

Early Death, Early Rebirth: A “Freedom from Concerns” Interpretation of Negative Discounting

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Abstract

Faced with future negative events, discounting theory holds that people should, and empirical observations similarly find that people actually choose to delay negative events, such as defaulting on payments, late payment of fines, taxes, and debts, and such delay undoubtedly leads to tremendous waste of individual and social costs. However, some studies have also found results that deviate from the predictions of discounting theory. This study proposes and explores a possible explanation for reversing the aforementioned preference, namely the “concern-elimination” explanation. We designed five studies, including both laboratory and field studies, and the results revealed that when there are subsequent concerning matters, student participants prefer to experience negative events earlier (in this study, namely an oral exam), and the degree of rumination induced by subsequent concerning events plays a mediating role. It is particularly noteworthy that the findings of this study indicate that this method of setting up subsequent concerning matters is a stable and effective behavioral nudge that can be readily comprehended by prospective users. In short, the role that setting up “concerning matters” in this study plays in “preferring immediate negative events” is analogous to the role that setting up “out-group threat” in the Robbers Cave experiment plays in “in-group cooperation” .

Full Text

Early Departure, Early Revival: A “Free from Care” Account of Negative Temporal Discounting

1.1 Possible Explanations

Previous research has attempted to explain the phenomenon of negative temporal discounting. For instance, Mischel et al. (1969) argued that negative discounting reflects individuals’ efforts to avoid the process of waiting for an

aversive stimulus, since waiting itself is an unpleasant experience. Therefore, people prefer to experience negative events as soon as possible to minimize unpleasantness. Consistent with this view, Loewenstein (1987) proposed a theoretical model to explain negative temporal discounting, suggesting that individuals experience anticipatory dread (a term originally derived from Jevons' 1905 concept of "anticipal pain") while waiting for future negative events (such as electric shocks), making delayed negative events more aversive. Harris (2012) further speculated that this dread differs from fear and "may include a broader range of emotional and cognitive factors" (p. 27). However, although previous studies have proposed anticipatory dread as a potential psychological mechanism underlying negative temporal discounting, experimental data supporting the nature of this dread—for example, what emotional and cognitive factors it comprises—remain scarce. Recently, Sun et al. (2015) investigated whether individuals experience additional psychological feelings (outgrowth) while waiting for future negative events. Through content analysis, they revealed that waiting for negative events generates two psychological components: anticipatory emotion and anticipatory rumination. The former refers to the accumulation of negative emotions triggered by the future negative event during the waiting period, while the latter refers to the involuntary preoccupation with the worrisome event that occupies cognitive resources and affects the completion of subsequent tasks. Building on this, Sun et al. (2015) subsequently measured anticipatory emotion and systematically examined its role in negative temporal discounting. However, anticipatory rumination during the waiting period has not been specifically measured, nor has its influence mechanism in negative discounting been further explored. Following Sun et al.'s (2015) research logic: increased anticipatory negative emotion (i.e., the emotional component) would drive individuals to prefer earlier occurrence of negative events. Consistently, the purpose of this study is to use the "rumination" component identified by Sun et al. as an entry point to test whether the logic that the emotional component drives individuals to "choose earlier negative events" also applies to the "rumination" component.

According to cognitive resource theory, various conscious mental activities or external behaviors must rely on available cognitive resources, which are limited and consumed by tasks within a specific time frame (Kahneman, 1973). Moreover, emotion regulation can be viewed as a type of task that consumes cognitive resources and affects cognitive performance (Gross & Levenson, 1997). Therefore, this study speculates that when facing negative events, individuals' rumination about these events occupies limited cognitive resources, which will affect other subsequent tasks or events that also consume cognitive resources (hereinafter referred to as "something tying one up").

We hypothesize that rumination during the waiting period for negative events (i.e., care/concern) occupies limited cognitive resources, and adding "something tying one up" after the negative event also triggers additional rumination (i.e., care), further increasing overall rumination during the waiting period and thus burdening limited cognitive resources. Only when the negative event is elimi-

nated promptly will it not affect the quality of completion of subsequent events. Therefore, the research hypothesis is: manipulating “additional rumination generated by adding something tying one up” will, like “anticipatory emotion caused by delaying negative events,” prompt “negative events” to occur earlier. Accordingly, we propose the “free from care” account: removing the concern about negative events (i.e., “early death”) to reserve sufficient time and energy to ensure the quality completion of subsequent events that tie one up (i.e., “early revival”).

