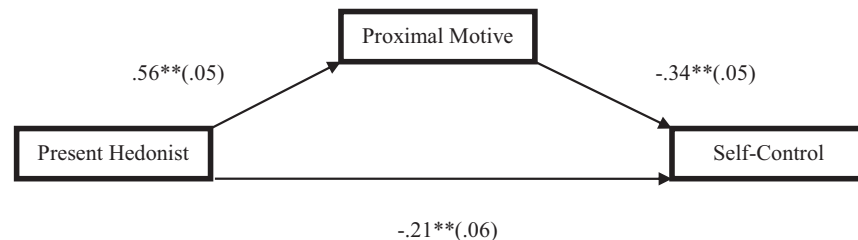
Although these data are cross-sectional, they do suggest that individuals with a future-oriented mindset may attach more value to distant goals, thus motivating them to regulate themselves in the present moment. By contrast, those with a present-oriented mindset may tend to place little value on temporally distant goals. As a result, present-oriented individuals have little incentive to regulate behavior, thus leading to the observed low self-control. Furthermore, this theory was supported by a test of indirect effects. In particular, a present-oriented mindset appears to lead to a greater incentive value of proximal motives, which then leads to lower self-control. By contrast, a future-oriented mindset appears to lead to a greater incentive value of distal goals, which then leads to higher self-control. Of course, due to the fact that this study was cross-sectional, we were unable to determine temporal precedence in the indirect effects model. Although the direction of causality makes theoretical sense, claims of causality should be interpreted cautiously due to the limitations of the data. The goal of Study 3 is to add the temporal precedence aspect and show that changes in time perspective do produce changes in self-control.

6. Study 3: Experimental manipulation of time perspective

The goal of Study 3 was to show that changes in time perspective produce changes in self-control. In this study, participants were primed with either a future-oriented or present-oriented mindset. Following the manipulation, participants engaged in a delay of gratification task. Delay of gratification tasks are excellent measures of self-control as they directly assess the tendency to prioritize distal motives over proximal motives. It was hypothesized that participants primed with a future-oriented mindset would be more willing to delay gratification due to a greater focus on the delayed reward.

6.1. Participants

Participants were recruited from a public university in the Southeastern United States. Data was collected from 120 participants, but 5 surveys were discarded due to non-compliance or expressing suspicion about the study, leaving a final sample of 115. Participants were primarily female (64.3%), white (79.1%), and had an average age



Total effect of X on Y: $b = -.40, p < .001$

Direct effect of X on Y: $b = -.21, p < .001$

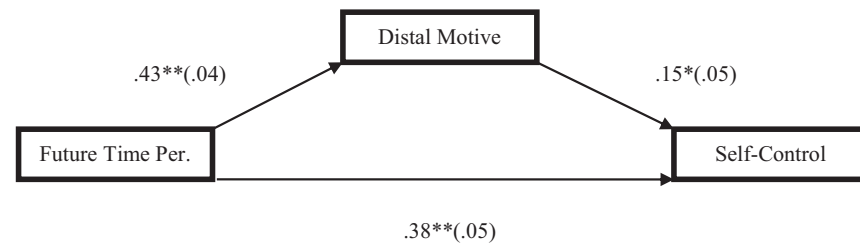
Note: * $p < .05$, ** $p < .001$; $R^2 = .26$

Fig. 3. Indirect effect of present hedonism on self-control through proximal motives

Total effect of X on Y: $b = -0.40, p < .001$

Direct effect of X on Y: $b = -0.21, p < .001$

Note: * $p < .05$, ** $p < .001$; $R^2 = 0.26$.



Total effect of X on Y: $b = .45, p < .001$

Direct effect of X on Y: $b = .38, p < .001$

Note: * $p < .05$, ** $p < .001$; $R^2 = .18$

Fig. 4. Indirect effect of future time perspective on self-control through distal motives

Total effect of X on Y: $b = 0.45, p < .001$

Direct effect of X on Y: $b = 0.38, p < .001$

Note: * $p < .05$, ** $p < .001$; $R^2 = 0.18$.

of 19 ($SD = 3.0$).

