



The time effect on desire for self-improvement products

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Abstract

Time-relevant cues are one of the most common elements used in ads, packaging or online retailing settings. However, little research has directly examined how time priming influence the preferences for self-improvement products. Across three experiments, this paper demonstrates that time priming increases consumers' consumption intention of self-improvement products. This pattern is driven by consumers' heightened locomotion orientation. That is, time activation reminds consumers to initiate actions and be more locomotion orientated. As a result, it motivates them to pursue self-improvement goals through consuming relevant products. Furthermore, the time priming effect on self-improvement products will be mitigated or even inverted when the self-improvement goals were difficult to attain. This occurs because perceived difficulty leads consumers to assess the attainability of the goal and decreases the locomotion orientation. Both theoretical contributions and practical implications for research on time priming and self-improvement are discussed.

Keywords Time priming · Self-improvement products · Locomotion orientation · Self-regulation

Introduction

Time is a pervasive concept and affects individuals' cognition and behaviors in various ways (Mogilner & Devoe, 2019). However, time is not directly observable through our senses. People use time-related cues such as a clock, hour-glass, calendar, and time-related images and words to visualize or depict time. In marketing practice, time-related cues are widely used. Time-related elements are, for instance, frequently found in advertising leaflets of a gym, on the covers of books, introductory offers for online courses, and interfaces of fitness applications. If we look closely at what they have in common, we will find that time-related cues are frequently used in products that help consumers to pursue self-improvement goals. Self-improvement refers to the motivation to pursue outcomes that will help to improve some aspect of the self (Allard & White, 2015; Sedikides, 2009). How might time-relevant cues influence preferences for products enabling self-improvement goals?

Research has long established the relationship between time and individuals' pursuit of goals (Munichor & LeBoeuf, 2018; Zhu et al., 2019). One stream of research has examined how the specific characteristics of time influence individuals' goal pursuits. For example, goal maintenance (limited or unlimited) (Brodscholl et al., 2007; Haiyang et al., 2015), anticipated time of goal pursuit (Etkin & Ratner, 2013), deadlines for completing goals (Zhu et al., 2019), and even descriptions of the time intervals (Munichor & LeBoeuf, 2018) may affect individuals' pursuit of goals. Another stream of literature has examined the influence of time with specific meanings, which are referred to as temporal landmarks. These landmarks demarcate the passage of time, create new mental accounting periods, and relegate past imperfections to a previous period, inducing people to pursue their goals immediately (Dai et al., 2015; Hengchen et al., 2014; Wilson & Ross, 2001).

Great strides have been made toward revealing the influence of time characteristics and temporal landmarks on the pursuit of goals, but they have largely ignored the intrinsic link between time concept and self-improvement behavior. The primary goal of this article is to shed light on the effect of general time concept on consumption intention in self-improvement products. Across three experiments, we propose that for self-improvement products, time priming leads to higher consumption intention. Furthermore, we suggest

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that heightened locomotion orientation, which refers to the proclivity toward movement and change, plays a mediating role. Specifically, for self-improvement products, time priming leads consumers to commit their psychological resources to goal-directed progress and to initiate self-improvement consumption. In addition, we identify the perceived difficulty as theoretically relevant moderator, providing a more nuanced understanding of when and why time priming can serve as a motivator of self-improvement consumption. The observed effect will be mitigated or even inverted when consumers perceive it is as difficult to achieve their goals through consuming self-improvement products.

This research makes three contributions. First, the current research extends the literature on time priming and goal pursuit, which has focused primarily on how specific features of time affect goal pursuit. We attempted to find the intrinsic connection between time and pursuing self-improvement goals. Second, this work illustrates the self-regulatory mechanism underlying time priming effect. Specifically, we show that locomotion plays a mediating role and identify perceived difficulty as the moderator which informs the effectiveness of time priming on self-improvement consumption. Third, we extend the literature on self-improvement consumption. Prior research on the drivers of self-improvement consumption has focused on emotional factors, such as guilty and envy (Allard & White, 2015; Salerno et al., 2019). Our findings provide important insights into existing research by improving our understanding of the role of the time priming effect on consumption intention for self-improvement products. The results of our research suggest that time priming promotes consumers' locomotion orientation, thus leads to a high preference for self-improvement products.

Theoretical Background

Time Priming Effect

Time priming refers to individuals' general concept of time activated through time-related cues (Su & Gao, 2014). The priming techniques used in the literature include asking people explicitly to evaluate a time-related picture depicting many clocks (Su & Gao, 2014) and implicitly exposing individuals to time-related words (Mogilner & Aaker, 2009). Previous research in consumer behavior has investigated the psychological consequences of time priming and found that time priming influences the way consumers process product information. For example, Liu and Aaker (2008) found that consideration of time may activate a mindset in which individuals focus on emotional meaning and well-being, which increases the subsequent amount of their charitable contribution. Likewise, implicitly activating the construct

of time motivates individuals to spend more time on social connection (Mogilner, 2010). Other studies have also shown that time priming can induce abstract (Macdonnell & White, 2015), holistic (Su & Gao, 2014), and heuristic processing (Saini & Monga, 2008). Extending this line of research, we examine how time priming influences consumers' self-regulation process, which in turn leads to higher consumption intentions for self-improvement products.

Time Priming and Self-Improvement

Self-improvement is defined as the motivation to pursue outcomes that facilitate the improvement of some aspects of the self, including personal attributes or performance in domains important to the self, such as the intellectual, physical, moral, or social self (Sedikides, 2009; Sedikides & Strube, 1995; Sedikides & Strube, 1997). In consumption contexts, self-improvement products are referred to as products that enable consumers to become better at a task or to improve some aspects of themselves (Allard & White, 2015), such as textbooks, exercise programs, or learning courses.