1.2 Overview of Studies

This paper systematically examines the role of distracting rumination (i.e., the “free from care” account) in negative discounting phenomena in intertemporal choice through five studies. Specifically, Study 1 verifies the existence of negative discounting in negative intertemporal decision events; Studies 2 and 3 examine how the degree of “care” added after negative events influences preferences for negative intertemporal events. Meanwhile, we test the mediating role of additional rumination triggered by these care-inducing events in the above preferences, providing preliminary verification of the “free from care” account. Study 4 explores the boundary conditions of how “care” events influence preferences for immediate negative events, providing more direct evidence for the free from care account. Study 5 employs a more ecologically valid field study to further confirm the “free from care” account in negative intertemporal event choice.

Study 1: Early Exam or Late Exam?—Preference for Negative Intertemporal Events

Study 1 explores whether student participants, when choosing between an early or late exam, (1) perceive the “oral exam” as a negative event, and (2) exhibit intertemporal preferences consistent with negative discounting: a preference for immediate negative events. To this end, we adopted the research scenario from Sun et al. (2015), asking student participants to choose which day (within a 1–7 day range) to take the oral exam and to rate whether they perceived the oral exam as a negative event.

2.1.1 Participants

Based on Sun et al. (2015), we anticipated an effect size of $d = 0.40$. G*Power analysis indicated that at least 52 participants were needed to achieve statistical power of 0.8. Considering that invalid data might reduce the sample size in the formal experiment, we recruited 60 undergraduate students from Jinan University as participants. One invalid participant was excluded for failing to complete the study, leaving a final sample of 59 valid participants with a mean age of 21.24 (SD = 1.15) years, including 22 males and 37 females. As the study was anonymous and posed no ethical or physical harm, we obtained verbal consent

from student participants before data collection. All participants had the right to refuse or withdraw from the study at any time and received course credit upon completion.

2.1.2 Materials and Procedure

This experiment adopted the “oral exam” scenario from Sun et al. (2015), designing the “oral exam” as a negative event in an intertemporal choice task. First, participants completed a negative event intertemporal choice task by selecting which day (1-7) to hold the oral exam. To operationally verify whether participants perceived the “oral exam” as a negative event, they subsequently rated on a 9-point scale (1 = not at all, 9 = completely) whether the oral exam was negative. The research instructions were presented as follows:

Please imagine the following scenario: Your English teacher requires each student to take an oral exam, with judges present to assign grades on-site. The oral exam score constitutes an important component of your final course grade.

The content and format of the oral exam will be selected on-site and do not require advance preparation. Please choose which day you would like to take the oral exam (1 = Day 1, 7 = Day 7).

2.2 Results and Discussion

2.2.1 Manipulation Check Participants’ mean rating of whether the oral exam was negative was 5.71 (SD = 1.53). Since 1 represented “not at all,” 5 represented “neutral,” and 9 represented “completely,” a one-sample t-test against the theoretical midpoint of 5 revealed that participants’ mean evaluation was significantly greater than 5, $t(58) = 3.57$, $p < 0.001$, indicating that Chinese student participants in this study indeed perceived the English oral exam as a negative event. Furthermore, participants’ evaluation of the oral exam was significantly negatively correlated with their choice preference, $r = -.27$, $p = .039$, suggesting to some extent that individuals who perceived the oral exam as more negative were more likely to choose to take it earlier.

2.2.2 Negative Intertemporal Event Choice Following Hardisty and Pfiffer (2016), this study and subsequent studies measured preference for negative intertemporal events by using the average number of days chosen for the negative event to occur.

For the oral exam, all participants chose to take it on average on day 1.86 (SD = 1.31). First, an independent samples t-test on the chosen oral exam times for male and female participants revealed no significant gender difference; therefore, data analysis in this and subsequent studies did not distinguish by gender. A chi-square analysis of the number of participants choosing different time points for the course exam indicated that the distribution was not uniform across the seven days, $\chi^2(5, N = 59) = 75.34$, $p < 0.001$, $\Phi G = 0.46$ (see Table 1).

Study 1 results indicate that our student participants indeed perceived the “oral exam” as a negative event and exhibited negative discounting. These findings are consistent with existing research (Siemer, 2008; Sun et al., 2015). For example, Sun et al. (2015) found that when waiting for negative events, individuals are more inclined to experience them earlier, demonstrating the phenomenon of negative temporal discounting.

Study 2: “Something to Do” or “Nothing to Do”?: The Effect of “Something Tying One Up” on Preference for Negative Intertemporal Events

Study 1, along with Sun et al. (2015), found that student participants, when choosing between an early or late oral exam (viewed as a negative event), preferred to complete it as soon as possible, demonstrating negative temporal discounting. However, the psychological mechanism underlying this preference effect remains unclear. Therefore, Study 2 and subsequent studies examine the “free from care” explanation for negative discounting. Based on the free from care account and limited resource theory (Kahneman, 1973; Sun et al., 2015), Study 2 hypothesizes that when faced with the choice of completing a negative event early or late, individuals under conditions with subsequent “something tying one up” will prefer to complete the negative event earlier than those without such subsequent concerns (Hypothesis 1). Additionally, we propose that the effect of adding a care-inducing event after the negative event on this choice preference occurs through the mediating role of rumination triggered by the care-inducing event (Hypothesis 2).