6.2. Procedure

Participants first completed baseline measures of self-control, motive incentive value, and time perspective. These included the Zimbardo Time Perspective Inventory (Zimbardo & Boyd, 1999), the Self-Control Scale (Tangney et al., 2004), and the measures of motive incentive value used in the preceding studies. All scales showed acceptable reliability ($\alpha > 0.75$), except for the distal motives inventory ($\alpha = 0.699$). After completing these questionnaires, participants were randomly assigned to be primed with either a present-oriented or a future-oriented mindset. In the present-oriented condition ($n = 57$), participants read the following prompt: “Psychologists have found that “in-the-moment” activities are what make life meaningful and valuable. Rather than spending time worrying about the future, people may be happier if they focus on the enjoyable things around them every day. For example, many of life’s most memorable experiences are intense and passionate, rather than cool and calculated. We would like to hear about some of the desires, passions, and interests you have that make your life meaningful.” Participants then responded to six prompts that cued thoughts about short-term desires, such as “describe a time when you have felt in the moment, or a time when you have been so engaged in an activity that you almost lose track of time. What was this like? How often do you feel like this?” and “describe a time when you acted impulsively and really enjoyed it.”

Participants in the future-oriented condition ($n = 58$) read the following prompt: “Psychologists have found that long-term, goal-oriented activities make life meaningful and valuable. Humans spend a great deal of time planning for the future because they realize this. Many of life’s most meaningful experiences take years of work and labor to achieve (such as graduating or having a family). We would like to hear about some of the long-term goals, interests, and beliefs you have that make your life meaningful. Please elaborate on your responses and give as much detail as possible.” Participants then responded to six prompts that cued thoughts about long-term goals, such as “What is a long-term goal (one year away or more) that you are pursuing? Why is it important to you? How long have you been pursuing this goal?” and “If everything goes as planned, what would you like to be doing in 10 years? What about 20 years?”

Following the manipulation of time perspective, participants engaged in a delay of gratification task. For this task, participants were presented with a choice. Option 1 was to take the research credits (3 total) they had earned and be allowed to leave immediately. Option 2 was to stay and complete an additional half hour of surveys but receive

an additional half research credit (3.5 total) in return. Option 3 was to stay and complete an additional hour of surveys but receive an additional research credit (4 total) in return. This directly assessed participants willingness to sacrifice an immediate desire (leaving early) in favor of a longer-term goal (extra credit in a course). This served as the dependent measure of self-control. In order to ensure that participant’s schedules did not influence their choice, the study advertisement indicated that the study could last up to 3 h. All participants reached the extra credit decision point in under 2 h, so assuming participants had blocked out 3 h for the study as indicated in the advertisement, student’s schedules should not have influenced their decision to leave or stay in exchange for additional research credits.

Previously, it was argued that the criteria for what counts as a measure of self-control is stricter under the dual motive model than under the strength model. According to the dual motive model, a task only counts as a measure of self-control if it elicits competition between proximal and distal motives. For example, the taste test would only be a measure of self-control for someone with both the proximal motive to eat candies and the distal motive to regulate caloric intake. Given this conceptualization, it is in fact quite difficult to find a task that constitutes a measure of self-control equally well across many different individuals, given the fact that individuals vary in their levels of motivation for different goals.

Due to this concern, the measure of state self-control being used here requires additional justification. As mentioned, this task was designed to resemble the classic delay of gratification experiments conducted by Mischel (1958, 1961). Such tasks constitute measures of self-control because they deliberately elicit a motive conflict between a smaller, immediate reward (proximal motive) and a larger, more desirable delayed reward (distal motive). However, unlike the original delay of gratification studies, the focal reward used was not food but instead research credits. The decision to not use food was made because adults vary widely in the intensity of their food and weight related goals, meaning food would not elicit a goal conflict of equal strength among all participants. By contrast, it is a comparatively safer assumption that participants enrolled in our study were motivated to obtain research credits. This is because at the university in which this research was being conducted, students are able to exchange research credits for extra credit in courses and this constitutes the primary way that research participation is incentivized. Since participants were not offered any incentive besides research credits for engaging in this study, it is a safe assumption that all participants enrolled in the current study were, by virtue of signing up in the first place, motivated to obtain research credits. This ensured the distal motive was constant across participants. Since it is also a safe assumption that college students

Table 4
Correlations between time perspective, motive incentive value, and self-control.

