

The Self-Other Decision Effect in Intertemporal Choice

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Abstract

Many intertemporal choices using monetary outcomes have revealed the existence of the self-other decision-making effect. However, the outcomes of intertemporal choices are not limited to money; time is also a scarce and non-renewable resource. Therefore, we conducted a series of experimental studies to reveal the self-other decision-making effect in intertemporal choices based on time, focusing on the type of intertemporal choice with time as the outcome. Across three experiments, the existence of the self-other decision-making effect was confirmed. Subjects making decisions for others were more inclined to choose the smaller-sooner (SS) option over the larger-later (LL) option, and perceived the benefits of the SS option as significantly greater than those of the LL option. Conversely, subjects making decisions for themselves preferred the LL option over the SS option; however, they perceived no significant difference in benefits between the LL and SS options. Changing the decision-maker's role affects individuals' ability to consider the future consequences of their choices. The self-other decision-making effect in intertemporal choices involving time can be explained by economic rationality and construal level theory. The research results indicate that the self-other decision-making effect in intertemporal choices involving time can be generated simply by reframing the problem, which can help individuals make optimal long-term choices without requiring increased self-control.

Full Text

The Self-Other Decision-Making Effect in Time-Based Intertemporal Choice

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Abstract: Numerous intertemporal choice studies using monetary outcomes have revealed the existence of self-other decision-making effects. However, in-

tertemporal choice outcomes are not limited to money; time is also a scarce and non-renewable resource. Therefore, we conducted a series of experimental studies to uncover the self-other decision-making effect in time-based intertemporal choice, focusing on intertemporal choices with time as the outcome. Across three experiments, we confirmed the presence of this effect. Participants making decisions for others preferred the smaller-sooner (SS) option over the larger-later (LL) option and perceived the benefits of the SS option as significantly greater than those of the LL option. In contrast, participants making decisions for themselves favored the LL option over the SS option, yet perceived no significant difference in benefits between the LL and SS options. Changing the decision-maker's role influences individuals' ability to consider the future consequences of their choices. The self-other decision-making effect in time-based intertemporal choice can be explained by economic rationality and construal level theory. The findings indicate that this effect can be generated simply by reframing the problem, thereby helping individuals make optimal long-term choices without requiring increased self-control.

Keywords: self-other decision-making effect, time-based intertemporal choice, opportunity cost, economic rationality

As social beings, people inevitably participate in decision-making that involves others (Sanfey, 2007). Individuals are employed or even elected to make decisions on behalf of others; consultants, politicians, and board members represent three typical examples. Sometimes we must make intertemporal choices for others, such as deciding whether someone should work immediately after graduation or pursue further education to earn more in the future. In intertemporal choice contexts, the way people decide for others differs from how they decide for themselves (Pronin, Olivola, & Kennedy, 2008; Chen & He, 2014). For instance, compared to when deciding for themselves, people exhibit lower time discounting and greater preference for the more valuable LL option when deciding for others (Pronin, Olivola, & Kennedy, 2008; Chen & He, 2014).

In the field of intertemporal choice, a substantial body of research has used money as the outcome (Read, Frederick, Orsel, & Rahman, 2005; Read, Frederick, & Scholten, 2013; Jiang, Hu, & Zhu, 2014). However, intertemporal choice outcomes are not limited to money. Time is a scarce, finite resource (Moore, 1963). Humans frequently make time-allocation decisions for others. For example, parents occasionally decide for their children whether to spend one day on entertainment now or two days on entertainment a week later. We refer to intertemporal choices with time as the outcome as time-based intertemporal choice. Resource allocation theorists argue that nearly all economic rents can be attributed to the ownership and distribution of scarce resources (Becker, 1965). Derivatives of the resource-based view, including the knowledge-based view (Grant, 1996), the core competence approach (Lado & Wilson, 1994; Prahalad & Hamel, 2000), and the dynamic capabilities approach (Teece & Shuen, 1997), all regard effective resource utilization as central to competitive differentiation (Grant, 1991). Consequently, it is widely believed that competitive

advantage derives at least partially from optimal resource allocation.

