



How episodic simulation promotes prosocial behavior in individuals with low helping tendency

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Abstract

Episodic simulation effectively promotes an individual's willingness to help, and temporal distance can influence an individual's mental representation and reaction. However, the effect of episodic simulation on pro-social behavior at different temporal distances has not been explored, and this perspective is crucial to understand how episodic simulation can more efficiently promote individuals' pro-social behavior. The present study examined how episodic simulation and temporal distances promote pro-social behavior and its scope of applications. Experiment 1 ($N=200$) used a two-factor experimental design to explore how episodic simulation and temporal distance (near: after 1 day vs. far: after 1 year) interacted to influence willingness to help and donation behavior. Experiment 2 ($N=335$) employed a mixed experimental design to examine the interactive effects of episodic simulation and temporal distance on willingness to help and donation behavior among individuals with different social value orientations (pro-self orientation vs. pro-social orientation). The two experiments used a 7-point scale of willingness to help people and the amount of money donated to charity as indicators of pro-social behavior. The results showed that willingness to help and subsequent donation behavior were significantly higher after initiating the episodic simulation. Individuals matched with the far temporal distance condition (compared to the near temporal distance condition) had a significantly increased willingness to help and donation behavior. Notably, episodic simulation and far temporal distance significantly enhanced the donation behavior of individuals with a pro-self orientation but not of those with a pro-social orientation. The matching of episodic simulation and distant temporal distance facilitated the production of pro-social behavior, especially for individuals with low helping tendencies.

Keywords Pro-social behavior · Donation behavior · Episodic simulation · Social value orientation · Temporal distance

Introduction

The cultivation of pro-social behavior in humans is indispensable for their long-term survival and well-being (Campbell et al., 2022). Pro-social behavior (i.e., engaging in actions that benefit others) is a bedrock of human societies (van Kleef & Lelieveld, 2022). How to enhance individuals'

willingness to help and promote donation behavior has garnered interest from policymakers and scholars (Campbell et al., 2022; Gaesser et al., 2017a; Gaesser et al., 2020). Episodic simulation, as a strategy to persuade donating, has been shown to be effective in promoting individual willingness to help others. Episodic simulation is a form of future thinking or foresight, which refers to our ability to imagine future events at a specific time and place (Gaesser et al., 2017a, c; Vollberg et al., 2021). After participants imagined specific scenarios involving assistance, researchers found that the participants' willingness to help was significantly greater than that of the control group, which did not undergo episodic simulation induction (Gaesser et al., 2017a, b; Gaesser et al., 2015; Gaesser & Schacter, 2014). Furthermore, imagining a helping episode significantly increased the self-reported intention to help both in-group and out-group targets, and eliminated the gap between the groups compared to a control manipulation (Gaesser et al., 2020).

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This study indicate that episodic simulation could play a crucial and distinct role in influencing our decisions to assist others, irrespective of their group membership. However, limited research has been conducted on the influence of episodic simulation on actual donation behavior. Further investigation into this aspect will offer valuable insights and recommendations for fostering individual pro-social behavior. Therefore, this study aimed to shed more light on the effect of episodic simulation on pro-social behavior using actual donation behavior.

Construal Level Theory (CLT) proposes that individuals tend to construe objects or events at a greater psychological distance with a higher level of construal, representing them with primary, core, essential, and decontextualized features. By contrast, objects or events closer in psychological distance are construed with a lower level of construal, involving secondary, ancillary, non-essential, marginal, detailed, and contextualized features (Trope & Liberman, 2010). Temporal distance is a psychological category related to the perceived proximity or remoteness of events in relation to the time of occurrence, using the “present moment” as the reference point. Short temporal distance indicates events perceived as relatively close to the present, while far temporal distance refers to the opposite (Trope & Liberman, 2010). Previous studies have shown that temporal distance can influence individuals’ mental representations and their reaction to future events (Liberman & Trope, 1998, 2003). For future events in the near temporal distance, people’s mental representations tend to be more concrete, detailed, and contextualized. By contrast, for future events in the far temporal distance, people’s mental representations tend to be more abstract, essential, and decontextualized (Lee et al., 2017). Therefore, the current study suggests that psychological distance also influences the representation of individuals’ imagined helping scenarios. Moreover, charitable giving may vary depending on the differences in temporal distance perceived by individuals in terms of the CLT (Tugrul & Lee, 2018). When the level of detail in a charity’s donation request aligns with the perceived temporal distance, it can increase people’s willingness to give (Czeizler & Garbarino, 2017). The above results indicate that temporal distance affects the imagined representations of individuals and, simultaneously, influences their pro-social behavior.

Previous studies have not examined the combined impact of episodic simulation and temporal distance on pro-social behavior. Therefore, Experiment 1 of this study explored the impact of the interaction between episodic simulation and temporal distance on prosocial behavior. Specifically, far temporal distance is more persuasive and can effectively promote individual’s willingness to donate (Choi et al., 2011). Conversely, short-term events are interpreted at a more concrete level and emphasize

specific and short-term details, which can accentuate the personal cost of helping others (Aknin et al., 2015), leading to lower willingness to help. Therefore, the hypothesis of Experiment 1 posits that the impact of episodic simulation on pro-social behavior is significantly greater under conditions of far temporal distance compared to conditions of near temporal distance.

Social Value Orientation (SVO) is a stable social preference that reflects individuals’ tendencies in allocating outcomes to themselves and others in interdependent situations, which can be classified as either “pro-social-oriented” or “pro-self-oriented” (Li et al., 2020). Compared to individuals with a pro-self orientation, those with a pro-social orientation are more inclined toward cooperation (de Matos Fernandes et al., 2022). Relative to individualists and competitors, individuals with a pro-social orientation tend to engage in a greater number of donations, especially donations to organizations aimed at helping vulnerable groups (e.g., the poor and the ill) (Van Lange et al., 2010). It is worth noting that while self-oriented individuals are inclined to engage in less pro-social behaviors, they can still be influenced by external factors. Episodic simulation can effectively increase actual pro-social behavior and the likelihood of helping in the real world, especially for groups with a low propensity to help (Campbell et al., 2022). The above results indicate that there are differences in the impact of episodic simulation on pro-social behavior among different groups. However, it remains unclear whether the interaction between episodic simulation and temporal distance is more effective for pro-social decision-making in individuals with a lower propensity to help. To verify the boundary conditions of the efficacy of episodic simulation and temporal distance on pro-social behavior, Experiment 2 explored the role of SVO.