Variable	1	2	3	4	5
1. Self-control	(0.763)				
2. Proximal incentive value	−0.281*	(0.743)			
3. Distal incentive value	0.285*	0.239*	(0.699)		
4. Present hedonistic	−0.234*	0.501**	−0.144	(0.777)	
5. Future	0.343**	−0.368**	0.224*	−0.301*	(0.754)

* p < .05.
** p < .001.

value their time, presenting them with a choice between leaving immediately (but earning less credits) or staying longer (and earning more credits) represents a direct conflict between an immediately gratifying option with a smaller reward (proximal motive) or a delayed option with a larger reward (distal motive).

6.3. Results and discussion

Consistent with the previous studies, time perspective was related to motive incentive value and self-control. Correlation coefficients are presented in Table 4. In addition, the manipulation check showed that the prompts to which participants responded did induce the target time perspectives. A Chi-square test of independence revealed a significant difference across conditions in response to the question, “Do you think it is more important to spend time working toward personal goals and aspirations, or is it more important to spend time living life in the moment and indulge in your passions and urges?” In the present-oriented condition, 57.9% of participants indicated prioritizing proximal goals. In the future-oriented condition, only 8.1% of participants prioritized proximal goals and the remaining 91.4% selected the option “It is more important to spend time working toward future goals.”

A Chi-square test of independence was conducted to see whether there was a significant difference across conditions in terms of willingness to complete extra survey questions. The percentage of participants willing to stay and complete extra survey questions significantly varied by condition, $\chi^2(2, N = 115) = 10.57, p = .005$. In the present-oriented condition, 63.2% of participants opted to take the three credits and leave immediately, whereas only 15.8% were willing to remain in the study for an extra hour to get an extra credit. In the future-oriented condition, only 39.7% of participants opted to take the three credits and leave immediately, whereas 43.1% were willing to stay the extra hour. A visual depiction of the group differences is shown in Fig. 5. These results show that inducing a present- or future-oriented mindset had an effect on participants’ willingness to delay gratification, suggesting that time perspective is an important contributor to self-control.

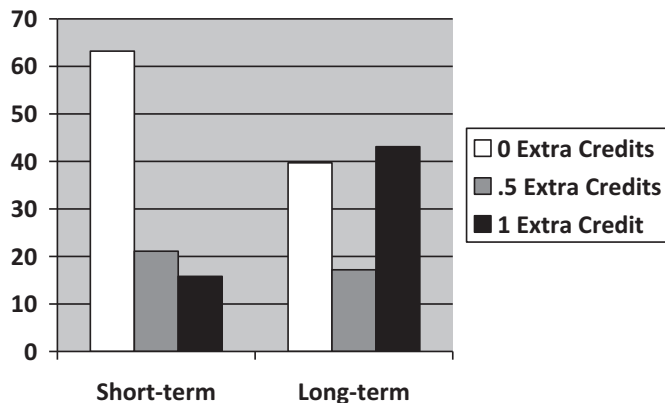


Fig. 5. Bar chart depicting group differences in willingness to complete extra survey questions in exchange for class credits.

7. General discussion

The results of the present studies suggest that there is a robust relationship between time perspective, the value of proximal and distal motives, and self-control. Based on an analysis of indirect effects in Studies 1 and 2 and the experimental manipulation in Study 3, it appears that time perspective leads to changes in the relative incentive value of proximal and distal motives. Individuals who experience a present hedonistic time perspective tend to report placing greater importance on short-term, proximal motives. Individuals who experience a future time perspective tend to report placing greater importance on long-term, distal motives. Subsequently, a greater focus on either proximal or distal motives produces changes in self-control. Individuals reporting strong motivation for proximal motives tend to report lower self-control whereas individuals who report strong motivation for distal motives tend to report higher self-control.

These results fit well with previous theorizing on time perspective and self-control. *Zimbardo and Boyd (1999)* point out that time perspective is a pervasive filter through which individuals view the world and has an influence on decision-making and behavior. Indeed, the results of these three studies show exactly that. Furthermore, *Fujita (2011)* conceptualizes self-control as the prioritization of distal motives over proximal motives when the two come into conflict. These studies also show that people who tend to place greater relative importance on distal goals have higher self-control. This was demonstrated through both self-report and behavioral (delay of gratification) measures.