3.1.1 Participants

Based on previous similar research requiring an effect size of $d = .60$ (Hardisty et al., 2013), we determined that at least 90 participants were needed (G*Power 3.1). Therefore, we recruited 75 undergraduate students from Jinan University. Forty-three participants (12 males, 31 females) were assigned to the “something tying one up” condition, and 32 participants (10 males, 22 females) were assigned to the “nothing tying one up” condition. The mean age was 20.80 ($SD = 1.23$) years. As the study was anonymous and posed no ethical or physical harm, we obtained verbal consent before data collection, and participants had the right to refuse or withdraw at any time. All participants volunteered and had not participated in similar studies. They received course credit or a small gift upon completion.

3.1.2 Materials and Procedure

The dependent variable in this study was preference for negative intertemporal events, with the negative event being the same oral exam as in Study 1: participants chose which day (1-7) they preferred to take the oral exam. This negative event intertemporal choice task was used in all subsequent studies.

The independent variable was the presence or absence of “something tying one up” on Day 10 after the negative event. In the “something tying one up” condition, participants were asked to imagine the following scenario: “You are required to present a psychology paper from a top-tier journal in 10 days.” In contrast, in the “nothing tying one up” condition, participants were asked to imagine: “You are invited to attend a class gathering in 10 days that requires no organization or planning on your part.” A schematic diagram of the research procedure is shown in Figure 1 [Figure 1: see original paper].

To examine the degree of rumination (i.e., care) triggered by the care-inducing event, all participants in both conditions completed: (1) the same negative intertemporal event choice task as in Study 1; and (2) a 9-point rating of the degree of rumination about the care-inducing event (class gathering or paper presentation) occurring in 10 days: “To what extent will you repeatedly think about and be preoccupied with this event?” (9 = very much, 1 = very little).

3.2 Results and Discussion

3.2.1 Choice Preference Intertemporal choice preferences are shown in Table 2. An independent samples t-test on the average number of days chosen for the oral exam revealed that participants in the “something tying one up” condition ($M = 3.45$, $SD = 2.09$) chose significantly earlier dates than those in the “nothing tying one up” condition ($M = 4.59$, $SD = 1.92$), $t(72) = -2.42$, $p = 0.018$, Cohen’s $d = 0.57$. This result supports Hypothesis 1, indicating that when there is a subsequent “something tying one up,” participants prefer to complete the oral exam earlier compared to when there is no such subsequent concern.

3.2.2 Mediation Analysis To test Hypothesis 2, we first analyzed the degree of rumination triggered by the “something tying one up.” Specifically, participants’ average “care” rating for the “paper presentation” in 10 days was 6.23 ($SD = 1.46$), while their average “care” rating for the “class gathering” was 3.59 ($SD = 1.70$). An independent samples t-test revealed that participants’ rumination about the paper presentation was significantly greater than that about the class gathering, $t(73) = 7.21$, $p < 0.001$, Cohen’s $d = 1.67$.

We then conducted a mediation analysis to examine whether rumination mediated the relationship between the care condition and preference for immediate negative events. Regression analysis indicated that the care condition was positively correlated with rumination, $B = .65$, $t(73) = 7.21$, $p < .001$, and negatively correlated with negative event choice preference, $B = -.27$, $t(73) = -2.42$, $p < .01$. Similarly, rumination was negatively correlated with preference for the oral exam, $B = -.38$, $t(73) = -3.71$, $p < .001$. Using the bootstrap procedure (Preacher & Hayes, 2004) with 5,000 random samples at a 95% confidence interval, the results indicated that, consistent with Hypothesis 2, rumination mediated the relationship between the care condition and negative event choice preference, $B = -.25$, $CI: [-.431, -.064]$. This suggests that when a care-inducing

event exists, it triggers additional rumination (care), which, due to limited cognitive resources, prompts individuals to prefer ending the negative event as soon as possible.

[Figure 2: see original paper]

Study 2 provides preliminary evidence for our proposed “free from care” explanation for negative discounting. However, this study manipulated the presence or absence of care using two different tasks requiring different amounts of time and effort. Additionally, confounding variables such as participants’ emotional experiences during the negative event need further clarification. Therefore, Study 3 was designed to further test the robustness of the free from care explanation by using the same task to manipulate the degree of care while also requiring participants to assess positive and negative emotions experienced during the oral exam.