In sum, this study adopted the episodic simulation initiation paradigm to explore how episodic simulation and temporal distance might influence pro-social willingness and behavior, and introduces SVO to examine whether the utility of episode simulation for pro-social behavior is applicable to all groups. We set up two experiments to test the hypothesis that episodic simulation has a boosting effect on pro-social behavior, especially under the effect of greater temporal distance; individuals with a lower propensity to help (pro-self orientation) are more likely to be influenced by episodic simulation under greater temporal distance regarding pro-social behavior.

Experiment 1

Experiment 1 manipulated the temporal distance variable to explore the roles of episodic simulation and temporal distance on willingness to help and donation behavior. The experiment hypothesized that willingness to help and

donation behavior of the far temporal distance-episodic simulation condition would be significantly higher than the near temporal distance-episodic simulation condition.

Materials and methods

Participants

A power analysis (G*Power 3.1, power = 0.80, effect size $f = 0.5$, $\alpha = 0.05$) indicated that 179 participants were required for each between-subject group, which would reveal significant effects with 80% statistical power (Faul et al., 2007). Due to the concern that the start-up effect of the online experiment would be impacted, 200 participants (109 females; $M = 31.27$, $SD = 9.52$) were recruited using convenience sampling via an online platform. The participants signed an informed consent form before the experiment, and remuneration was paid upon experiment completion.

Materials

Episodic simulation scenarios The episodic simulation scenarios used in the experiment were utilized in previous studies (Gaesser et al., 2017b; Gaesser & Schacter, 2014). The episodic simulation scenarios comprised five undifferentiated declarative sentences, including brief stories describing everyday events featuring a person in need of help (e.g., an individual who was locked out of their house; an individual whose dog had not returned home), and one of the scenarios was used for practicing experiments.

Episodic simulation manipulation check This test was based on Gaesser and Schacter (2014), in which the degrees of detail and coherence recorded in the episodic simulation could identify whether participants had engaged in the episodic simulation. The participants responded on a 7-point Likert scale. The following three questions were asked: (1) Did you imagine the scenario just presented? (1 = *not at all*, 7 = *vividly imagined*); (2) How much detail of the scenario did you imagine? (1 = *simple amount*, 4 = *modest amount*, 7 = *detailed amount*); (3) What is the coherence of the scenario you imagined? (1 = *vague*, 4 = *moderate*, 7 = *coherent and clear*). The Cronbach's α coefficient for the whole scale was 0.865, which showed good internal reliability.

The manipulation of the temporal distance The manipulation of the temporal distance was based on Kim and Schnall's study, in which the near and far temporal distances

with events were manipulated to occur “tomorrow” and “one year from now” (Kim et al., 2013).

Experimental design

The design was a 2 (episodic simulations: episodic simulation vs. control) $\times$ 2 (temporal distances: near vs. far) within-participants experiment; the dependent variables were the score of willingness to help scale and actual donation amount.

Procedure

Participants' data were collected through Credamo (www.credamo.com). Credamo is an internet technology company that provides advanced solutions for integrating academia, industry, and research. The platform supports online randomized experiment designs, multi-wave tracking surveys, paired sample surveys, and more. With over 340,000 completed research projects, the data quality meets the standards of top international academic journals. It comprehensively covers various disciplines such as psychology, management, sociology, tourism, public administration, medicine, and more. The participants were initially informed that they were taking part in a social decision-making experiment. They were instructed to complete imaginative and writing tasks based on different experimental requirements. Following that, manipulation check tests were conducted. Subsequently, participants' willingness to help was measured, and finally, they completed a real charitable donation task. The experiment used five scenarios from Experiment 1 (1 material for practicing experiments): two scenarios each for the experimental and control conditions. All experimental scenarios were presented randomly.

Explanation of the initiation conditions of episodic simulation Participants were presented with a brief statement (e.g., someone is locked outside the door) and were subsequently asked to imagine, based on the provided scenario, that at some future moment, they would assist this stranger in need. Moreover, participants were instructed to mentally construct specific details of the helping scenario (e.g., how they would provide assistance or the characteristics of the person seeking help) and record these details. The imagined duration of the helping episode was set to 40 s. Control group participants were instructed to speculate on the identity of the subject and the location of the helping scenarios at different temporal distances and then record their responses.

Explanation of the initiation conditions of temporal distance In the episodic simulation's near temporal distance

condition, participants were asked to imagine a helping scenario that would occur “tomorrow.” In the episodic simulation’s far temporal distance condition, participants were asked to imagine a helping scenario that would occur “one year from now.” Participants in the far-near temporal distance control group were instructed to speculate on the identity of the subject and the location of the helping scenarios at different temporal distances (e.g., someone failing a job interview). The participants in the control group were instructed to speculate on which group the event was most likely to occur in and where the event would take place).

This was followed by a decision on willingness to help and a donation to charity. Participants were asked to rate their willingness to help in this task on a seven-point Likert scale at the end of the experiment. The measurement indicator of pro-social behavior was whether participants were willing to make an actual donation to a charitable organization using their participation fee (i.e., 10 Chinese Yuan). Therefore, participants made a charitable donation decision using an 11-point scale (0 means *not donating*, and 10 means *donating the entire participation fee*). The participants were told real information about the donation foundation and specific donation project (China Charity Federation New Seedling Relief Project for Children in Distress, filing no: 53100000500016260MA22007). To ensure the authenticity of participants’ donations, we informed them in advance that each participant would randomly select one decision out of four donation decisions to determine the actual donation amount, which was then deducted from the participant fee. Therefore, every decision had to be taken seriously.