We propose that time is intrinsically linked to self-improvement consumption for three reasons. First, time plays an important role in goal pursuit. People use time as a defining feature of goals, such as reading 30 minutes per day. Existing studies have found that the temporal duration of goals influences self-control (Fujita et al., 2006; Trope & Liberman, 2003) and envisioning goal pursuit at different points in the future impacts motivation (Yanping & Soman, 2014). In addition to being a defining feature of goals, time is also a dimension of goal pursuit (Etkin, 2019). Goal pursuit follows a time course, and people's position along this course influences their method choice, motivation, and performance (Huang et al., 2012; Huang & Zhang, 2011; Zhang & Huang, 2010). Second, time cues can induce people to examine their current state and inspire them to pursue a better version of self. For example, when people approach a new decade in their chronological age, they are more likely to engage in a life review (Kim et al., 2019). Similarly, temporal landmarks, such as birthdays and New Year's Day, organize memories and experiences in time and generate a sense of psychological disconnect between the past, current, and future self, and thus induce people to pursue a better self (Dai & Li, 2019; Peetz & Wilson, 2013). Third, against a cultural background of social acceleration, the relationship between time and self-improvement has been further strengthened. Rosa (2013) has suggested that people live in an accelerating society where the material, social, and cultural world is moving fast (Rosa et al., 2017). This accelerates the daily rhythm of life (Husemann & Eckhardt, 2019). In this culture construction, people strive to use time productively, make progress, and realize accomplishments, that is, it reflects a productivity orientation (Keinan & Kivetz,

2011). Consistent with this notion, Shir-Wise (2019) has suggested that time and self-management are interrelated and that free time is utilized for self-improvement. Therefore, we propose that time priming leads to higher consumption intention of self-improvement products; or more formally:

H1: Time activation (vs. control condition) leads individuals to exhibit increased preferences for self-improvement products.

The Mediating Role of Locomotion Orientation

Locomotion orientation is a self-regulatory tendency to emphasize movement from a current state to a new state (Higgins et al., 2003). During this process, individuals commit their psychological resources for initiating and maintaining goal-directed progress while avoiding distractions and delays (Kruglanski et al., 2000). Locomotion orientated individuals tend to initiate actions quickly and focus on “doing” (Pierro et al., 2011). They desire to take action immediately and continue pursuing a goal until the task is completed. Locomotors place the emphasis on affecting change and moving, and value the possibilities of the present and the future (Higgins et al., 2003; Kruglanski et al., 2016). The state of change itself serves as a reinforcement. Besides operating as individual difference variables, locomotion orientation can also be situationally induced (Avnet & Higgins, 2003; Pierro et al., 2018).

There is an inherent relation between time and locomotion orientation. Locomotors want to maximize movement toward a future ideal state and view the resource aspect of time as a means of attaining goals. The framing of the means to achieving the goal ties locomotion orientation to time conceptually: in striving to move ahead, people are more future-oriented and concerned about utilizing time to the fullest (Kruglanski et al., 2016). Existing research has suggested that the concept of time may prompt people to examine their current state. For example, Cotte et al. (2004) found that time is a metaphor for “mirror.” People regard time as a way of self-examination and personal evaluation, making continued efforts to perform better in the time use. Gino and Mogilner (2014) also found that time priming can induce people to examine their own cognition and behavior, and encourage them to act in a more reflective way. In the context of self-improvement products, implicitly activating the construct of time leads people to examine their current state and make them aware of the importance of taking action.

Increased locomotion orientation increases the likelihood of using self-improvement products. The essence of locomotion involves initiating movement away from a current state to a new state (Avnet & Higgins, 2003), which is prototypically oriented forward and facing the desired direction.

For high locomotors, the shift forward is essential and they will be upset when they encounter obstacles that interfere with their ability to maintain this movement (Kruglanski et al., 2016). Self-improvement products help consumers to improve some aspect of themselves by emphasizing the change from the current self to the future ideal self. This is consistent with the change of state in locomotion orientation. Moreover, locomotion orientation is positively related to internal motivation. Individuals with high locomotion orientation invest efforts in realizing their intentions and this facilitates their goal attainment (Higgins, 2012; Pierro et al., 2006). Locomotion orientation is also positively related to psychological vitality, self-esteem, optimism, and decisiveness, and negatively related to social anxiety and depression (Kruglanski et al., 2000). Therefore, if consumers are more locomotion orientated, they are more motivated to achieve self-improvement goals and will be more willing to commit to action and invest effort in it. Hence, they can move closer to their ideal self through consuming self-improvement products.

To summarize, for self-improvement products, time priming can serve as a reminder to enable consumers to examine their current state and encourage them to move toward a more ideal state. Therefore, the following hypothesis is proposed:

H2: Desire for self-improvement products triggered by time priming is mediated by consumers’ locomotion orientation.

The Moderating Effect of Perceived Difficulty

Perceived difficulty refers to consumers’ subjective perception of the likelihood of achieving the self-improvement goal. The pursuit of a self-improvement goal involves not only the actions directed toward the desired outcome but also the monitoring process to achieve the goal (Heckhausen, 1991; Heckhausen & Gollwitzer, 1987). Perceived difficulty is one of the key factors in determining motivation toward a goal. According to the value \times expectancy models, the possibility of achieving a goal positively affects motivation (Shah & Higgins, 1997). Similarly, the social-cognitive model also posits that the willingness to pursue a goal is positively related to the belief that the goal can be achieved through effort. That is, goal activation and pursuit are based on an assessment of the ease with which the goal can be attained (Bandura, 1977). Therefore, the motivation to initiate and pursue a goal would decrease when the perceived difficulty is high (Liyin et al., 2013; Rozental & Carlbring, 2014; Zhu et al., 2019). In our context, if the perceived difficulty is low, the time priming effect on self-improvement products remains significant. In contrast, the time priming effect will be weakened or even reversed when the perceived

difficulty of the goal is high. This is because a high level of perceived difficulty leads consumers to consider the attainability of the self-improvement goal and impairs their locomotion orientation, which in turn reduces the consumption intention of self-improvement products. Thus, we hypothesize as follows:

H3: Perceived difficulty moderates the effect of time priming on consumption intention of self-improvement products. Specifically, compared with low perceived difficulty of attaining the self-improvement goal, high perceived difficulty will weaken the time priming effect.