Many researchers have noted the inefficient use of scarce resources and have examined intertemporal choice using time as the outcome (which we call time-based intertemporal choice), finding that time and money are not psychologically equivalent (Okada & Hoch, 2004; Mogilner, 2010; Reed, Kay, Finnel, Aquino, & Levy, 2015; Zhao, Jiang, Zhou, Li, Rao, & Zheng, 2015). Two key differences exist between money and time in intertemporal choice. First, the opportunity cost of time is higher than that of money in intertemporal choice. For money, consider the question: “Would you prefer 5 yuan today or 6.2 yuan in 26 days?” Choosing the former incurs an opportunity cost equal to the latter. For time, consider: “Would you prefer one day off tomorrow or two days off in a month?” Choosing the former incurs opportunity costs equal to one day of study or work time (since time spent traveling cannot be used for other activities) plus two days of vacation time (Read, Olivola, & Hardisty, 2017). In other words, obtaining more money (LL) represents an absolute gain with no loss, whereas obtaining additional time is not an absolute gain because we lose the opportunity to spend that time on other activities. Money has no opportunity cost, but time does. Second, present bias is weaker for time than for money in intertemporal choice. For example, our previous research found that in time-based intertemporal choice, participants tended to select the LL option rather than the SS option (Zhao, Jiang, Zhou, Li, Rao, & Zheng, 2015). This result contrasts sharply with monetary intertemporal choice, where people are impatient and prefer SS over LL options (Frederick, Loewenstein, & O’Donoghue, 2002; Read, Frederick, & Scholten, 2013; Olivola & Wang, 2016). Olivola and Wang (2016) found that people exhibited less present bias for time bids than for monetary bids. Consequently, we hypothesized that the self-other decision-making effect in time-based intertemporal choice would differ from that in monetary intertemporal choice. To address this important gap in the literature, we investigated self-other differences in time-based intertemporal choice.

Why do the same options have different characteristics when decisions are made for different people (self vs. others)? The literature offers several explanations. One perspective suggests that when making decisions for themselves, people often act against their own interests due to “visceral factors” —including hunger, emotions and affect, physical pain, and drug cravings—even when fully informed. These visceral factors lead to impulsive behavior when deciding for oneself. However, when deciding for others, people typically underestimate or even ignore the visceral factors experienced by others, showing less emotional involvement and greater patience (Loewenstein, 1996; Albrecht, Volz, Sutter, Laibson, & Von Cramon, 2011). Thus, in monetary intertemporal choice, people prefer the lower-value SS option when deciding for themselves and the higher-value LL option when deciding for others (Pronin, Olivola, & Kennedy, 2008; Chen & He, 2014).

An alternative perspective, construal level theory (CLT), describes how psychological distance influences how individuals understand events. People form

low-level construals (involving more concrete, subordinate features; e.g., writing a paper can be described as pressing keys on a keyboard) for psychologically proximal events. Conversely, they form high-level construals (involving more abstract, superordinate features; e.g., writing a paper can be described as expressing ideas) for psychologically distant events. According to CLT, desirability refers to the value of an action's end state (e.g., "Is the lecture interesting?"), is abstract, and reflects high-level construal. Feasibility, in contrast, refers to the ease or difficulty of achieving an action's end state (e.g., "Is the lecture scheduled at a convenient time?"), is concrete, and reflects low-level construal (Liberman & Trope, 1998; Trope & Liberman, 2010). Many researchers have confirmed that as psychological distance increases, people rely more on desirability-related factors than feasibility-related factors (Liberman & Trope, 1998; Lu, Xie, & Xu, 2012; Todorov, Goren, & Trope, 2007). In monetary intertemporal choice, people choose the less valuable SS reward when deciding for themselves (relying on feasibility-related factors) and the more valuable LL reward when deciding for others (relying on desirability-related factors) (Pronin, Olivola, & Kennedy, 2008; Chen & He, 2014; Sun, Wang, Liu, & Liu, 2017).