Study 3: More Care or Less Care?: The Effect of Degree of “Care” on Preference for Negative Intertemporal Events

4.1.1 Participants

Based on the results of Studies 1 and 2, we recruited 96 undergraduate students from Jinan University. Seven participants were excluded for failing to complete all measures, leaving a final sample of 89 valid participants (69 females, 20 males) with a mean age of 21.63 (SD = 1.99) years. All participants volunteered, provided informed consent, had not participated in similar studies, and received course credit upon completion.

4.1.2 Materials and Procedure

This study employed a single-factor between-subjects design. The dependent variable was participants’ choice preference in the negative intertemporal event, which was the same oral exam used in Studies 1 and 2. The independent variable was adapted from the “class gathering” task in Study 2, which served as the “no care” level in this study’ s three-level manipulation. We developed two additional levels: low care and high care (as shown in Figure 3 [Figure 3: see original paper]).

The instructions for measuring the three levels of the independent variable were identical except for the italicized content in parentheses: “Please imagine you are invited to attend a class gathering in 10 days (‘as a class member, you do not need to undertake any organizational tasks’).”

- 1) In the no care condition, the parenthetical statement was: “as a class member, you do not need to undertake any organizational tasks.”
- 2) In the low care condition, the parenthetical statement was: “as an assistant to the class monitor, you need to complete the following tasks: a) write the gathering plan; b) reserve the restaurant; c) count attendance.”

- 3) In the high care condition, the parenthetical statement was: “as the class monitor, you need to complete the following tasks: a) write the gathering plan; b) draft the activity process; c) reserve the restaurant; d) count attendance; e) collect participation fees; f) purchase beverages and other items.”

Thirty participants (28 females) were assigned to the “no care” condition, 27 participants (18 females) to the “low care” condition, and 32 participants (23 females) to the “high care” condition. All participants completed three types of tasks: (1) a choice task: the same negative intertemporal event “oral exam” choice as in Studies 1 and 2; (2) a rating task: after making their choice, participants rated the degree of rumination (i.e., care) triggered by the “care” event occurring in 10 days: “To what extent will you repeatedly think about and be preoccupied with this gathering activity?” (9 = very much, 1 = very little); and (3) an emotion assessment: participants evaluated their emotional experience regarding the oral exam (1 = not at all, 9 = very much). Following Sun et al. (2015), we measured both positive emotions (excitement and thrill) and negative emotions (anxiety and worry) triggered by the oral exam.

4.2 Results and Discussion

4.2.1 Choice Preference Participants’ preferences for the negative intertemporal event are shown in Table 3. In the high care condition, participants chose to take the oral exam on average on day 3.19 (SD = 1.26); in the low care condition, the average chosen day was 3.97 (SD = 1.77); and in the no care condition, it was 4.33 (SD = 1.57). A one-way ANOVA on the average number of days chosen for the oral exam across the three care conditions revealed a significant difference, $F(2, 86) = 4.33, p = .016$. Post-hoc comparisons showed that the difference between the high care and no care conditions was significant ($p = 0.006$), as was the difference between high care and low care ($p = 0.05$). These results indicate that when there were more care-inducing tasks, participants were more inclined to choose earlier dates for the oral exam compared to the low care and no care conditions.

Meanwhile, we integrated different types of positive and negative emotions to examine emotional differences across care conditions. A 3×2 ANOVA on emotion intensity revealed only a significant main effect of valence, $F(1, 80) = 48.06, p < .001, \eta^2 = .38$, indicating that the intensity of negative emotions triggered by the negative event (5.57 ± 1.62) was significantly higher than that of positive emotions (3.66 ± 1.95). This further confirms that the English oral exam scenario was perceived as a negative event in this study.

4.2.2 Mediation Analysis To test our hypothesis, we first examined participants’ rumination across conditions. The average rumination rating was 5.44 (SD = 1.97) in the high care condition, 4.47 (SD = 1.76) in the low care condition, and 3.11 (SD = 1.89) in the no care condition. A one-way ANOVA revealed significant differences among the three conditions, $F(2, 86) = 11.31, p$

< 0.001 , $p^2 = 0.21$, with post-hoc comparisons showing significant differences between all pairs: rumination in the high care condition was significantly higher than in both the low care ($p = .045$) and no care ($p < .001$) conditions.