We test our hypotheses in three studies. Study 1 provides preliminary evidence that time priming (vs. no time priming) leads to a desire for self-improvement products. In Study 2, we explore the psychological mechanism using different manipulation methods and experimental stimuli. Last, Study 3 tests whether the perceived difficulty of the self-improvement goal serves as a boundary condition for the time priming effect.

Study 1: The Effect of Time Priming on Preferences for Self-Improvement Products

The main purpose of Study 1 is to test the effect of time priming on preferences for self-improvement products. We first primed the participants to consider time and then measured their intention to consume self-improvement products. We predicted that time priming will increase their preference for self-improvement products, while the time priming effect will not be significant in the comparison product condition.

Design, Participants, and Procedure

Study 1 had a 2 (concept priming: time priming vs. control condition) \times 2 (product type: self-improvement vs. comparison) between-subjects design. In total, 328 participants (41% female, $M_{\text{age}} = 27.22$, $SD_{\text{age}} = 5.73$) were recruited for the experiment through a widely used online platform Credamo. All the participants were randomly assigned to one of the four conditions.

First, the time concept of the participants was activated by a manipulation method similar to the one used by Su and Gao (2014). Each participant was presented with either a time-related or time-unrelated picture (Fig. 1). Specifically, the time-related picture depicted many clocks, while the time-unrelated picture used an image of buttons, which are similar in shape. All the participants were asked to look at the pictures carefully and to write down two thoughts that came to mind when looking at the images.



Time-priming condition



Control condition

Fig. 1 Stimuli used in Study 1

To ensure that participants' time concept was manipulated successfully, we conducted a pretest using different samples from the online platform ($N = 80$, $M_{\text{age}} = 26.35$). After looking at the picture presented, participants were asked to complete the same writing task as in the main study. Each participant was then instructed to use seven separate Chinese words to form a phrase either relevant to time or not. For example, the given word was “表”; it can be used to form the phrase “钟表” (watch) or “表情” (expression). Two independent raters ($r = 0.99$, $p < .01$), who were blind to the research purpose, scored participants' combined words for the level of time priming. The two raters indicated whether each of the seven phrases formed by the participants was related to time on a dichotomous “time-related” (coded 1) vs. “time-unrelated” (coded 0) scale. Then, we averaged the indicators' scores to form an index of the relative strength of time priming. Our logic was that if participants' time concept had indeed been activated, then they were more likely to associate the given words with time-relevant phrases. The

Fig. 2 Products used in Study 1 Product descriptions used in study 1:**Self-improvement product***Vitamin Water Focus:*

Improving your mental performance is key. Focus gives you the clarity and alertness to improve your mental performances.

**Comparison product***Vitamin Water Essential:*

Getting the right hydration is essential for your body. Essential gives you hydration that you need.



results showed that participants in the time-priming condition scored significantly higher on the measure ($M = 2.60$, $SD = 2.27$) than those in the control condition ($M = 1.71$, $SD = 1.64$; $t(78) = -2.01$, $p < .05$), indicating that the time-priming manipulation was successful. To exclude the influence of picture aesthetics, participants were asked to rate how much they liked the presented picture on a 7-point scale (1 = not at all, 7 = very much). The results showed that

there was no significant difference between two pictures ($M_{\text{time}} = 4.63$, $SD_{\text{time}} = 1.13$, $M_{\text{control}} = 4.58$, $SD_{\text{control}} = 1.20$; $t(78) = 0.19$, $p > .05$).

Participants were then randomly assigned to either self-improvement or comparison conditions. They were shown a description of the benefits of vitamin-enriched water and presented with a picture of the product (Fig. 2). We used the same experimental material as Allard and White (2015). A

pretest was conducted to ensure that the self-improvement product was perceived as having a higher self-improvement value than the comparison product. Participants were asked to complete a self-improvement features scale (e.g., “This [product] is positioned as a product that can help me improve”; “This [product] is positioned as a product that can help me become better”) using four 7-point scale items (1 = not at all, 7 = very much; $\alpha = 0.89$). The results showed that those in the self-improvement condition scored significantly higher on the measure ($M = 5.61$; $SD = 0.92$) than those in the comparison condition ($M = 4.48$; $SD = 1.11$; $t(78) = 4.97$, $p < .01$). In the self-improvement condition, the “Focus” flavored vitamin water was positioned as a self-improvement product and the description stated, “Improving your mental performance is key. Focus gives you the clarity and alertness to improve your mental performance.” In the comparison condition, the “Essential” flavor acted as a comparison product and its description read, “Getting the right hydration is essential for your body. Essential gives you the hydration that you need.” The dependent measure used three 7-point scale items: “How willing are you to gather more information about this product?” “How desirable do you find this product?” and “How likely will you use this product?” (1 = not at all, 7 = very much, $\alpha = 0.90$). Finally, participants completed the demographic measures.

Results

Consumption Intentions A 2 (concept priming) \times 2 (product type) ANOVA of consumption intention showed a main effect of concept priming ($F(1, 324) = 13.93$, $p < .001$, $\eta^2 = 0.04$). The main effect of product type was not significant ($F(1, 324) = 1.47$, $p > .10$). Consumption intention was affected by the interaction between time priming and product type ($F(1, 324) = 8.41$, $p < .005$, $\eta^2 = 0.03$). Subsequently, a simple effects analysis showed that for the self-improvement product, participants in the time priming condition were more likely to consume the product ($M = 5.41$, $SD = 1.05$) than those in the control condition ($M = 4.59$, $SD = 1.20$; $F(1, 324) = 22.39$, $p < .001$, $\eta^2 = 0.07$). However, for the comparison product, the effect of time priming on consumption intentions was not significant ($M_{\text{time}} = 4.90$, $SD_{\text{time}} = 1.11$, $M_{\text{control}} = 4.80$, $SD_{\text{control}} = 1.12$; $F(1, 324) = 0.34$, $p > .05$). These findings supported our hypothesis that time priming facilitates consumption intention of self-improvement products (H1). Moreover, when exposed to time priming, the self-improvement product was associated with higher consumption intention than the comparison product ($M_{\text{self-improvement}} = 5.41$ vs. $M_{\text{comparison}} = 4.90$; $F(1, 324) = 8.63$, $p < .005$, $\eta^2 = 0.03$). In the control condition, consumption intention did not differ between the product types ($M_{\text{self-improvement}} = 4.59$ vs. $M_{\text{comparison}} = 4.80$; $F(1, 324) = 1.44$,

$p > .05$). Thus, the interaction effect of time priming and product type was robust Fig. 3.