Results

Manipulation check results

A *t*-test was employed to compare the scores between the episodic simulation and control groups on measures of imagination, details, and coherence. The episodic simulation condition ($M=6.28$, $SD=0.51$) had a higher imagination score than the control condition ($M=2.36$, $SD=1.01$), $t(97)=20.43$, $p<.001$; the details: episodic simulation condition ($M=5.91$, $SD=0.55$) had a higher details score than the control condition ($M=2.05$, $SD=0.81$), $t(97)=24.68$, $p<.001$. The episodic simulation condition ($M=6.01$, $SD=0.48$) had a higher coherence score than the control condition ($M=2.06$, $SD=0.82$), $t(97)=23.35$, $p<.001$. The above indicated the manipulation of episodic simulation was successfully initiated in the experimental condition. The Cronbach’s alpha result of 0.865 indicates a high level

of internal consistency for the episodic simulation manipulation check scale.

Willingness to help results

In Experiment 1, a two-way mixed-effects linear model was conducted to investigate the effects of episodic simulation (imagine vs. control) and temporal distance (near vs. far) on pro-social behavior. The model incorporated fixed effects for episodic simulation and temporal distance, as well as their interactions. Additionally, random effects were included to capture the variability among subjects. The random effects in the mixed linear model of Experiment 1 primarily manifest as individual differences among participants, without considering gender differences. This is because researchers have already demonstrated that gender does not significantly affect willingness to help in episodic simulations (Gregory et al., 2023).

A Mixed Linear Models (MLMs) was run to explore the influence of episodic simulation and temporal distance on willingness to help. The results of the descriptive statistics were shown in Table 1. The results revealed a significant condition effect, with those in the episodic simulation conditions reporting increased willingness to help compared to those in the control condition, $B=0.63$, 95% CI [0.46, 0.79], $t(597)=7.23$, $p<.001$. The far temporal distance group rated significantly higher helping intentions than near temporal distance group, $B=0.28$, 95% CI [0.11, 0.45], $t(597)=3.24$, $p<.001$. Temporal distance moderated the effect of imagination, with episodic simulation significantly amplifying individuals’ willingness to help when the imagined plot unfolded within a distant temporal context (Fig. 1; interaction, $B=0.26$, 95% CI [0.02, 0.49], $t[597]=2.09$, $p<.05$; simple effect when far temporal distance group rated more helping intentions, $B=0.28$, 95% CI [0.07, 0.36], $t(273)=3.24$, $p<.001$; simple effect when near temporal distance group rated less helping intentions (See Fig. 1), $B=0.03$, 95% CI [−0.79, 0.08], $t(273)=0.29$, $p=.99$. The results were shown in Table 2.

Donation behavior results

A MLM was run to investigate the impact of episodic simulation and temporal distance on donation behavior. The results of the descriptive statistics were shown in Table 3. The results

Table 1 Descriptive statistics of the temporal distance and episodic simulation effects on willingness to help in experiment 1

Group	Temporal Distance	N	M ± SD
Episodic simulation	near	200	5.93 ± 0.83
	far	200	6.22 ± 0.74
Control	near	200	5.31 ± 1.30
	far	200	5.34 ± 1.25

Table 2 Effects of episodic simulation and temporal distance on willingness to help in experiment 1

Predictors	Est.	95% CI	<i>t</i>	<i>p</i>
Episodic simulation	0.63	[0.46, 0.79]	7.23	<0.001
Temporal distance	0.28	[0.11, 0.45]	3.24	<0.001
Episodic simulation*temporal distance	0.26	[0.02, 0.49]	2.09	<0.05

Table 3 Descriptive statistics of the temporal distance and episodic simulation effects on donation behavior in experiment 1

Group	Temporal Distance	N	M ± SD
Episodic simulation	near	200	5.52 ± 2.67
	far	200	6.78 ± 2.56
Control	near	200	5.12 ± 2.77
	far	200	5.24 ± 2.77

revealed a significant condition effect, with participants in the simulation condition reporting a significantly higher level of donation behavior compared to those in the control condition, $B=0.41$, 95% CI [0.13, 0.65], $t(597)=3.39$, $p<.001$. The far temporal distance group rated significantly higher donation behavior than the near temporal distance group, $B=1.25$, 95% CI [1.01, 1.49], $t(597)=10.34$, $p<.001$. Temporal distance moderated the effect of imagination, with episodic simulation significantly amplifying individuals' donation behavior when the imagined scenarios unfolded within a distant temporal context (Fig. 1; interaction, $B=1.13$, 95% CI [0.80, 1.45], $t(597)=6.61$, $p<.001$; simple effect when far temporal distance group rated more donation behavior, $B=1.25$, 95% CI [6.40, 7.15], $t(273)=1.25$, $p<.001$; simple effect when near temporal distance group rated less donation behavior (See Fig. 1), $B=0.12$, 95% CI [5.15, 5.90], $t(273)=6.61$, $p=.75$. The results were shown in Table 4.

Discussion

The manipulation of temporal distance and episodic simulation affected pro-social behavior regarding willingness to help and actual donation behavior. Willingness to help and

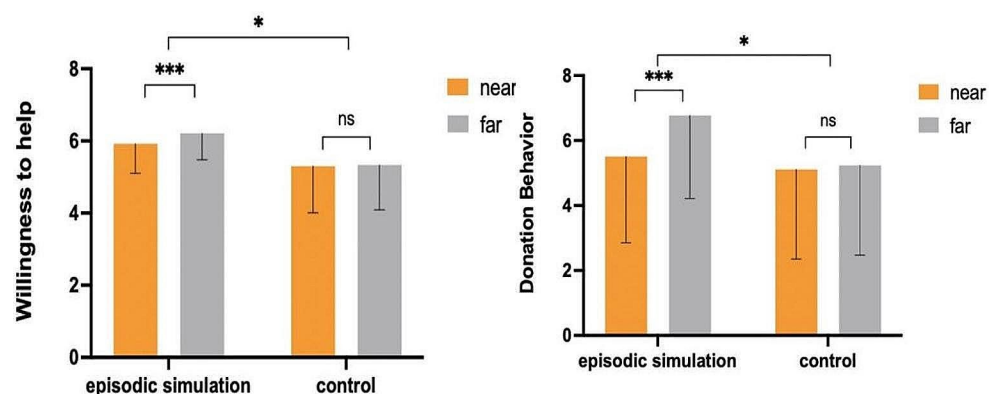
Table 4 Effects of episodic simulation and temporal distance on donation behavior in experiment 1