We then conducted a mediation analysis to examine whether rumination mediated the relationship between care condition and preference for immediate negative events. Regression analysis showed that care condition was positively correlated with rumination, $B = .45$, $t(88) = 4.76$, $p < .001$, and negatively correlated with negative event preference, $B = -.69$, $t(88) = -2.42$, $p < .01$. Using the bootstrap procedure (Preacher & Hayes, 2004) with 5,000 random samples at a 95% confidence interval, the results indicated that, consistent with Hypothesis 2, rumination triggered by the care-inducing event mediated the relationship between care condition and preference for immediate negative events, $B = -.32$, CI: $[-.471, -.178]$. This suggests that care-inducing events trigger additional rumination, which, due to limited cognitive resources, leads individuals to prefer ending negative events as soon as possible.

[Figure 4: see original paper]

Building on Study 2's manipulation of the presence or absence of "something tying one up" using two different tasks, Study 3 manipulated the degree of care using the same task. The results from both studies confirm our predictions: compared to the "no care" condition, when there is "something tying one up" (regardless of degree), participants are more willing to experience the negative event earlier (take the oral exam sooner). The pattern of preferences demonstrated by these results aligns precisely with the notion of "early death, early revival."

Study 4: Inside or Outside the Interval?: The Effect of Timing of "Something Tying One Up" on Boundary Conditions of Negative Intertemporal Events

Studies 2 and 3 demonstrated that the more participants cared about subsequent events, the more they preferred earlier options. Study 4 further manipulated the timing of the care-inducing event to explore boundary conditions for the negative discounting effect. According to the free from care account: removing the negative event (i.e., "early death") is intended to free up time and energy to ensure the completion of the "something tying one up" (i.e., "early revival"). Based on this logic, we speculate that whether the care-inducing event occurs inside or outside the time interval of the negative event will affect people's choices about when the negative event should occur.

Only when the care-inducing event occurs outside the time interval of the negative event (see Figure 5 [Figure 5: see original paper]) does choosing to remove the negative event early (i.e., "early death") make sense—it can reserve sufficient time and energy to address the "something tying one up."

If the care-inducing event occurs inside the time interval of the negative event:

(1) participants would not want to schedule the exam on the same day as the care-inducing event, because the class gathering (the care-inducing event) would distract them from the negative event (likely no one would choose this option); and (2) participants would most prefer to schedule the exam after the care-inducing event, because delaying the exam would make sense: a later exam could reserve sufficient time and energy to address the “negative event” itself.

Therefore, we propose two working hypotheses: Hypothesis 3: If the care-inducing event occurs outside the time interval of the negative event, people will prefer to complete the negative event on an earlier date (early death). Hypothesis 4: If the care-inducing event occurs inside the time interval of the negative event, then: (1) people will be least willing to schedule the exam on the same day as the care-inducing event; and (2) people will prefer to complete the negative event on a later date (delayed death).

5.1.1 Participants

Participants were 85 undergraduate students from Jinan University (46 females) with a mean age of 21.26 ($SD = 1.70$) years. All participants volunteered, had not participated in similar studies, and received course credit upon completion.

5.1.2 Materials and Procedure

The dependent variable (oral exam) was identical to Studies 1–3. The independent variable measurement used the same class gathering task as Studies 2 and 3 (specifically, the high care condition from Study 3—requiring participants to organize the entire class gathering as the event planner). The difference was that in previous studies, the care-inducing event always occurred outside the time interval of the negative event, whereas in this study, the care-inducing event timing had two possibilities: inside the time interval (Day 4) or outside the time interval (Day 10) of the negative event (as shown in Figure 5). The inside interval condition (Day 4) and outside interval condition (Day 10) were equidistant from the deadline of the negative intertemporal decision event (Day 7) to control for possible confounding effects of time interval.

Each participant was assigned to one experimental condition. Forty-eight participants (35 females) were in the condition where the “care” event occurred inside the interval, and 37 participants (11 females) were in the condition where it occurred outside the interval.

[Figure 5: see original paper]

5.2 Results and Discussion

The average chosen time (in days) for the oral exam differed significantly between the two timing conditions: when the care-inducing event occurred inside the interval, participants chose on average Day 4.83 ($SD = 1.52$), whereas when it occurred outside the interval, participants chose on average Day 3.35 ($SD =$

1.53). An independent samples t-test revealed a significant difference between the two conditions, $t(83) = 3.5$, $p < 0.01$, Cohen' s $d = 0.7$, indicating that when the care-inducing event occurred outside the time interval of the negative event, participants were significantly more inclined to take the oral exam earlier (compared to when it occurred inside the interval).

Study 4' s results support our two hypotheses regarding the free from care account: student participants prefer to choose earlier dates to complete the oral exam (removing the negative event) (i.e., “early death”) in order to free up time and energy to ensure the completion of the class gathering (the “care”event) (i.e., “early revival”). Otherwise, so-called early revival (i.e., successfully organizing the class gathering) would become impossible. However, in all studies from Study 1 to Study 4, we used hypothetical scenarios to measure the independent and dependent variables, so whether our findings apply to real-world settings outside the laboratory remains unverified. To enhance the ecological validity of our results, Study 5 sought to confirm our findings in a real environment.