Discussion

The results of Study 1 provided initial support for the hypothesis that time priming leads to a higher preference for self-improvement products. We showed that time priming leads to higher consumption intention for self-improvement products, but not for comparison products. In Study 1, we manipulated participants’ time concept using pictures that are widely used in existing research and easily applied in marketing practice. In the next study, we examined the underlying mechanism. We predicted that locomotion orientation mediates the influence of time priming on preferences for self-improvement products.

Study 2: The Mediating Role of Locomotion Orientation

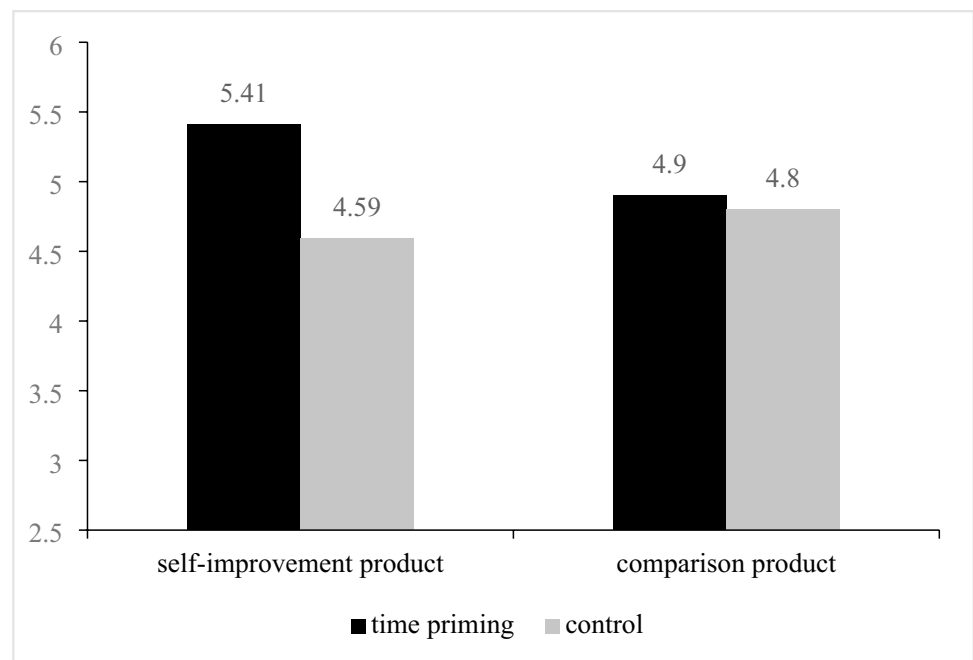
Study 2 tested whether locomotion orientation mediates the effect of time priming on preferences for self-improvement products. We used a different time priming manipulation method and different self-improvement products as stimuli to test the robustness of our findings in Study 1. Specifically, we first primed participants to consider the concept of time using a sentence construction task. Then participants were asked to report their consumption intentions for self-improvement products.

Design, Participants, and Procedure

Study 2 adopted a 2 (prime: time vs. control) \times 2 (product: self-improvement vs. comparison) between-subjects design. In total, 341 participants (35% female, $M_{\text{age}} = 27.16$, $SD_{\text{age}} = 5.00$) took part in the study in exchange for a small cash reward. Participants were recruited through the same online platform as in Study 1 and were randomly assigned to one of the four conditions.

First, participants were asked to complete a sentence construction task (adapted from Mogilner & Aaker, 2009) to activate their time concept. There were 18 sets of randomly arranged words and each set contained 4 words. Participants were asked to use 3 of the words in a set to compose a grammatical sentence. In the time priming condition, half of the sets (9 sets) contained time clues, such as “stare, *time*, you, building,” “sheet, this, change, *clock*.” In the control condition, these words were replaced by neutral words: “stare, *bookshelf*, you, building,” “sheet, this, change, *background*.” Recent research has shown that participants’ time concept can be primed in this way (Gino & Mogilner, 2014; Su & Gao, 2014).

Fig. 3 The effect of time priming on consumption intention (Study 1)



A separate pretest was conducted to support the validity of the manipulation in activating participants' time concept. We used the same method to measure the level of time priming as in the pretest in Study 1. As expected, the results showed that participants ($N=79$, $M_{\text{age}}=27.96$) in the time priming condition rated significantly higher on the measure ($M=2.85$, $SD=1.81$) than the control condition ($M=1.71$, $SD=1.67$; $t(77)=-2.88$, $p<.01$). Thus, our analyses suggested that our manipulation was successful.

Then, participants read about one of two herbal teas (Fig. 4). The material was adapted from Allard and White (2015). In the self-improvement product condition, the description of the “Get Smart” herbal tea was positioned to improve “brain power,” “mental clarity,” and “IQ.” In the comparison product condition, the herbal tea had the function of “quenching your thirst” and helping “water retention.” After reading the descriptions, participants were asked to report their purchase intentions for the herbal tea using the same measure as in Study 1 ($\alpha=0.877$). In addition, we conducted a separate pretest to examine whether the product manipulation was successful. Participants were asked to complete the same measure used in the previous study. The results showed that those in the self-improvement condition scored significantly higher on the measure ($M=5.61$, $SD=0.92$) than those in the comparison condition ($M=4.48$, $SD=1.11$; $t(78)=4.97$, $p<.01$), consistent with our expectation.

Next, participants were asked to report their locomotion orientation based on three statements (Kruglanski et al., 2016; Pierro et al., 2011): “Now, I should take action to do the things I want to do”; “Now, I enjoy actively doing

things, rather than just watching and observing”; “Now, I'd like to be a ‘doer’” (1 = strongly disagree, 7 = strongly agree; $\alpha=0.868$). Last, we collected demographic information.