Predictors	Est.	95% CI	<i>t</i>	<i>p</i>
Episodic simulation	0.41	[0.13, 0.65]	3.39	<0.001
Temporal distance	1.25	[1.01, 1.49]	10.34	<0.001
Episodic simulation*temporal distance	1.13	[0.80, 1.45]	6.61	<0.001

actual donation behavior were significantly higher in the far than near temporal distance condition, with no significant difference between the far and near temporal distance control conditions. Consistent with the previous finding that far temporal distance is more persuasive than near distance for people's willingness to donate (Choi et al., 2011), people may be more appreciative of pro-social behavior in the far future (Jin & Chun-Hua, 2015). Conversely, short-term events emphasize short-term details, highlighting the cost of an individual's intention to help others (Aknin et al., 2015), leading to a lower willingness to help. The current study provides evidence that the CLT and episodic simulation play a role in influencing pro-social behavior, which enriches the application of the CLT to the pro-social behavior field. To further validate the effects of episodic simulation on pro-social behavior, Experiment 2 introduced SVO (personality trait variables) to examine the interaction between the helping state-trait effects on pro-social behavior from the episodic simulation initiation in Experiment 1.

Experiment 2

Experiment 2 examined the role of SVO and its effects on episodic simulation and temporal distance on helping behavior (Van Lange et al., 1997). There are differences between episodic simulation and temporal distance on willingness to help and helping behavior under individuals' different value orientations. Episodic simulation is more effective for groups with a lower baseline propensity to help and may have less impact on individuals with pro-social orientation with a higher propensity to help, as they already have highly pro-social traits, which leaves limited room to

Fig. 1 The effects of temporal distance and episodic simulation on willingness to help (Left side) and donation behavior (Right side). (* $p<.05$, ** $p<.01$, *** $p<.001$)

receive interventions that increase helping. This study found that individuals with pro-self-orientation had significantly greater helping behavior in the episodic simulation condition than in the control condition, whereas in the pro-social orientation condition, helping behavior in the episodic simulation condition did not differ significantly from that of the control condition.

Materials and methods

Participants

According to the G*power analysis, a medium effect size of $f=0.25$ required 237 participants to achieve an effect size of 80%. This study recruited 335 participants (184 females; $M=30.64$, $SD=8.65$; 122 participants in the self-oriented group, and 213 participants in the prosocial-oriented group) using convenience sampling via an online platform, all of whom were right-handed and had normal or corrected vision. Participants signed an informed consent form before the experiment and were remunerated upon completion.

Materials

SVO: the triple-dominance measure scale The content of the Triple-Dominance Measure Scale was as follows: Imagine participating in a two-person money distribution task, but you do not know the other person's identity. You have the right to distribute funds, regardless of the distribution scheme; the other person accepts that. You have nine opportunities to allocate funds, and the amounts in the options correspond to the amounts of funds. The participants chose one of three options for each fund's allocation according to their preference (for example, Scenario 1: Option A: Personal gain: 480, Others' gain: 80; Option B: Personal gain: 540, Others' gain: 280; Option C: Personal gain: 480, Others' gain: 480) (Van Lange et al., 1997). The scoring key for the measurement scale, based on the proprietary scoring method of the SVO scale, involves categorizing participants according to their selections. Participants are classified when they make 6 or more consistent choices. Pro-social choices are indicated by the following options: 1c, 2b, 3a, 4c, 5b, 6a, 7a, 8c, 9b. Individualistic choices correspond to 1b, 2a, 3c, 4b, 5a, 6c, 7b, 8a, 9c. Competitive choices are represented by 1a, 2c, 3b, 4a, 5c, 6b, 7c, 8b, 9a. The classification is determined by the participants' cumulative choices. It is noteworthy that individual and competitive orientations, both aimed at maximizing self-interest, are collectively referred to as pro-social self-orientation, acknowledging the nuanced differences in degree between the two (Murphy & Ackermann, 2014). The manipulation of

episodic simulation and temporal distance used in Experiment 2 was the same as in Experiment 1. Additionally, the measurement method for the dependent variable was also the same.

Experimental design

Experiment 2 used an online experiment with a three-factor mixed experimental design. The independent variables were 2 (SVO: pro-self-orientations vs. pro-social orientations) $\times$ 2 (episodic simulations: episodic simulation condition vs. control condition) $\times$ 2 (temporal distances: near: after 1 day vs. far: after 1 year), SVO is a between-participants variable; the dependent variables were a score of willingness to help scale and actual donation amount.

Procedure

Participants' data were collected on the Credamo online platform (www.credamo.com). All participants were first assessed for SVO using the Triple-Dominance Measure Scale. Subsequently, participants completed tasks for four different experimental conditions, along with the measurement of pro-social willingness and behavior. The experimental procedure was the same as in Experiment 1.

Results

Manipulation check results

A *t*-test compared the scores between the episodic simulation group and the control group on measures of imagination, details, and coherence: the episodic simulation condition ($M=6.26$, $SD=0.67$) had a higher imagination score than the control condition ($M=5.31$, $SD=1.33$), $t(474)=9.86$, $p<.001$; the details: episodic simulation condition ($M=6.00$, $SD=0.68$) had a higher details score than the control condition ($M=5.06$, $SD=1.47$), $t(474)=8.98$, $p<.001$; episodic simulation condition ($M=5.89$, $SD=0.83$) had a higher coherence score than the control condition ($M=4.85$, $SD=1.54$), $t(474)=9.22$, $p<.001$. The above indicated that the manipulation of episodic simulation was successfully initiated in the experimental condition. The Cronbach's alpha result of 0.884 indicates a high level of internal consistency for the episodic simulation manipulation check scale.