Do the explanatory mechanisms for self-other differences in monetary intertemporal choice apply to time-based intertemporal choice? Given that opportunity costs and present bias differ between time and money in intertemporal choice, while the trade-off between costs and benefits remains the same, we use economic rationality and construal level theory to explain the self-other decision-making effect in time-based intertemporal choice. Economic rationality applies cost-benefit analysis concepts to individual decision-making. According to Kourilsky and Murray (1981), it can be conceptualized as a three-level hierarchy integrating scarcity, alternatives, and opportunity costs. Level 1 involves recognizing the existence of scarce resources, such as money and time. Level 2 involves the ability to identify specific alternative uses for scarce resources. Level 3 involves the ability to identify realistic, distinct alternative uses and rank them according to expected benefits (Laney, 1988).

According to construal level theory, in intertemporal choice, people form low-level construals for psychologically proximal events (deciding for oneself) and high-level construals for psychologically distant events (deciding for others). Based on economic rationality and construal level theory, individuals operate at different decision-making levels when choosing for themselves versus others. Participants deciding for themselves are at Level 1 of economic rationality: they can recognize the existence of scarce resources like money and time. In monetary intertemporal choice, people prefer SS options due to greater present bias (Olivola & Wang, 2016). However, in time-based intertemporal choice, people prefer LL options because present bias is weaker (Zhao, Jiang, Zhou, Li, Rao, & Zheng, 2015).

In monetary intertemporal choice, participants deciding for others are at Level 2 of economic rationality: they can identify specific alternative uses (alternative choices) and prefer LL options. However, in time-based intertemporal choice,

participants deciding for others are at Level 3: they can identify realistic alternative uses (opportunity costs) and prefer SS options due to lower opportunity costs. Monetary intertemporal choice without opportunity costs can be viewed as a “gain,” whereas time-based intertemporal choice with opportunity costs can be viewed as a “loss.” Choices in gain and loss domains follow the “reflection effect” (Kahneman & Tversky, 1979). That is, LL choices in gains (monetary intertemporal choice) become SS choices in losses (time-based intertemporal choice), and vice versa. We therefore propose Hypothesis 1:

Hypothesis 1: In time-based intertemporal choice, participants deciding for themselves will prefer LL over SS options, while participants deciding for others will prefer SS over LL options.

This logic becomes clearer when considering both time-based and monetary intertemporal choice simultaneously (see [Figure 1: see original paper]). Intertemporal choice without opportunity costs (money-based) can be treated as gains, while intertemporal choice with opportunity costs (time-based) can be treated as losses. Choices in gain and loss domains follow the “reflection effect” proposed by prospect theory (Kahneman & Tversky, 1979). That is, LL choices in gains (money-based intertemporal choice) become SS choices in losses (time-based intertemporal choice), and vice versa.

If Hypothesis 1 is supported, two alternative theories could explain the results. The first alternative explanation suggests that when making decisions from a social distance perspective, people are not equally generous to everyone. They tend to be more willing to share goods and resources with those they feel close to than with those they do not care about (Fareri, Niznikiewicz, Lee, & Delgado, 2012; Goeree, McConnell, Mitchell, Tromp, & Yariv, 2010; Harrison, Sciberras, & James, 2011; Hoffman, McCabe, & Smith, 1996). In other words, another possible reason for self-other differences in time-based intertemporal choice is that participants are very generous to themselves (choosing LL) but their generosity decreases disproportionately when directed toward others (choosing SS). The second alternative explanation is the social values theory proposed by Stone and Allgaier (2008) to explain self-other differences in risky decision-making. Social values represent people’s perceptions of their social group’s values. Stone and Allgaier (2008) argued that when risk-taking is socially valued, people make riskier decisions for others, but not when risk is not valued. That is, when deciding for others, people rely on social values, whereas when deciding for themselves, they rely on personal preferences (Stone & Allgaier, 2008). In China, travel is typically a personal preference, while studying or working is socially preferred. Therefore, participants choose LL (more travel time) for themselves and SS (less travel time, meaning more study or work time) for others. Which theory—economic rationality, construal level theory, social distance theory, or social values theory—best fits self-other differences in time-based intertemporal choice? In our view, regardless of whether participants decide for themselves or others, they always seek rewards and avoid losses (Zhao, Shen, Rao, Zheng, Liu, & Li, 2018; Zheng, Shen, Xu, Rao, & Li, 2019). Therefore, we propose Hypothesis 2:

Hypothesis 2: In time-based intertemporal choice, participants deciding for others will perceive greater benefits in SS options than in LL options, while participants deciding for themselves will perceive greater benefits in LL options than in SS options.

If Hypothesis 2 is supported, economic rationality, construal level theory, and social values theory would be supported, while participant generosity would not. We then examined the underlying mechanisms of self-other differences in time-based intertemporal choice. We used two hypothetical scenarios—a study time scenario and a training time scenario—to test these differences. Students/athletes were asked to imagine that they or their friends had recently engaged in intensive studying/training, and a classmate/teammate suggested an extracurricular activity/trip to help them relax. The two options were:

The SS option asked them to “participate in a one-day extracurricular activity/trip tomorrow.” The LL option asked them to “participate in a two-day extracurricular activity/trip in one week.” According to economic rationality and construal level theory, participants deciding for themselves form low-level construals of the event and only recognize the existence of scarce time (Level 1 of economic rationality); that is, they cannot identify time’s opportunity costs. Therefore, we infer that they consider extracurricular activities/trips more important than studying/training. Participants deciding for others form high-level construals and can identify time’s opportunity costs (Level 3 of economic rationality). Therefore, we infer that they consider studying/training more important than extracurricular activities/trips. These inferences align with social values theory: when people decide for others, they rely on social values (considering studying/training more important than extracurricular activities/trips), whereas when deciding for themselves, they rely on personal preferences (considering extracurricular activities/trips more important than studying/training). Thus, we propose Hypothesis 3:

Hypothesis 3: Participants deciding for others can identify time’s opportunity costs and therefore consider studying/training more important than extracurricular activities/trips; participants deciding for themselves cannot identify time’s opportunity costs and therefore consider extracurricular activities/trips more important than studying/training.

If Hypothesis 3 is supported, the next question is why participants deciding for others consider studying/training more important than extracurricular activities/trips. Do they identify alternative uses of time (opportunity costs) or rely on social values? To answer this, we conducted a two-step experiment. One group decided for others first and then for themselves, while another group decided for themselves in both stages. We reasoned that if the underlying mechanism of self-other differences in time-based intertemporal choice is reliance on social values, and social values are stable, then the initial decision (whether for self or others) should not affect subsequent decisions for oneself. Consequently, the two groups would not differ in their second-stage choices. However, if the underlying mechanism is time’s opportunity cost, then the initial condition of

deciding for others leads participants to form high-level construals and attend to time's opportunity costs. Subsequently, in the later decision, they would prefer the SS option (with lower opportunity costs) more than participants who decided for themselves in both stages. Therefore, we propose Hypothesis 4:

Hypothesis 4: If opportunity cost rather than social value is the underlying mechanism of self-other differences in time-based intertemporal choice, then in the second decision, participants who initially decided for others and subsequently for themselves will prefer the SS option more than those who decided for themselves in both stages.

The following experiments sought to test these hypotheses.

Experiment 1

Participants

Ninety-five undergraduate political science majors from Shandong Normal University participated in a classroom setting (59 females, $M_{age} = 20.06$, $SD_{age} = 0.63$). All participants provided oral consent and received a small gift as thanks. Additionally, all experiments were approved by the Ethics Review Committee of the Institute of Psychology, Chinese Academy of Sciences.