Study 5 (Field Study): Intertemporal Decision-Making with Real Negative Events and Real Care-Inducing Events

Study 5 aimed to further test the free from care account of negative discounting in a real-world setting. To this end, we selected a natural class enrolled in a psychology course at a university in Guangzhou for a field experiment. The course met once per week for twenty sessions (Weeks 1-20), with Week 21 (January 18, 2016) being the final exam week for all subjects. The course required students to complete two oral presentations (i.e., oral exams) during the semester—one early and one late. Each student needed to: (1) choose a date for their presentation within designated time periods, and (2) actually complete the oral exam (10 minutes) on their chosen date. This course feature allowed us to examine students' preferences for oral exam timing at different distances from the final exam, using the actual temporal distance from the “care-inducing event” (the final exam) to manipulate the degree of care (as shown in Figure 6 [Figure 6: see original paper]).

As a field study, Study 5 differed from previous studies in several aspects. First, the negative event used in this study (the dependent variable: oral exam) was a real rather than hypothetical oral exam: once student participants chose a specific week for their oral exam within the designated time period, they had to actually attend and complete it. Second, the “care-inducing event” in this study was also students' real final exam rather than a fictional event. We manipulated the degree of care about this event by setting the temporal distance from the final exam. Specifically, students chose when to complete the oral exam either early in the semester or during the last six weeks of the semester. We speculated that at the beginning of the semester, the distant final exam was a “low care” event, whereas at the end of the semester, with final exams approaching across subjects, it became a “high care” event. Our field experiment ran from early October 2015 to January 2016.

6.1.1 Participants

A natural class of 50 undergraduate students enrolled in a psychology course at a university in Guangzhou was selected, including 33 females and 17 males, with a mean age of 20.13 (SD = 0.88) years. To maintain authenticity, we did not provide gifts or course credit as experimental compensation to avoid making student participants aware they were participating in a study.

6.1.2 Procedure

Study 5 used a single-factor within-subjects design. The dependent variable was the timing of participants' oral exam choice for the course. The independent variable was "care": the first oral exam occurred early in the semester (i.e., low "care" condition), with the instructor assigning the first presentation on September 30, 2015, allowing each student to choose which week between October 8, 2015, and November 12, 2015 (6 weeks) to present; the second oral exam occurred near the final exam week (i.e., high "care" condition), with the second presentation assigned on December 3, 2015, allowing students to choose which week between December 10, 2015, and January 14, 2016 (6 weeks) to present, with a one-week (7-day) interval between options. After choosing, each student presented on their selected date, and the two presentation scores contributed to their final grade for the educational psychology course.

[Figure 6: see original paper]

Additionally, to verify whether students' care about the final exam differed between the beginning and end of the semester, and to prevent participants from guessing that the final exam was the experimental care-inducing event, we did not ask the formal field study participants to rate their care level. Instead, we recruited 30 students from a parallel class in the same grade (18 males, 12 females, mean age = 21.1 ± 1.20 years) and asked them to rate at the beginning (Week 6) and end (Week 15) of the semester: "To what extent will you repeatedly think about and be preoccupied with the final exams for all subjects?" (9 = very much, 1 = very little).

6.2 Results and Discussion

6.2.1 Manipulation Check The average care rating was 3.60 (SD = 1.85) at the beginning of the semester and 5.87 (SD = 1.61) at the end. A paired samples t-test revealed that participants' rumination about the final exams at the end of the semester was significantly greater than at the beginning, $t(29) = -5.50$, $p < 0.001$, confirming that manipulating the presence of "something tying one up" by the semester period (beginning vs. end) was effective.

6.2.2 Choice Preference The average chosen time (in weeks) for the oral exam was 3.80 (SD = 1.46) weeks at the beginning of the semester (out of 6 weeks) and 1.76 (SD = 0.59) weeks at the end. A paired samples t-test revealed that compared to the first test at the beginning of the semester, participants

at the end of the semester were significantly more inclined to experience the negative event (oral exam) earlier, $t(49) = 14.59$, $p < 0.001$.