Willingness to help results

In Experiment 2, a three-factor MLM was conducted to investigate the effects of episodic simulation (imagine vs.

control), temporal distance (near vs. far), and SVO (pro-self-orientations vs. pro-social orientations) on pro-social behavior. The model incorporated fixed effects for episodic simulation, temporal distance, and SVO, as well as their interactions. Additionally, random effects were included to capture the variability among subjects. The random effects in the MLM of Experiment 2 primarily manifested as individual differences among participants, without considering gender differences. This is because researchers have already demonstrated that gender does not significantly affect willingness to help in episodic simulations (Gregory et al., 2023).

The results of the MLM revealed a significant condition effect, with those in the episodic simulation condition reporting increased willingness to help compared to those in the control condition, $B=0.72$, 95% CI [0.55, 0.90], $t(717)=8.05$, $p<.001$. The far temporal distance group rated significantly higher helping intentions than the near temporal distance group, $B=0.21$, 95% CI [0.06, 0.36], $t(666)=2.73$, $p<.001$. No significant differences were found between the pro-self orientation and pro-social orientation groups; however, there was a trend observed toward similarity, $B=0.20$, 95% CI [0.001, 0.41], $t(716)=1.95$, $p=.052$. There was no three-way interaction effect, $B=0.03$, 95% CI [-0.03, 0.68], $t(666)=1.77$, $p=.07$ (The results of the descriptive statistics were shown in Table 5).

Donation behavior results

The MLM results revealed a significant condition effect, with participants in the simulation condition reporting a significantly higher level of donation behavior compared to those in the control condition, $B=0.51$, 95% CI [0.26, 0.75], $t(737)=4.07$, $p<.001$. The far temporal distance group rated significantly higher donation behavior than the near temporal distance group, $B=1.08$, 95% CI [0.86, 1.29], $t(666)=9.81$, $p<.001$. The pro-self orientation group rated significantly higher donation behavior than the pro-social orientation group, $B=1.42$, 95% CI [0.85, 2.00], $t(405)=4.86$, $p<.001$. Additionally, a significant interaction effect was observed between episodic simulation and temporal distance ($B=0.93$, 95% CI [0.63, 1.23], $t(666)=6.00$, $p<.001$). A significant interaction effect was observed between SVO and temporal distance ($B=0.47$, 95% CI [0.12, 0.83], $t(666)=2.61$, $p<.01$). There was no interaction effect of episodic simulation and SVO ($B=0.13$, 95% CI [-0.271, 0.53], $t(737)=0.63$, $p=.53$) (The results of the descriptive statistics were shown in Table 6).

It is important to highlight the significant three-way interaction effect among episodic simulation, temporal distance, and SVO ($B=0.55$, 95% CI [0.04, 1.05], $t(666)=2.13$, $p<.05$). Under conditions of near temporal distance, there

Table 5 Descriptive statistics of the episodic simulation and temporal distance and SVO effects on willingness to help in experiment 2

Group	Temporal Distance	SVO	N	M	SD
Episodic simulation	near	pro-social	213	5.93	0.91
	far	pro-self	122	5.73	0.98
	near	pro-social	213	6.15	0.85
	far	pro-self	122	6.23	0.78
Control	near	pro-social	213	5.21	1.39
	far	pro-self	122	4.92	1.30
	near	pro-social	213	5.23	1.29
	far	pro-self	122	4.91	1.36

Table 6 Descriptive statistics of the episodic simulation and temporal distance and SVO effects on donation behavior in experiment 2

Group	Temporal Distance	SVO	N	M	SD
Episodic simulation	near	pro-social	213	5.8	2.64
	far	pro-self	122	4.40	2.58
	near	pro-social	213	6.90	2.59
	far	pro-self	122	5.95	2.59
Control	near	pro-social	213	5.32	2.81
	far	pro-self	122	4.02	2.59
	near	pro-social	213	5.46	2.80
	far	pro-self	122	4.10	2.69

was no significant difference in donation behavior between the episodic simulation group ($M=4.40$, $SE=0.23$) and the control group ($M=4.02$, $SE=0.25$) for individuals with a pro-self-orientation, $B=0.38$, 95% CI [-0.05, 0.80], $t(737)=2.28$, $p=.10$.

Under conditions of near temporal distance, individuals with a pro-social orientation in the episodic simulation group ($M=5.83$, $SE=0.18$) exhibited significantly greater donation behavior than those in the control group ($M=5.32$, $SE=0.19$), $B=0.51$, 95% CI [0.19, 0.83], $t(737)=4.07$, $p<.001$.

Under conditions of far temporal distance, individuals with a pro-self orientation in the episodic simulation group ($M=6.90$, $SE=0.18$) exhibited significantly greater donation behavior than those in the control group ($M=5.46$, $SE=0.19$), $B=1.44$, 95% CI [1.43, 2.28], $t(737)=11.52$, $p<.001$.

Under conditions of far temporal distance, individuals with a pro-social orientation in the episodic simulation group ($M=5.95$, $SE=0.23$) exhibited significantly greater donation behavior than those in the control group ($M=4.10$, $SE=0.25$), $B=1.85$, 95% CI [1.12, 1.76], $t(737)=11.24$, $p<.001$.

Participants with a pro-social orientation, regardless of the condition (i.e., far or near temporal distance), exhibited significantly higher donation behavior in the episodic simulation group compared to the control group. However, for individuals with a pro-self orientation, the donation behavior in the episodic simulation group was significantly higher than that in the control group only under far temporal

distance conditions, with no significant difference observed under short temporal distance conditions. This result indicates that the influence of far temporal distance and episodic simulation is more pronounced among individuals with a pro-self value orientation (see Fig. 2).