Materials and Procedure

Participants were asked to imagine that they or their friends had recently experienced intense studying, and a student representative proposed an extracurricular activity to help classmates relax. Participants chose between two options for themselves or their friend:

Option A: Participate in a one-day extracurricular activity tomorrow

Option B: Participate in a two-day extracurricular activity in one week

Results and Discussion

shows that 15 of 45 participants preferred the SS option (Option A) in the “deciding-for-self” condition, while 30 of 50 participants chose the SS option in the “deciding-for-other” condition. A 2×2 (deciding for self vs. deciding for other) $\times 2$ (SS option vs. LL option) chi-square test revealed a significant association between experimental condition and choice preference, $\chi^2(1, N = 95) = 6.76$, $p = 0.000$, $\phi^2 = 0.06$. That is, participants in the “deciding-for-self” condition preferred the LL option, whereas those in the “deciding-for-other” condition preferred the SS option. This result provides supporting evidence for Hypothesis 1 and suggests a self-other decision-making effect in time-based intertemporal choice.

Table 1. Preference Results Across Conditions in Experiment 1

	SS Option	LL Option
Deciding for self ($N = 45$)		
Deciding for other ($N = 50$)		

Experiment 2

Experiment 2 examined the generality of the self-other decision-making effect in time-based intertemporal choice by modifying the scenario used in Experiment 1. We adapted the scenario to create an athletic training context and added manipulation checks. We then obtained participants' responses to each scenario. The study scenario resembled a school-required task, whereas the training scenario resembled a student-initiated activity. Therefore, we employed a within-subjects design to verify the stability of temporal trade-offs across different contexts. In the training scenario, participants imagined they were athletes undergoing intense training whose teammates proposed a trip to help them relax. Participants indicated their preferences on a 7-point scale.

We also sought to explore the explanatory mechanism underlying self-other differences in time-based intertemporal choice. We hypothesized that when participants chose between LL and SS options, they would consistently select the more beneficial option (Hypothesis 2). This experiment aimed to test this hypothesis.

Participants

One hundred two undergraduate psychology majors from Shandong Normal University participated (77 females, $M_{age} = 19.52$, $SD_{age} = 1.29$). All participants provided oral informed consent and received a small gift as compensation.

Materials and Procedure

Two hypothetical scenarios were used: a study time scenario and a training time scenario, adapted from our previous research (Zhao, Jiang, Zhou, Li, Rao, & Zheng, 2015).

Participants were randomly assigned to two groups—making choices for themselves or for others (their friends)—with each group completing both study and training time scenarios. Unrelated questions (approximately 20 items) were inserted between the two scenarios to prevent carryover effects and balance order effects. Thus, scenario (study time vs. training time) was a within-subjects variable, while decision role (deciding for self vs. deciding for other) was a between-subjects variable. Fifty-four participants were in the “deciding-for-self” condition, and 48 were in the “deciding-for-other” condition. Participants circled a number on a 7-point scale (from 1 = definitely choose A to 7 = definitely choose B) to indicate their choice for themselves or their friend. Subsequently, all participants (regardless of their choice) rated the perceived benefit or loss of “one day of extracurricular activity, two days of extracurricular activity, one day of

travel, and two days of travel” on a 6-point scale ($-3 =$ large loss to $3 =$ large gain). The two hypothetical scenarios and corresponding manipulation checks were as follows:

Study Time Scenario: Participants imagined they/their friend were students experiencing intense studying. A classmate proposed organizing an activity to help everyone relax. Two options were available, and participants indicated their own or their friend’ s preference on a 7-point scale (1 = definitely choose A1, 7 = definitely choose B1). The options were:

A1: Receive 1 day of extracurricular activity time tomorrow

B1: Receive 2 days of extracurricular activity time in one week

Training Time Scenario: Participants imagined they/their friend were athletes undergoing intense training recently. A teammate proposed a trip to help everyone relax. Two options were available, and participants indicated their own or their friend’ s preference on a 7-point scale (1 = definitely choose A1, 7 = definitely choose B1). The options were:

A2: Receive 1 day of travel time tomorrow

B2: Receive 2 days of travel time in one week

Participants were then asked: “Do you consider ‘one day of extracurricular activity/travel or two days of extracurricular activity/travel’ a loss or a gain? Please circle a number on the 6-point scale to indicate your judgment ($-3 =$ large loss, $3 =$ large gain).”