One important implication of these findings is that this research also helps to differentiate the dual motive model of self-control (*Fujita, 2011*) from other models of self-control such as the strength model (*Baumeister et al., 2007*). Under the strength model, it is not clear that time perspective and self-control should have any relationship since it is conceivable that individuals with past, present, and future time perspectives could all be equally adept at suppressing impulses. Only the dual motive model predicts that time perspective, working through motive incentive value, should influence self-control. Additionally, we argue that self-control is domain-specific in the sense that the expression of self-control depends, in large part, on the particular motives in conflict. However, because certain factors can systematically bias how individuals evaluate motive conflicts, this may give the appearance that self-control is a single construct that operates across domains. Here, we showed that time perspective is one of these systematically biasing factors.

An unexpected finding from Studies 2 and 3 was that motivation for proximal goals was positively correlated with motivation for distal goals. Initially, it was thought that those who were more motivated by distal goals would be less motivated by proximal goals, and vice versa (negative correlation). However, the fact that these two variables are positively correlated suggests that people can be motivated by both proximal and distal goals simultaneously. Future research will need to examine the motivation for specific goals more closely in order to determine whether people who tend to be high in one type (e.g., distal) tend to be high in another type (e.g., proximal) of motivation. This has implications for self-control because people who are very high in both would be expected to experience more frequent motive conflicts as a result of being highly motivated to achieve two incompatible goals. For example, if an individual was highly motivated to lose weight (distal goal) and highly motivated to eat food (proximal goal), this would lead to frequent and intense self-control dilemmas. In future studies, it may be possible to conduct a more fine-grained analysis of motive content in order to predict the frequency of motive conflicts a given person will encounter.

Another relationship worth examining in the future is the potential moderating effect of probability discounting. As these studies suggest, individuals with a future time perspective tend to report greater motivation for distal goals and higher self-control. However, research suggests that delay (temporal distance) and probability (likelihood of

reward) interact to determine the motivational value of a reward (Cox & Dallery, 2016). It is possible that there is a subset of individuals who do have a future time perspective but are also very high in probability discounting. In other words, they recognize what they could gain in the long run but are also highly risk averse. This may have the effect of decreasing motivation to act on long-term goals. For example, although an individual may recognize that going to an Ivy League school is a highly rewarding long-term goal, they may view the possibility as so unlikely that their motivation to apply to such schools is reduced.

There are a few limitations of the studies conducted. First, Studies 1 and 2 only examined correlational data. This is especially problematic for the analysis of indirect effects in Studies 1 and 2, which would ideally be able to show temporal precedence in the causal chain from time perspective to motive incentive value to self-control. However, given the strong theoretical backing for the direction of these relationships, we choose to accept this as evidence of indirect effects. For example, it does not make theoretical sense to propose that self-control causes time perspective. Moreover, this argument is strengthened by the experimental data from Study 3, which does show that experimentally manipulated changes in time perspective produce changes in self-control (e.g., a tendency to prioritize distal motives over proximal motives).

Another limitation is sample representativeness. All three studies were conducted on undergraduate college students. In order to confirm this relationship in the general population, additional studies should be conducted with samples that are more diverse. Moreover, it is likely that the time perspective of college students significantly differs from that of other populations. Indeed, just being in college might be suggestive of a future time perspective. College requires years of work with the end goal of receiving a degree and, in a sense, resembles a massive delay of gratification task. It might be useful to study time perspective in populations with known impulse issues, such as in criminal populations, among individuals with gambling disorders, or among impulse shoppers, to examine whether they tend to endorse more present hedonistic or present fatalistic mindsets.

In sum, this research sheds light on a fundamental process in motivation and goal-pursuit. The results suggest that whether individuals are primarily motivated by past experiences, present desires, or future goals has consequences for behavior. In addition, these findings help to differentiate the dual motive model of self-control (Fujita, 2011) from other models of self-control. In particular, only the dual motive model predicted that time perspective would have an effect on self-control, working through motive incentive value. The results of this research serve to support the dual motive model as well as show that time perspective has a pervasive influence on the way that individuals navigate motive conflicts.

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Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Declaration of Competing Interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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