Discussion

Consistent with the results of Experiment 1, Experiment 2 showed that the episodic simulation initiation significantly enhanced individuals' willingness to help and actual donation behavior, further supporting the impact of episodic simulation on willingness to help (Brendan et al., 2020; Gaesser et al., 2020). Meanwhile, the interaction between episodic simulation and temporal distance was significant. Consistent with the results of Experiment 1, episodic simulation conditions at different temporal distances led to significant differences: participants showed more willingness to help and helping behavior in the far temporal distance condition; the difference between participants' willingness to help and donation behaviors in the near temporal distance condition was not significant. In Experiment 2, the results of the three-way interaction indicated a notable distinction in donation

behavior between episodic simulation and control condition, specifically in the far temporal distance of pro-self orientation condition. However, under the pro-self orientation condition, there was no significant difference in donation behavior between episodic simulation and the control condition at a near temporal distance. Under the pro-social orientation condition, the impact of episodic simulation and temporal distance on donation behavior was significant, both for the far temporal distance and near temporal distance conditions. This indicates that the effects of episodic simulation and temporal distance had a significant impact on individuals with a pro-self orientation. However, the p -value for the three-way interaction on the willingness to help did not reach significance ($p = .07$). No similar results were found for willingness to help, possibly because there was a disconnect between individuals' expressed willingness and their actual behavior. Previous research has indicated that individuals often exhibit a willingness-behavior gap, showing high willingness but low corresponding behavior. Hence, no differences were detected in willingness to help in our study. The results of Experiment 2 indicated that the effects of episodic simulation and temporal distance on pro-social behavior did not apply across all conditions. Specifically, in the far temporal distance condition, the donation behavior in the

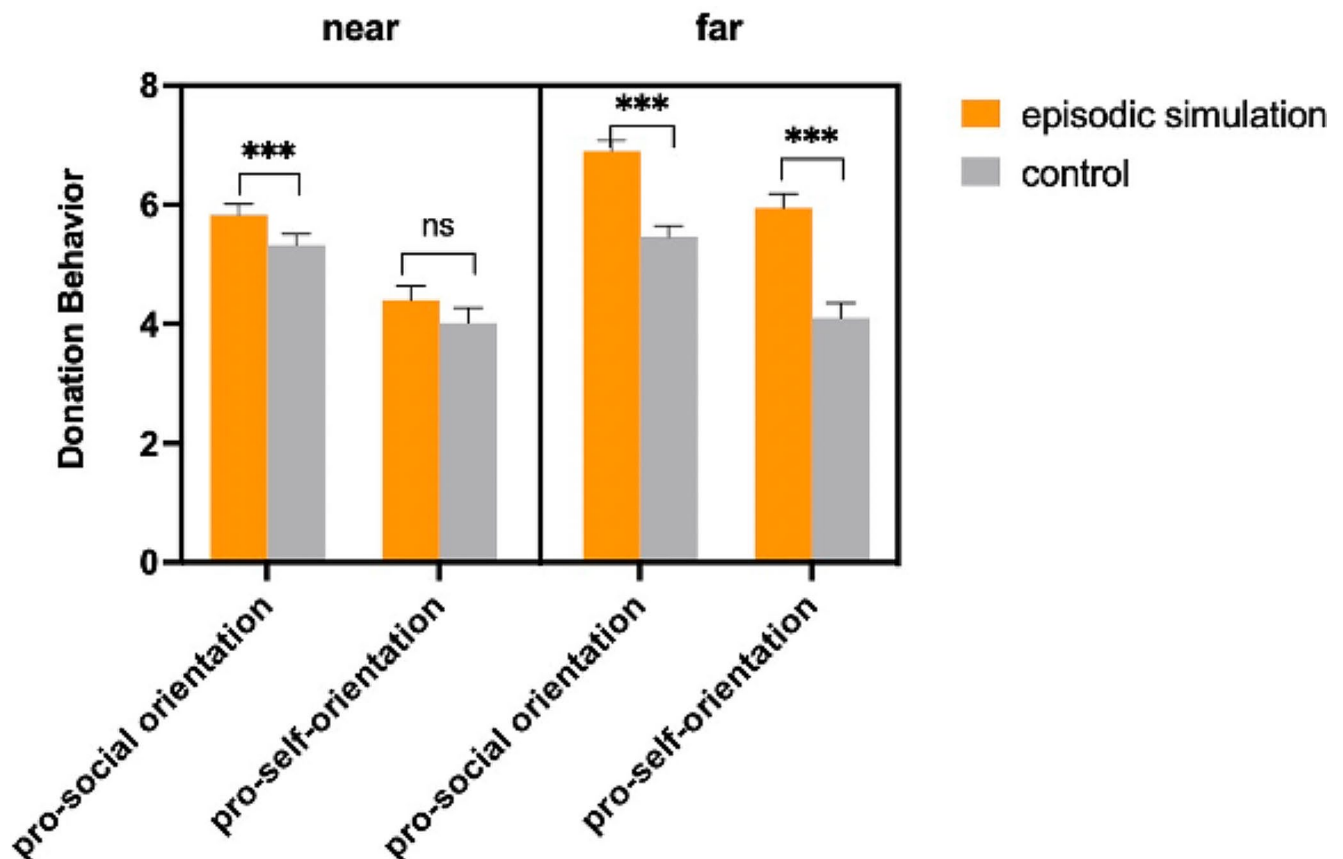


Fig. 2 The effects of temporal distance and episodic simulation on donation behavior(* $p < .05$, ** $p < .01$, *** $p < .001$)

episodic simulation of pro-self orientation was significantly greater than that in the control group. However, in the near temporal distance condition, the donation behavior in the episodic simulation of pro-self orientation did not significantly differ from that of the control group. This indicates that episodic simulation and far temporal distance significantly enhanced the donation behavior of individuals with a pro-self orientation. Nevertheless, among individuals with a pro-social orientation, the donation behavior in the episodic simulation significantly exceeded that of the control group, irrespective of whether it was in the far or near temporal distance condition.

This is consistent with the extant studies that have revealed that episodic simulation is more effective for conditions with a lower baseline propensity to help. Those with a pro-social orientation and higher propensity to help may have experienced less impact because they already have high pro-social traits; thus, they have limited room to receive interventions to increase helping (Campbell, Tusche, & Bo O'Connor, 2022).