Results and Discussion

[Figure 2: see original paper] shows mean choice preferences across roles (deciding for self vs. deciding for other) and scenarios (study vs. training). ANOVA results revealed a significant main effect of role. Specifically, participants in the deciding-for-self condition preferred the LL option (2 days of extracurricular activity/travel), whereas those in the deciding-for-other condition preferred the SS option (1 day of extracurricular activity/travel), $F(1, 100) = 17.29$, $p = 0.000$, $\eta^2 = 0.15$. Choice preferences did not differ significantly between study and training scenarios, $F(1, 100) = 2.19$, $p = 0.14$, $\eta^2 = 0.02$. Moreover, the interaction between role and scenario was not significant, $F(1, 100) = 0.01$, $p = 0.92$, $\eta^2 = 0.000$, indicating that the self-other decision-making effect was similar across both parallel scenarios. This provides supporting evidence for the generality of the self-other decision-making effect in time-based intertemporal choice.

[Figure 3: see original paper] shows benefit/loss evaluations across conditions (deciding for self vs. deciding for other) and extracurricular activity/travel duration (1 day vs. 2 days). ANOVA results indicated a significant main effect of condition on benefit/loss evaluations. Specifically, ratings were higher in the “deciding-for-self” condition ($M = 1.25$) than in the “deciding-for-other” condition ($M = 0.93$), $F(1, 100) = 5.13$, $p = 0.02$, $\eta^2 = 0.05$. The main effect of

duration (1 day vs. 2 days) was not significant, $F(1, 100) = 2.23$, $p = 0.14$, $\eta^2 = 0.02$. However, the interaction was significant, $F(1, 100) = 10.32$, $p = 0.002$, $\eta^2 = 0.09$. Simple effects analysis revealed that in the “deciding-for-self” condition, ratings did not differ significantly between 2 days ($M2\text{-day} = 1.34$) and 1 day ($M1\text{-day} = 1.16$) of extracurricular activity/travel, $F = 1.68$, $p = 0.20$. In the “deciding-for-other” condition, however, ratings for 1 day ($M1\text{-day} = 1.18$) were significantly higher than for 2 days ($M2\text{-day} = 0.67$), $F = 9.86$, $p = 0.004$. The manipulation check results provide partial support for Hypothesis 2. Although the hypothesis that participants deciding for themselves would perceive greater benefits in LL than SS options was not confirmed, participants clearly preferred LL over SS. We speculate that this preference for LL is emotionally driven; more vivid images of extracurricular activities/travel and greater recall of details produce stronger emotional responses (Miller et al., 1987). In summary, our findings support Hypothesis 2 because participants deciding for others perceived significantly greater benefits in SS options than in LL options.

Experiment 3

Why did participants deciding for others perceive greater benefits in SS options? We hypothesized that in time-based intertemporal choice, they could identify time’s opportunity costs. The following experiment sought to test Hypotheses 3 and 4.

This experiment also explored effective time utilization methods and used a similar nudge intervention to examine the effect of decision role (deciding for others) on reducing actual class time.

Participants

Two hundred six Chinese language undergraduate students from Shandong Normal University participated in a classroom setting (178 females, $M_{age} = 20.34$, $SD_{age} = 0.76$). All participants provided oral informed consent and received a brief class break as compensation.