As shown in Table 5, when we categorized the first three class sessions as “near-term options” and the last three as “far-term options” for the early-semester oral exam, 17 participants (34%) chose near-term options and 33 (66%) chose far-term options. A chi-square test revealed significantly more participants chose far-term than near-term options, $\chi^2(1, N = 50) = 5.12$, $p = 0.024$, $\Phi G = 0.32$. In contrast, for the end-of-semester exam, all 50 participants (100%) chose near-term options. A 2 (beginning vs. end of semester) \times 2 (near-term vs. far-term) McNemar test revealed a significant difference, $\chi^2(1, N = 50) = 31.03$, $p < 0.001$. These results show that at the beginning of the semester, participants preferred to delay the negative intertemporal event, but as the final exam approached, their preference reversed, and they became more inclined to end the negative event as soon as possible.

[Figure 7: see original paper]

Study 5’s findings achieved our expected results: seeking to further confirm previous findings in a real-world environment. The clever aspect of Study 5 is that it subtly manipulated the degree of care by utilizing the temporal distance between the oral exam date and the final exam date. Without viewing the results from the “free from care” perspective, it would be difficult to explain why the same negative intertemporal event elicited such different real choice preferences at the end versus the beginning of the semester.

General Discussion

According to discounting theory, when making intertemporal decisions in loss contexts, people should exhibit a behavioral preference for discounting future losses (Harvey, 1994; Loewenstein, 1992; Mazur, 1984). In reality, people typically delay experiencing negative events (e.g., postponing vaccinations, delaying fine payments and loan repayments, putting off academic tasks). This preference for delaying negative events in intertemporal choice can cause substantial waste of individual and societal resources in health, development, medical, and other domains. Negative discounting phenomena can avoid such waste. In these situations, the reversed preference (i.e., negative discounting that violates discounting theory) should be promoted due to its social value. Although current understanding of the relevant psychological mechanisms is developing, the academic community knows much less about positive discounting phenomena, let alone negative discounting involving future losses. To explore an intervention method consistent with negative discounting in future losses, this study proposes a novel account to help people make more beneficial decisions for individuals and society in intertemporal choice.

This paper systematically verified the “free from care” psychological mechanism through five studies. Study 1 found that people indeed prefer near-term options in negative event intertemporal decisions. Study 2 found that under conditions

with “something tying one up,” individuals are more inclined to choose earlier experiences of negative events, with indirect evidence suggesting that rumination triggered by the care-inducing event mediates this preference. Study 3 further manipulated the degree of “care,” showing that compared to the “no care” condition, participants in the “high care” condition were more inclined to experience negative events earlier. Corresponding mediation analysis revealed that care-induced rumination promoted preference for immediate negative events. Study 4 demonstrated that the timing of the “care” event (relative to the negative event) influences preferences for negative intertemporal events. This result further clarifies our free from care account: removing the negative event early is intended to free up time and energy to ensure the completion of subsequent care-inducing events (“early death”). If the care-inducing event occurs before the negative event—that is, the class gathering occurs inside the time interval (Day 4)—early death becomes unnecessary, and the effect would be unlikely to emerge. Finally, to verify the ecological validity of our findings, we conducted a field study in Study 5. Together, these results provide deeper understanding of our free from care account.

Traditional decision theories view decision-making as a cognitive process of “considering various factors among given dimensions (or attributes) to make a choice,” following the principle of maximizing subjective value (Kahneman & Tversky, 2000; Luce, 1959). However, research shows phenomena that violate traditional decision theories, such as negative discounting. Some researchers have explained this by modifying the representation space, arguing that people rely not only on given dimensions but also make decisions on additional generated dimensions. Building on this, some theories have attempted to explain why people discount future losses—that is, why we want to experience negative events earlier (Li, 2016; Rao et al., 2014). However, to our knowledge, their focus has primarily been on negative emotions, with cognitive components mentioned but not directly measured (Harris, 2012; Sun et al., 2015). Following Sun et al. (2015), this paper further explores the psychological mechanism underlying negative discounting. Our difference lies in focusing on “anticipatory rumination” (i.e., the cognitive component) rather than “anticipatory negative emotion” (i.e., the emotional component), and our study attempts to systematically explain negative discounting from the cognitive component level.

Our findings appear to violate discounting models, and existing discounting models cannot explain our results. Upon examining the results, we speculate that, at least in this study, our participants did not follow a discounted utility loss-minimization process when making intertemporal decisions in the loss domain. Sun et al.’s (2015) research on negative emotions still employed the discounted utility loss-minimization framework to analyze their observed negative discounting phenomenon. That is, people add the negative emotions generated during waiting to the delayed loss option, making that option’s negative utility larger, thus leading them to choose the immediate negative event option with smaller negative utility. In contrast, in our study, participants did not use this loss-minimization strategy to reach decisions. Our research provides evidence

that, at least in our experimental context, people choose immediate negative event options not because they perceive the immediate option as having smaller overall utility, but because only by completing the negative event early can they free up time and energy to complete subsequent care-inducing events.