General discussion

Individuals' donation behavior requires improvement, and greater involvement in charitable giving should be addressed. Episodic simulation effectively promotes pro-social behavior as a persuasive strategy to increase donation behavior. Therefore, this study explored the effects of episodic simulation (episodic simulation condition vs. control condition), temporal distance (far vs. near), and SVO (pro-self vs. pro-social orientation) on pro-social behavior. Consistent with the research, this study supports the role of episodic simulation on pro-social behavior (Gaesser & Fowler, 2020; Gaesser & Schacter, 2014; Timmons et al., 2019). The two experiments revealed that episodic simulation effectively promoted pro-social behavior; it was more effective in the far temporal distance condition but was not applicable across all groups. The effect was present in individuals with pro-self-orientation.

Episodic simulation effects on pro-social behavior

We found a significant impact of episodic simulation on pro-social behavior, specifically on donation behavior. People's increased willingness to engage in pro-social behavior after a helping episode simulation may be attributed to the enhanced understanding of altruistic actions following episodic simulations. The judgment and decision-making research has asserted that imagining an event makes it easier to understand it (Anderson, 1983; Kappes & Morewedge, 2016). Episodic simulation initiation eases the construction of a helping scenario and the decision on willingness

to help; generally, individuals will help in such situations to prove their worth (Kappes & Morewedge, 2016). Additionally, cognitive psychology and neuroscience research have highlighted spatial processing as a key feature of vividly imagined events; the results of the current study also suggest that this feature is important for pro-social decision-making (Andrews-Hanna et al., 2010; Rubin & Umanath, 2015). Episodic simulation can increase subjective detail and vividness (Boland et al., 2017; Hallford et al., 2020) and rationality (Boland et al., 2017), and the easier future events come to mind through episodic simulation initiation, the more likely this event will occur.

Temporal distance interacts with episodic simulation to influence pro-social behavior

Our research findings indicated that temporal distance moderated the impact of episodic simulations on pro-social behavior. According to the CLT, this effect could be attributed to individuals adopting a high-level construal under conditions of distant temporal distance and episodic simulations, leading them to focus more on the reasons or motives behind the behavior (Choi et al., 2011). For conditions of close temporal distance and episodic simulations, individuals focused more on the specific implementation costs and efforts expended when imagining helping scenarios (Aknin et al., 2015). In line with previous research findings, Choi et al. study revealed that individuals expressed stronger donation intentions for the distant future (one-year and no-time indication frames) compared to the near future (one-week and three-month frames) (Choi et al., 2011). Yan discovered that manipulating various temporal distances revealed individuals with a heightened construal level under distant temporal conditions, effectively facilitating ethical judgments (Jin & Chun-Hua, 2015).

Additionally, setting the problem scenario in a distant future makes people's decision-making more rational. This phenomenon is referred to as "Future Lock-in," as Rogers and Bazerman (2008) described. Research on construal level and temporal distance suggests that "Future Lock-in" results from the heightened construal representation brought about by a distant temporal distance. Individuals find it easier to assess whether a behavior aligns with long-term utility, thus choosing actions consistent with long-term benefits (Rogers & Bazerman, 2008). This leads people to potentially appreciate pro-social behaviors in the distant future (Jin & Chun-Hua, 2015). Wakslak examined the temporal differences in construal levels using different self-structure measures and found that far-future self-representations were simpler and more complete than near-future self-representations (Aknin et al., 2015). Moreover, thinking about future scenarios has a self-positive bias. Individuals believe they are more likely

to experience positive future events than others and have more positive future imagery (Salgado & Berntsen, 2020), implying that they are more confident in their self-related futures (LU et al., 2021) and are willing to engage in more pro-social behaviors to maintain positive future images of themselves.

Temporal distance and episodic simulation effects on pro-social behavior: role of SVO

SVO represents individuals' different motivations to help, and individuals with a pro-social orientation prefer to cooperate compared to those with a pro-self orientation (de Matos Fernandes et al., 2022).

The results of Experiment 2 indicated that the impact of episodic simulation on pro-social decision-making was moderated by SVO when the temporal distance dimension was introduced. Episodic simulation with temporal distance elicited higher pro-social behaviors specifically within the pro-self oriented group. The results illustrate the stability of pro-social orientation motivation, with this group having a higher tendency to help others and a lower susceptibility to the influence of episodic simulation. In line with previous research findings regarding individuals' different pro-social motivations, there may be an interaction between helping state-traits (Campbell, Tusche, & Bo O'Connor, 2022). Episodic simulation effectively increases actual pro-social behavior in the real world, especially for groups with a low propensity to help (Campbell, Tusche, & Bo O'Connor, 2022), which helps to pinpoint the groups that may be more likely to receive effective episodic simulation intervention.

However, the *p*-value for the three-way interaction on the willingness to help did not reach significance ($p = .07$). Previous research has indicated that individuals often exhibit a willingness-behavior gap, showing high willingness but low corresponding behavior (Carrington et al., 2014; Juvan & Dolnicar, 2014; Xiao et al., 2023). This attitude-behavior gap has attracted a lot of attention among behavioral and cognitive scientists, but although many studies have been undertaken, we do not yet have a full understanding of the mechanisms causing this discrepancy (Kennedy et al., 2009; Xiao et al., 2023).

Nevertheless, based solely on the results, it is less clear why this episodic simulation-temporal distance effect on helping applies exclusively to the pro-social behavior of the pro-self oriented group. Possibly, when pro-socially-oriented individuals notice an individual needing help, their intrinsic motivation to help may mean that they are more likely to generate mental imagery spontaneously. If so, then eliciting a specific "imaginary help" instruction would have little effect on this group; however, individuals with pro-self-orientation values are less likely to generate such

mental processes independently (Campbell, Tusche, & Bo O'Connor, 2022) and are more likely to prioritize individual interests. Thus, initiating episodic simulation is more likely to enhance the plausibility of event generation (Boland et al., 2018), thereby influencing individuals' pro-social decision-making.