Results

Consumption Intention A 2 (priming) \times 2 (product type) ANOVA of consumption intentions was performed. The results showed that the main effect of priming ($F(1, 337)=23.03$, $p<.001$, $\eta^2=0.06$) was significant, and the main effect of product type was not significant ($F(1, 337)=2.06$, $p>.10$). More importantly, the interaction effect of time priming and product type on purchase intentions was significant ($F(1, 337)=9.70$, $p<.005$, $\eta^2=0.03$). Subsequently, a simple effects analysis revealed that for the self-improvement product, participants in the time priming condition ($M=5.30$, $SD=1.05$) were more likely to consume self-improvement products than those in the control condition ($M=4.42$, $SD=1.05$; $F(1, 337)=31.96$, $p<.001$, $\eta^2=0.09$). However, the time priming effect was not significant for the comparison products ($M_{\text{time}}=4.79$, $SD=1.01$; $M_{\text{control}}=4.60$, $SD=1.01$; $F(1, 337)=1.39$, $p>.05$). These findings supported our key notion that time priming increases consumers' preference for self-improvement products (see Fig. 5). In addition, when the time concept was activated, the self-improvement product (vs. comparison product) was associated with higher consumption intention ($M_{\text{self-improvement}}=5.30$ vs. $M_{\text{comparison}}=4.79$; $F(1, 337)=10.38$, $p<.005$, $\eta^2=0.03$). In the control condition, consumption intention did not differ between the self-improvement and comparison product (M

Fig. 4 Products used in Study 2

Product descriptions used in study 2:**Self-improvement product****Product Description:**

Feeling fuzzy? Hardly focus?

Try this herbal tea! Based on stimulating organic rooibos with notes of orange peel, rosemary and gotu kola, this combination is sure to improve your mental clarity.

So sip away and improve your brain power !

Comparison product**Product Description:**

Feeling thirsty? Throat goes dry?

Try this herbal tea! Based on stimulating organic rooibos with notes of orange peel, rosemary and gotu kola, this combination is sure to quench your thirst.

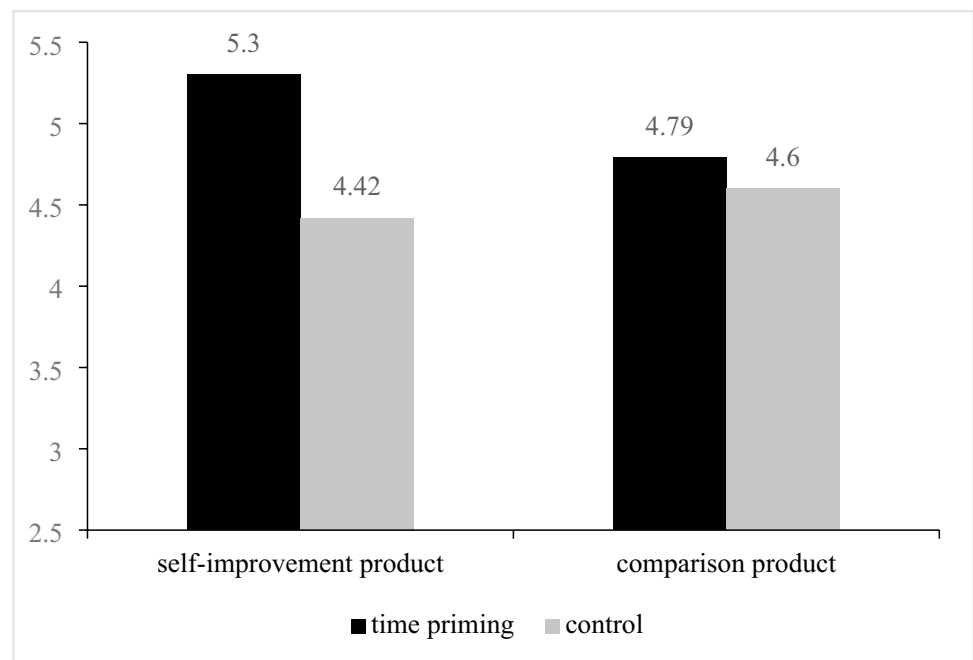
So sip away and helps water retention !

self-improvement = 4.42 vs. $M_{\text{comparison}} = 4.60$; $F(1, 337) = 1.40$, $p > .10$). These results replicated our main findings in Studies 1 and 2 and provided further support for H1.

Locomotion Orientation We conducted a moderated mediation analysis (PROCESS model 8) with 5000 bootstrapped

samples (Hayes, 2017). The results revealed that there was a significant moderated mediation effect ($b = 0.67$, with a bias-corrected 95% *CI* that did not include 0 [0.29, 1.05]). Specifically, for the self-improvement product, the relationship between time priming and consumption intention was mediated by locomotion orientation ($b = -0.86$, with

Fig. 5 The effect of time priming on consumption intention (Study 2)



a bias-corrected 95% *CI* that did not include 0 [−1.13, −0.59]). However, the meditating effect of locomotion orientation was not significant for the comparison product ($b = -0.19$, with a bias-corrected 95% *CI* that did include 0 [−0.47, 0.09]). Together, these results suggest that the time priming effect on consumption intention of self-improvement products was mediated by locomotion orientation, which supported our hypothesis H2.

Discussion

Study 2 replicated the main findings of Study 1 with a different time priming manipulation and different self-improvement products. More importantly, Study 2 tested the mediating role of locomotion orientation. The result showed that time priming increases consumers' locomotion orientation, thus leading to a higher preference for self-improvement products. In the following study, we examined the moderation role of perceived difficulty.

Study 3: The Moderation Role of Perceived Difficulty

The purpose of Study 3 was to examine how perceived difficulty moderated the time-priming effect on preferences for self-improvement products. We predicted that when the perceived difficulty is high, the time priming effect will be mitigated. In addition, we used a different product category. Study 1 and Study 2 used physical goods. In Study 3, we adopted virtual products as stimuli.