Materials and Procedure

This experiment used a two-step 2×2 between-subjects design (). Step 1 employed hypothetical scenarios, and Step 2 used a real scenario. Step 1 materials were similar to those in Experiment 2. On the same day, we recruited two classes with 90-minute psychology courses. The first class (110 students) received the deciding-for-self condition, and the second class (96 students) received the deciding-for-other condition. Each condition included two scenarios with balanced order. Participants circled a number on a 7-point scale (from 1 = definitely choose A to 7 = definitely choose B) to indicate their choice. Subsequently, they rated the importance of “studying/training versus extracurricular activity/travel” on a 9-point scale (1 = studying/training is more important, 9 = participating in extracurricular activity/travel is more important).

In Step 2, we told participants they would receive brief free time as a reward for participating (the author served as their psychology instructor). They chose between:

Option A: Receive a 15-minute break during this class

Option B: Receive a 30-minute break in next week' s class

Table 2. Experimental Design for Experiment 3

Step 1: Hypothetical Scenario	Step 2: Real Scenario
Deciding for other → Deciding for self	Deciding for self → Deciding for self

Results and Discussion

[Figure 4: see original paper] shows mean choice preferences across conditions (deciding for self vs. deciding for other) and scenarios (study vs. training). ANOVA results revealed a significant main effect of condition. Specifically, preference scores were significantly higher in the deciding-for-self condition than in the deciding-for-other condition, $F(1, 204) = 10.87, p = 0.001, \eta^2 = 0.05$. In the deciding-for-other condition, participants considered participating in studying/training more important than extracurricular activities/travel. However, in the deciding-for-self condition, they perceived no significant difference in importance between studying/training and extracurricular activities/travel, indicating that the importance of studying/training decreased significantly. This result provides partial support for Hypothesis 3.

Participants' option preferences in the study scenario were similar to those in the training scenario, $F(1, 204) = 0.18, p = 0.07, \eta^2 = 0.00$. Additionally, we found no significant interaction, $F(1, 204) = 0.02, p = 0.89, \eta^2 = 0.00$. Thus, the self-other decision-making effect did not differ across the two similar scenarios, providing further evidence for the generality of this effect in time-based intertemporal choice.

Table 3. Preference Results Across Conditions in Experiment 3

	SS Option	LL Option
Self-self condition: Deciding for self first, then for self ($N = 110$)		
Other-self condition: Deciding for other first, then for self ($N = 96$)		

Results (Table 3) showed that in the self-self condition (deciding for self in both stages), 26 of 110 participants chose the SS option. In the other-self condition

(deciding for other first, then for self), 36 of 96 participants chose the SS option. A 2 (self-self vs. other-self) \times 2 (choice preference) chi-square test revealed a significant association between condition and preference, $\chi^2(1, N = 206) = 4.68$, $p = 0.03$, $\phi^2 = 0.03$. These results indicate that participants in the self-self condition preferred the LL option, but this preference decreased significantly in the other-self condition, with LL preference dropping from 76.36% to 62.50%. Thus, participants in the other-self condition preferred SS more than those in the self-self condition. These results support Hypothesis 4. Consequently, our findings support economic rationality and construal level theory, but not social values theory.

General Discussion

We conducted a series of experimental studies to reveal self-other differences in time-based intertemporal choice. Compared to self-other differences in monetary intertemporal choice, our results show that in time-based intertemporal choice, participants choosing for others preferred SS options and perceived significantly greater benefits in SS than LL options. Participants deciding for themselves preferred LL options over SS options, yet perceived no significant difference in benefits between LL and SS options. We term this phenomenon the self-other decision-making effect in time-based intertemporal choice. This effect was highly consistent across all experiments in this study. To our knowledge, this study is the first to report this novel effect in intertemporal choice.