Referring to Sherif, Harvey, White, Hood, & Sherif's (1961) classic Robbers Cave experiment, our research results and theoretical explanation become more readily understandable. That experiment distilled a simple and effective method to promote cooperation: when group members encounter external threats, they shift from competition to cooperation. Similarly, this study also discovered a method that can promote earlier experience of negative events. When people face subsequent care-inducing events (cf. external threats), they shift from preferring to delay negative events (cf. competition) to preferring immediate negative events (cf. cooperation). Both methods share a common feature: they use a “third hand” —setting up external events (threats or care)—to facilitate something difficult (counter to habit) but beneficial to happen earlier.

Our discovered “early death, early revival” account is both reliable and reproducible, leading us to recommend its use as a simple and effective behavioral nudge: simply establishing a care-inducing event can nudge people toward preferring earlier experiences of negative events. Life offers numerous examples where delaying negative events harms society, which could be improved through nudge methods. Among many examples, tax return filing delay and manuscript reviewing are two instances sharing similar characteristics with our oral exam scenario. Since journal reviewing, like oral exams, is time- and energy-consuming, many reviewers who accept invitations weeks or months in advance keep delaying completion, which is undoubtedly a nightmare for young scholars urgently needing publications for promotion. If reviewers are given a subsequent care-inducing event, they may be more willing to handle manuscripts earlier. Similarly, tax filing is also troublesome for many people who keep delaying; setting up a subsequent care-inducing event might avoid the social resource waste caused by delayed filing (Demshock, 2016; Lorence, 2015).

In short, our discovered method of setting up an “external enemy” (subsequent care-inducing event) shows promise for inclusion in the nudge technique toolkit. Through our work, we hope to join the ranks of behavioral scientists dedicated to nudging, collectively contributing to improving people's health, wealth, and happiness (Leonard, 2008; Thaler & Sunstein, 2008).

Despite these contributions, this study has several limitations requiring further exploration in future research. First, we used the English oral exam scenario as the negative event to explore the free from care account of negative discounting. Future research could expand the scenarios to include monetary loss, air quality, and waste management (Guyse & Simon, 2011). Recent studies have shown that negative discounting also exists in contexts of monetary loss and deteriorating air quality (Hardisty & Weber, 2009; Sun et al., 2015). Additionally, previous research has speculated that negative discounting should exist in both positive and negative domains (Loewenstein & Prelec, 1993; Read & Powell, 2002). Fu-

ture studies should verify our results and the mechanism of negative discounting in other domains.

Second, in Study 4, we set up a care-inducing event on Day 10 outside the time interval that triggered rumination and distraction. However, the effect of the “outside the interval” condition on negative intertemporal events should have boundary conditions, providing an avenue for future research. For example, the “outside the interval” condition may be influenced by the temporal distance between the care-inducing event and the final date of the negative event. According to construal level theory, temporal distance is a fundamental dimension of psychological distance; events farther from the individual are represented as high-level construals, while nearer events are represented as low-level construals (Liberman et al., 2007). Many studies have explored the impact of psychological distance on decision preferences (Liberman et al., 2002; Trope & Liberman, 2003). Future research should more carefully examine the boundary conditions of “outside the interval.”

Third, Study 5 (the field study) provides new evidence for our hypotheses. However, it is undeniable that possible confounding variables in this study require further clarification (e.g., order effects from the first exam influencing the second exam). Future research could employ stricter controls, such as measuring participants’ emotions after the first exam, to effectively explore the internal mechanism of negative discounting.

Finally, we believe the free from care account is an important potential mechanism underlying negative discounting. This study examined the free from care explanation by manipulating care degree (Studies 2 and 3) and care timing (Study 4). However, the psychological mechanism of negative discounting could also be tested from other perspectives. For example, Loewenstein and Prelec (1993) proposed the sequence model, which suggests that people generally prefer sequences that improve over time. In the context of this study, the oral exam and care-inducing event could be viewed as a two-time-point outcome sequence. Additionally, it is worth noting that in Study 1, participants also exhibited negative discounting without any manipulation, suggesting that other factors (e.g., individual differences) may moderate the relationship between negative intertemporal events and related behaviors. For instance, participants’ personality traits may moderate our results (e.g., impulsivity vs. procrastination; Strunk et al., 2013). Impulsive individuals are more likely to choose to experience negative events earlier. In contrast, procrastination means people involuntarily delay completing designated events even when anticipating adverse consequences (Steel, 2007). Therefore, future research on negative discounting should incorporate personality traits to identify potential moderating effects.

Note: Figure translations are in progress. See original paper for figures.

Source: ChinaXiv – Machine translation. Verify with original.