Design, Participants, and Procedure

The participants were 350 adults (57.5% female, $M_{\text{age}} = 29.26$) recruited from the same online platform Credamo for a small cash incentive. The study was a 2 (concept priming: time priming vs. control condition) \times 2 (perceived difficulty: low vs. high) between-subjects design. The participants were randomly assigned to one of the four conditions.

To prime participants' time concept, we employed the same manipulation method as in Study 1. All the participants read about a fitness course named Burning Calories. This course aimed to "improve your figure, lose weight and make you healthier." Participants were randomly assigned to either the low or the high perceived difficulty condition (Fig. 6). In the low perceived difficulty condition, the course was positioned at entry level with the difficulty rating as one star (difficulty ranged from 1 to 5 stars). Alternatively, in the high perceived difficulty condition, the course was described as advanced with a difficulty rating of five stars. Then, participants reported their consumption intentions ($\alpha = 0.91$) and locomotion orientation ($\alpha = 0.90$) with the same measures used in Study 2. As a manipulation check, they rated their perceived difficulty of the fitness course on a 7-point scale (Zhu et al., 2019): "How difficult do you expect the fitness course to be?" (1 = not at all difficult, 7 = very difficult). Finally, their demographic information was collected.

Results

Manipulation Check A 2 (concept priming) \times 2 (difficulty) ANOVA of perceived difficulty showed only a main effect of difficulty ($F(1, 346) = 24.66, p < .001$). Participants in the high perceived difficulty condition rated the fitness course as more difficult ($M = 4.72, SD = 1.67$) than those in the low perceived difficulty condition ($M = 3.84, SD = 1.65$). Thus, we had manipulated perceived difficulty as intended.

Consumption Intentions To test the effect of time priming and perceived difficulty on consumption intentions, we performed a 2 (concept priming) \times 2 (perceived difficulty) ANOVA of consumption intentions. The results showed a main effect of perceived difficulty ($F(1, 346) = 10.69, p < .005, \eta^2 = 0.03$). The main effect of time priming was not significant ($F(1, 346) = 3.13, p > .05$); however, the interaction between time priming and perceived difficulty was significant ($F(1, 346) = 26.60, p < .001, \eta^2 = 0.07$). A simple effects analysis revealed that for the low perceived difficulty condition, participants in the time priming condition ($M_{\text{time}} = 5.36, SD_{\text{time}} = 1.12$) reported higher consumption intention than participants in the control condition ($M_{\text{control}} = 4.50, SD_{\text{control}} = 1.21; F(1, 346) = 24.13, p < .001, \eta^2 = 0.07$). In contrast, for the high perceived difficulty condition, the effect of time priming on consumption intention was reversed ($M_{\text{time}} = 4.32, SD_{\text{time}} = 1.05$ vs. $M_{\text{control}} = 4.74, SD_{\text{control}} = 1.25; F(1, 346) = 5.71, p < .05, \eta^2 = 0.02$). Moreover, in the time priming condition, low perceived difficulty was associated with higher consumption intention ($M_{\text{low difficulty}} = 5.36$ vs. $M_{\text{high difficulty}} = 4.32; F(1, 346) = 35.10, p < .001, \eta^2 = 0.09$). In the control condition, consumption intention did not differ between these two perceived difficulty levels ($M_{\text{low difficulty}} = 4.50$ vs. $M_{\text{high difficulty}} = 4.74; F(1, 346) = 1.80, p > .10$). These results supported hypothesis H3, namely, that time priming leads to a higher preference for self-improvement products only when the perceived difficulty is low Fig. 7.

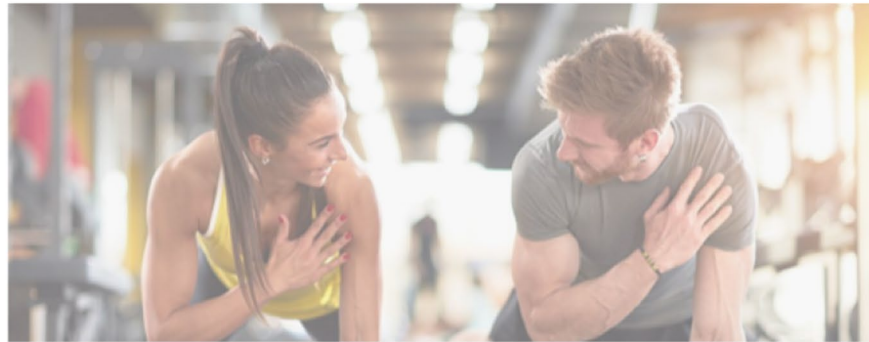
Locomotion Orientation A 2 (concept priming) \times 2 (perceived difficulty) ANOVA of locomotion orientation showed the main effects of concept priming ($F(1, 346) = 11.02, p < .005, \eta^2 = 0.03$) and perceived difficulty ($F(1, 346) = 22.35, p < .001, \eta^2 = 0.06$). Locomotion orientation was affected by the interaction between time priming and perceived difficulty ($F(1, 346) = 19.21, p < .001, \eta^2 = 0.05$). Subsequently, a simple effects analysis showed that when the perceived difficulty was low, participants with activated time concept showed higher locomotion orientation ($M = 5.62, SD = 1.00$) than those in the control condition ($M = 4.71, SD = 1.08; F(1, 346) = 29.85, p < .001, \eta^2 = 0.08$). However, when the perceived difficulty was high, the effect of time priming on locomotion orientation was not significant ($M_{\text{time}} = 4.54, SD_{\text{time}} = 1.24, M_{\text{control}} = 4.67, SD_{\text{control}} = 1.10; F(1, 346) = 0.56, p > .05$). In addition, in the time priming condition, low perceived difficulty was associated with higher locomotion orientation ($M_{\text{low difficulty}} = 5.62$ vs. $M_{\text{high difficulty}} = 4.54; F(1, 346) = 41.03, p < .001, \eta^2 = 0.11$). In the control condition, locomotion orientation did not differ between these two perceived difficulty levels ($M_{\text{low difficulty}} = 4.71$ vs. $M_{\text{high difficulty}} = 4.67; F(1, 346) = 0.06, p > .50$). These findings supported our hypothesis that when the perceived difficulty is low, time priming facilitates locomotion orientation, but when the perceived difficulty is high, time priming does not work.