Our results indicate that the self-other decision-making effect in time-based intertemporal choice cannot be explained by “visceral factors,” participant generosity, or social values theory applicable to monetary intertemporal choice. This is because opportunity costs differ between time and money in intertemporal choice. For money, an option’s opportunity cost is the alternative choice. For time, an option’s opportunity cost includes both the alternative choice and the time cost of the opportunity. Under the influence of visceral factors, people typically behave impulsively (choosing SS) when deciding for themselves. Additionally, those deciding for others usually underestimate or even ignore others’ visceral factors, thus showing more patience (choosing LL). This view directly contradicts the self-other decision-making effect in time-based intertemporal choice. However, the effect can be explained by economic rationality and construal level theory. Experiment 2 demonstrated that regardless of whether participants decided for themselves or others, they always chose the most beneficial option. This result rules out generosity as an explanation. Specifically, participants deciding for others perceived significantly greater benefits in SS options and thus chose SS. Participants deciding for themselves perceived no significant difference in benefits between LL and SS options and thus chose LL (see [Figure 3: see original paper]). Therefore, the utility of LL options differed significantly between conditions. We speculate that in the deciding-for-other condition, increased social distance led participants to form high-level construals and identify time’s opportunity costs (Level 3 of economic rationality). This

suggests that participants could identify each option' s opportunity costs and chose SS when they found LL' s opportunity costs higher than SS' s.

Experiment 3' s results showed that in the deciding-for-other condition, participants considered studying/training more important than extracurricular activities/travel. However, this importance decreased significantly in the deciding-for-self condition; that is, participants perceived no significant difference in importance between studying/training and extracurricular activities/travel (see [Figure 4: see original paper]). This result supports economic rationality and construal level theory while ruling out social values theory. Participants deciding for others formed high-level construals and could identify time' s opportunity costs. Therefore, the deciding-for-other condition may increase attention to each option' s opportunity costs, leading people to prefer alternatives with lower opportunity costs (i.e., one day of extracurricular activity/travel has lower opportunity costs than two days) over the other (see [Figure 4: see original paper]). Combined with other research (Kray, 2000; Jonas et al., 2005; Polman, 2010; Polman & Emich, 2011; Liu, Polman, Liu, & Jiao, 2018), this study suggests that people making choices for others (i.e., agentic decision-makers) investigate and seek more information (alternatives, attributes, and opportunity costs) than those choosing for themselves (i.e., personal decision-makers). Resisting impulsive and myopic tendencies to increase goal-directedness often requires self-control (Baumeister, 2002; Houben & Jansen, 2011; Tsukayama, Duckworth & Kim, 2012). The self-other decision-making effect in time-based intertemporal choice reported in this study can be generated simply by reframing the problem, thereby helping individuals make optimal long-term choices without requiring increased self-control.

Our study has three limitations. First, the two scenarios (study and training) used a within-subjects design. The similarity between scenarios was so obvious and demand characteristics so high that participants likely responded to the second scenario based on their reactions to the first. A between-subjects design might counteract this effect and would be more appropriate. Future research would benefit from examining scenarios involving time spent on other activities, such as educating children, physical exercise, earning money for the future, or engaging in other productive activities.

Second, subjective time perception plays an important role in time-based intertemporal choice but was not addressed in this study. Research shows that time perception is a concave function of objective time and can play a key role in generating temporal discounting behavior (Han & Takahashi, 2012; Takahashi, Oono, & Radford, 2008; Zauberman, Kim, Malkoc, & Bettman, 2009). Other studies show that perceptions of future time depend on outcome characteristics, such as magnitude. Future time is perceived as shorter in loss domains than gain domains (Bilgin & Leboeuf, 2010), shorter for larger reward magnitudes (Wang, Wang, & Keller, 2015), and shorter when outcomes are associated with more intense emotions (van Boven, Kane, McGraw, & Dale, 2010). Future research should examine how subjective time perception influences the self-other

decision-making effect in time-based intertemporal choice.

Third, caution is warranted regarding this effect's existence because the experimenter emphasized the study and training contexts. Without emphasizing these contexts, participants might view extracurricular activities and travel as pleasure, entertainment, and relaxation rather than "wasting time." In this argument, impure scenarios might activate social values that appreciate studying and training more. Therefore, further research should investigate whether this study's results vary depending on scenario emphasis or even produce different outcomes in gift-giving scenarios (Lu, Liu, & Fang, 2016).

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