The second possible explanation is that the automatic expression of pro-social values influences the effects of episodic simulation and temporal distance on pro-social behavior. Haruno et al. research found that pro-social value orientation is automatically expressed, with pro-social individuals' behavior unaffected by cognitive load. In contrast, pro-self-individual behavior becomes more competitive in cognitive load situations (Haruno & Frith, 2010). Cornelissen et al. study also confirmed that pro-social value orientation is automatically expressed and moderated by factors such as interpersonal intimacy (Gert et al., 2011). Kuss et al. research indicated that, compared to pro-social individuals, pro-self-individuals require longer reaction times to exhibit pro-social behavior in dictator games and show greater activation in cognitive control brain regions (Katarina et al., 2015). These findings indirectly suggest that pro-social behavior in pro-social individuals is an intuitive, automatic expression. In contrast, pro-social behavior in pro-self-individuals requires more deliberation and cognitive control, making it more susceptible to the influence of episodic simulation and temporal distance.

Theoretical contribution

Regarding theoretical contributions, the social information processing model (SIP) emphasizes the importance of individuals' subjective interpretation and evaluation of social information. When processing social information in social contexts, individuals go through a series of cognitive processes, including attentional selection, encoding and decoding of information, interpretation, and evaluation, as well as generating responses and making decisions. SIP suggests that cognitive processes are influenced by individual factors such as attention, memory, perception, and reasoning. Episodic simulation, as a form of prospective information processing, influences individuals' information processing of future events by imagining detailed scenarios of events that have not yet occurred, thereby affecting their responses and decisions. Episodic simulation, as an effective way for individuals to process information, enriches the research content of the social information processing model.

Furthermore, this study enriches the relevant research on the influence of episodic simulation on pro-social behavior. Previous research has mostly demonstrated the positive impact of episodic simulation on pro-social intentions (Gaesser & Fowler, 2020) while overlooking actual

individual pro-social behavior. The research findings provide theoretical evidence for promoting individuals' pro-social behavior. Consistent with previous research, we found that episodic simulation processing increases individuals' willingness to help and engage in pro-social behavior. Additionally, previous studies have suggested that the construal level theory may explain the influence of episodic simulation on pro-social behavior. According to this theory, events imagined on a concrete rather than abstract level are perceived as temporally closer, which means that initiating episodic simulation may make us perceive a closer temporal distance to future pro-social decisions, facilitating better cognitive processing (Lee et al., 2018). This study found that episodic simulation and temporal distance influence pro-social decision-making. Individuals perceiving a distant temporal distance, who engage in episodic simulation, tend to express higher pro-social intentions and behavior. Furthermore, we identified the specific population to which this effect applies. We found that this facilitative effect of episodic simulation is only observed in the in-group, which expands the boundary conditions of the construal level theory.

Practical implications

In the context of the new era, where we may not personally witness events but receive information through media, episodic simulation can enhance our pro-social behavior. This study conducted a series of progressive experiments to explore this issue in depth, providing valuable insights for creating a favorable environment and encouraging pro-social behavior. Episodic simulation research can provide a deeper understanding of how people mentally simulate different scenarios before making decisions. By simulating scenarios at different temporal distances, individuals undergo different processing mechanisms, especially for the in-group with a lower inclination towards helping others. The facilitative effect of episodic simulation concerning temporal distance is significant. This finding can guide targeted strategies for different groups. Moreover, it can be applied in strategic planning and risk assessment to improve decision-making processes and promote individuals' pro-social behavior.

Limitations and future directions

This study has several limitations that must be acknowledged. First, there are many forms of pro-social behavior and ways to help people in need (Warneken & Tomasello, 2009). Whether episodic simulation would be useful for promoting other forms of pro-social behavior in addition to willingness to help and donation behavior could be further

explored. Second, the two experiments described herein were designed for a laboratory setting, thus having limited ecological validity. Field experiments could improve the ecological validity of episodic simulations in promoting pro-social behavior. The online experiment design of this study did not include attention checks, which may have impacted the reliability of our experimental data. We cannot ensure the participants' level of engagement with the experiment. It is advisable to consider incorporating attention checks in future research. Finally, alongside the temporal distance studied herein, future research could verify whether CLT has similar effects on other potential boundaries, such as social and spatial distance.

Drawing on previous relevant research results, similar trends and effects have been observed in various countries, such as the United States (Gaesser & Schacter, 2014; Jing et al., 2017; Morris et al., 2022; Schacter et al., 2017), Canada (Wynn et al., 2022), Belgium (Garcia Jimenez et al., 2023), and online platforms (Gaesser et al., 2020). Although the experiments were conducted in different countries, consistent research outcomes were obtained. While our study sample was from China, the experimental results align with previous research findings, indicating that episodic simulations facilitate individuals' pro-social behavior. However, owing to the absence of a comparative analysis of different national participant groups, it is impossible to verify whether there are country-specific differences. This limitation can be explored in future research.

Previous research has highlighted the influence of cultural differences on decision-making under conditions of uncertainty (Ochsner et al., 2005; Tversky & Kahneman, 1988; Wu & Keysar, 2007). Currently, there is limited research on the role of cultural backgrounds in promoting pro-social behavior through episodic simulations. Future studies could explore the cross-cultural variations of these results, presenting an interesting research direction.

Furthermore, emotions may play an important role in this process. Episodic simulation has a moderate to strong effect on individuals' feelings, and future imagery has greater emotional intensity than past remembrance (Rosenbaum et al., 2023). Schubert states that future imagery can promote positive emotions when individuals imagine their future lives and enhance negative emotions when worried about negative future scenarios. Emotions play an important role in individuals' donation decision-making behavior, and previous research has suggested that donors' positive emotions, such as gratitude (Shreyans & Van, 2019) and love (Cavanaugh et al., 2015), and negative emotions, such as guilt (Shreyans & Van, 2019) and sympathy (Small & Verrochi, 2009), promote donation behavior more than neutral emotions. This study did not examine the role of emotions in

this process, which may serve as a direction for follow-up research.

Conclusion

This study shows that episodic simulation effectively promotes individuals' willingness to help and donation behavior. Moreover, matching episodic simulation with far temporal distance significantly enhances the production of some individuals' pro-social behavior; however, this does not apply to all groups.

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Data availability All data and research materials are available via the Open Science Framework (<https://osf.io/vw2ar/>).

Declarations

Ethical approval The Institutional Review Board of the Hunan Normal University in Hunan approved the study (2023 – 320).

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