Moderated Mediation Analysis We conducted a moderated mediation analysis (PROCESS model 8) with 5000 bootstrapped samples (Hayes, 2017). The results revealed a significant moderated mediation ($b = 0.72$, with a bias-corrected 95% CI that did not include 0 [0.41, 1.06]). Specifically, in the low perceived difficulty condition, the effect of time priming on consumption intentions was mediated by locomotion orientation ($b = -0.63$, with a bias-corrected 95% CI that did not include 0 [-0.88, -0.40]). However, there was no significant mediation effect of locomotion orientation in the high perceived difficulty condition (with a bias-corrected 95% CI that included 0 [-0.16, 0.33]).

Discussion

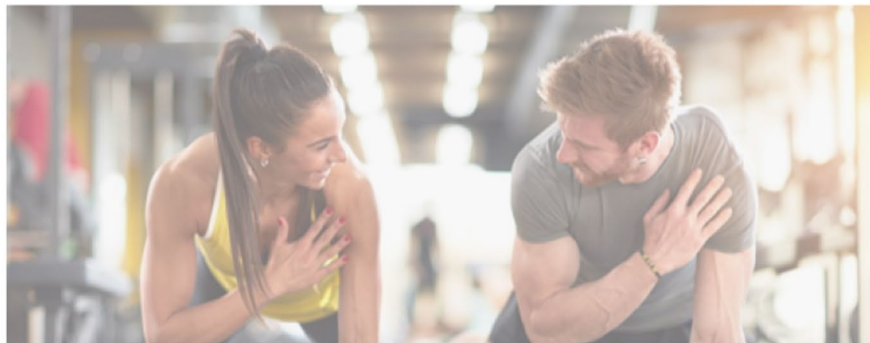
Study 3 replicated the findings of Study 1 and Study 2 using a different product category. More importantly, the results provided evidence for hypothesis H3, namely, that perceived difficulty moderates the time priming effect on desire for self-improvement products. Specifically, when the perceived difficulty of self-improvement is low, time priming (vs. control) induces stronger locomotion orientation, which in turn leads to higher consumption intentions for the product enabling self-improvement. Unexpectedly, when the perceived difficulty was high, we found the time priming effect was inverted. In that condition, the indirect effect through locomotion orientation was not significant, suggesting that locomotion orientation did not mediate the effect of time priming on consumption intention. This was probably because accomplishing a more difficult course frequently entails devoting more time and energy to achieving the goal (Zhu et al., 2019). Time priming might remind people to consider their resource commitment for pursuing the self-improvement goal, making them more susceptible to personal fear of invalidity. Thus, in the high perceived difficulty condition, time priming may lead to assessment orientation that results in procrastination (Kruglanski et al., 2000; Pierro et al., 2011), instead of acting quickly. The underlying mechanism requires further exploration.

Fig. 6 Products used in Study 3

Low perceived difficulty**Calories Burning - Primary Level**

Difficulty rating ★☆☆☆☆ (adaptive easy)

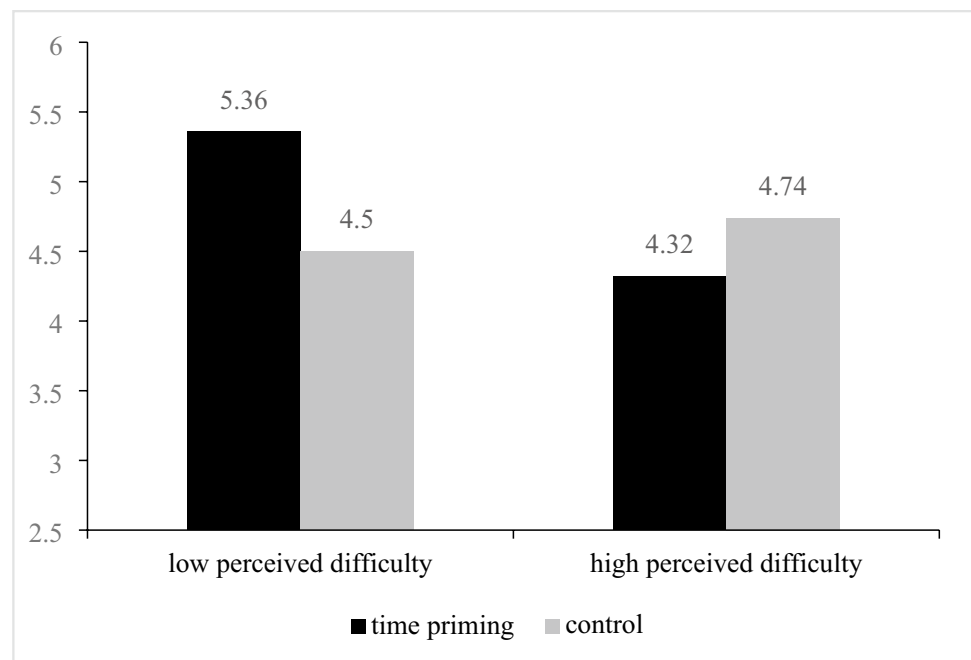
The primary fitness course helps you adapt to training, develop exercise habit, burn excess calories, and make you healthier!

High perceived difficulty**Calories Burning - Advanced Level**

Difficulty rating ★★★★★ (challenge difficulty)

The advanced fitness course helps you challenge yourself, strengthen exercise ability, burn excess calories, and make you healthier!

Fig. 7 The effect of time priming on consumption intention (Study 3)



General Discussion

Conclusions

Time relevant information is one of the most common environmental cues in our everyday life (Dagogo Jack et al., 2020). Three studies were conducted to test the influence of time priming on the preference for self-improvement products. Study 1 demonstrated that time priming increases consumers' likely usage of self-improvement products. In Study 2, a different manipulation method was used to replicate the findings in Study 1. Furthermore, we examined the mechanism underlying the time priming effect on the preference for self-improvement products. The results document that time priming increases consumers' locomotion orientation, thus leading to a high preference for self-improvement products. Finally, we tested the moderation effect of the goal's perceived difficulty. We used a different product category in Study 3. The results replicated the previous findings when the perceived difficulty of attaining the goal is low. However, the time priming effect will not be significant when the perceived difficulty is high, because high perceived difficulty decreases the goal's attainability, which in turn reduces locomotion orientation. The results are robust across different manipulation methods and stimuli. Our study provides both theoretical contributions and practical implications.

Theoretical Contributions

This research contributes to existing research in several ways. First, to the best of our knowledge, this work is the

first to demonstrate that activating general time concepts can influence the pursuit of self-improvement goals. Past findings explored how features of time relate specifically to goal-directed behaviors. For instance, temporal boundedness (Brodsholl et al., 2007; Haiyang et al., 2015), time-interval descriptions (Munichor & LeBoeuf, 2018), the categorization of time (Yanping & Soman, 2014) can influence individuals' goal pursuit. In the same spirit, the current research highlights the inextricable link between time and goals. We build on and extend past research showing that just activating general time concept—by making individuals think about time—facilitates the pursuit of self-improvement goals.

Second, this work deepens our understanding of the self-regulation. Prior research in the self-regulation and goal pursuit literature has primarily focused on the outcomes by examining information processing (Hong & Lee, 2007; Salerno et al., 2015) and strategy in goal pursuit (Townsend & Liu, 2012; Werner & Milyavskaya, 2019) that may improve or impair self-regulatory performance. In contrast, the current work identifies the process motive of locomotion orientation, which highlights the effect (control) movement in the direction of the goal. For individuals in a high locomotion state, the shift forward is essential and they are willing to commit psychological resources to initiate and maintain goal-related movement in a straightforward and direct manner (Kruglanski et al., 2000). Thus, consumers are more motivated to pursue self-improvement goals and manage the movement better. Furthermore, perceiving the appropriate difficulty of attaining the goal is a necessary condition for the effect to occur. High perceived difficulty

reduces the motivation to affect the movement and mitigates the locomotion orientation (Zhu et al., 2019).

Third, we extend the literature on self-improvement consumption. While existing studies show that the desire for self-improvement products is derived from an unfavorable social comparison with others (Wan et al., 2010) and negative emotions such as guilt (Allard & White, 2015) and envy (Salerno et al., 2019), these works neglected the intrinsic positive motivation to improve oneself (Armenta et al., 2017). We show that individuals have a general desire to pursue a better version of themselves but need impetus for that movement (Kliamenakis & Sobol, 2021). Time priming can serve as a reminder, enhance locomotion orientation, and facilitate self-improvement consumption.

Practical Implications

This research provides important practical implications. First, companies will benefit from time priming strategies under certain conditions. Marketers can use them to encourage consumers to purchase self-improvement products or to engage in self-improving behaviors. According to our findings, it would be more effective to use time-relevant cues to sell self-improvement products or to facilitate self-improving behaviors. For example, the advertisement “time engraver” for L’Oréal eye cream tells consumers: “Time will faithfully record everything about you. You can’t change time, but you can change yourself.” This advertisement used various time-related elements, such as clocks, hourglasses, and horological gears, which suggested that individuals were more motivated to pursuing self-improvement goals when directing their attention to time.

Second, our findings also suggest that locomotion orientation is crucial for marketing self-improvement products. Locomotion orientation can operate as individual difference variable, but it can also be situationally induced (Pierro et al., 2018). For the self-improvement products, marketers can enhance locomotion orientation and encourage consumers to take action immediately instead of hesitating or postponing action. In addition, the effect of a time priming strategy depends on goal difficulty. For attainable goals, the time concept may remind consumers to be a “doer” and participate in self-improvement consumption. In contrast, the time priming strategy might be detrimental when the self-improvement goals are perceived as too difficult to accomplish.

Third, our research also provides implications for individuals’ goal pursuit. Often, people procrastinate pursuing the self-improvement goals because immediate costs are high while benefits are temporally remote (Shu & Gneezy, 2010). According to our findings, time priming could be an important driving factor that influences individuals’

pursuit of self-improvement goals. For attainable goals, our work suggests that activating time concept can induce locomotion orientation, which in turn leads to a greater motivation. Thus, when people are in pursuit of attainable self-improvement goals (e.g., fitness goals, learning a new language, or improving intellectual performance), they could use time-related cues to increase the salience of time explicitly and implicitly. This can help people focus on the execution of self-improvement goals and manage their time effectively (Romero et al., 2021).

Limitations and Future Research

Our research has some limitations that also suggest directions for further study. First, this research uses pictures and writing tasks to activate time concept explicitly. However, time relevant information exists in various forms in our environment. Environmental cues that consumers are exposed to may implicitly induce time concept without them even noticing. Future research could explore more time activation methods (Monga & Zor, 2019). Second, the time priming effect might be affected by individual differences. For example, scheduling style may have an impact on the effect of time priming effect (Sellier & Avnet, 2014). Consumers who adopt a clock-time scheduling style tend to rely on an external clock, while those who adopt an event-time scheduling style might pay more attention to their internal sense of time. Therefore, the time priming effect might be more effective for those who adopt a clock-time scheduling style. Future research could identify more individual factors that might have an impact on the time priming effect. Last, cultural factors may also moderate the time priming effect. This study proposes that the influence of time priming on preferences for self-improvement products only occurs when time concept and self-improvement motivation is inherently connected. The connection between them may be robust in most cultures, but in some regions, people may follow a *carpe diem* approach. Thus, time priming may induce indulgence consumption or other behavior (Mogilner, 2019). Future research should explore the influences of social and cultural factors.

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Data Availability The datasets generated during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical Statement Ethical review and approval were not required for the study on human participants in accordance with the local legislation

and institutional requirements. The participants provided their written informed consent to participate in this study.

Conflict of Interest We declare that we have no conflict of interest.

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