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ORIGINAL RESEARCH

Influence of Cost and Self-Control on Individual Donation Behavior: The Promoting Effect of Self-Affirmation

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Purpose: Donation behavior plays a crucial role in promoting the development of social and public welfare undertakings. Previous studies have partially explored the influencing factors of donation behavior, but effective methods for boosting individuals' donation behavior remain unclear. Based on the resource dependence theory, our present study further explored the promoting effect of self-affirmation on the relationship among cost, self-control, and individuals' donation behavior, and provided empirical basis for boosting individuals' donation behavior.

Methods: In preliminary experiment, Carlson's real donation paradigm was conducted to examine the effect of cost on individuals' donation behavior. In experiment 1, we examined the effects of cost, self-control ability, and self-affirmation on individuals' donation behavior. Individuals with high or low self-control ability were assigned to complete the experimental induction of self-affirmation or non-affirmation. Subsequently, all participants completed the donation task under three cost conditions same as preliminary experiment. In experiment 2, we examined the effects of cost, self-control resource, and self-affirmation on individuals' donation behavior. Participants were assigned to complete the different Stroop task to induce the state of self-control resource exhaustion or non-exhaustion. Then, they completed the priming of self-affirmation or non-affirmation same as experiment 1. Finally, all participants completed the donation task under three cost conditions same as preliminary experiment.

Results: The results of preliminary experiment indicated that participants engaged in more donation behavior under low- and medium-cost conditions compared with high-cost condition. The results of experiment 1 demonstrated that self-affirmation exerted a promoting effect on the donation behavior for individuals with low self-control ability under low-, medium-, and high-cost conditions. The results of experiment 2 demonstrated that self-affirmation promoted the donation behavior of individuals with self-control resource exhaustion under low-, medium-, and high-cost conditions.

Conclusion: Self-affirmation could promote the donation behavior of individuals with low self-control ability and those with self-control resource exhaustion, whether donation's cost was high or low. Self-affirmation plays a crucial role for boosting individuals' donation behavior.

Keywords: cost, self-control, self-affirmation, donation behavior

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Introduction

Donation behavior plays a crucial role in promoting the development of social and public welfare undertakings and maintaining national modernization drive. Individuals from all walks of life engaged in donation behavior during the

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coronavirus disease 2019 pandemic. Donation behavior refers to the act of voluntarily providing money, goods, or time to someone in need to increase their welfare.[1] Donation behavior is a type of prosocial behavior[2] and can be divided into organ donation,[3] blood donation,[4] goods donation,[5] and monetary donation.[6] The present study mainly investigated individuals' monetary donation behavior.

Carlson's Real Donation Paradigm

Previous studies have adopted different measurement methods to explore individuals' donation behavior based on different experimental variables. For instance, (1) took the willingness to donate money as the measurement standard of donation behavior,[7] or used a Likert scale to examine the willingness to donate;[8] (2) took the willingness to donate goods as the measurement standard of donation behavior by asking, "Would you be willing to donate clothing to charity?";[9] (3) considered the difficulty of donation task as the measurement standard and reported that the more difficult the task, the stronger is the willingness to donate.[10] However, these aforementioned donation paradigms lacked authenticity and validity because of a fictitious donation situation. Therefore, our study used Carlson's real donation paradigm[6] to bring participants into a real donation situation.

In the real donation paradigm, participants would get a starting payment of 20 Yuan at the beginning of the experiment, and he/she would play as a "Donator" to decide whether to accept the donation plan presented in the computer. If he/she accepted the donation plan, the corresponding money would be donated to the Charity. If he/she refused the donation plan, he/she would get all money and did not donate money to the Charity. Moreover, participants were told that average money of all rounds' donation would be considered as the actual donation money to the Charity, and it would be deducted from their starting payment. The final participation fee of subjects was their starting payment minus actual donation money, so donation decisions of participants would affect their final participation fee. This donation paradigm could effectively reflect participants' real donation behavior based on a real donation situation. With the deeply research on online technology, online technology can clearly simulate real donation situation.[11] Because online technology is very convenient and efficient, more and more researchers have adopted online donation paradigm to measure individuals' donation behavior,[6,11] their studies provide further support for how donations online can be measured in a consequential way.

Cost and Donation Behavior

Carlson's real donation paradigm also discussed the effect of cost on individuals' donation behavior.[6] The previous study suggested that prosocial tendency depended on costs, benefits, and the environment.[12] Cost was the main influencing factor of helping behavior.[13] In the field of donation, cost refers to time, material possessions, risk, and expenses that individuals are required to pay when making a donation.[14] According to the research of Chinman and Wandersman,[15] the present study would define cost as a tangible material cost, namely money. In the present study, donation behavior refers to the act that participants donate money to the Charity, material cost (money) is the main cost of donation behavior.

Studies indicated that individuals' donation behavior would decrease with an increase in donation cost.[16–18] Harbaugh et al reported that participants' willingness to donate decreased with an increase in donation cost.[18] However, a unified division standard for cost has not been used to investigate the effect of cost on prosocial behavior. Heyman and Ariely suggested that cost in terms of money could be divided into low-cost (US$0.50) and high-cost (US$5.00).[19] Yu et al proposed that 25–50% and 75–100% of the total disposable money could be considered low- and high-cost, respectively.[20] Furthermore, Carlson et al divided donation cost into low, medium, and high level and indicated that 5–35%, 40–60%, and 65–95% of the starting payment could be considered as low-, medium-, and high-cost, respectively.[6] Carlson's division standard of cost is more precise and reasonable, and thus is more convenient for use in experiments. Accordingly, Carlson's division method was adopted in the present study to investigate the effect of cost on individuals' donation behavior under the real donation paradigm, and to examine the validity of the paradigm.

Self-Control and Donation Behavior

According to the resource dependence theory,[21] individuals' donation behavior is mainly affected by both internal and external resources, including human capital (personal characteristics), social capital (social networks), and cultural capital. Self-control is considered as a regulatory mechanism between internal natural impulse and external cultural demand,[22] self-control exerts a crucial effect on donation behavior.[23] Self-control refers

to individuals' ability to control and transform their own impulsive and habitual actions to match their own values, ideals, social morality, and expectations for maintaining the ability to pursue long-term goals.[24] Self-control can be divided into two aspects: self-control ability and self-control resource. Self-control ability is a trait that develops with an individual's growth and is relatively stable,[25] whereas self-control resource is an immediate state of individual and can be manipulated. Studies have shown that cognitive resources would be consumed during self-control tasks, such resources were called self-control resources.[26] According to the theory of limited self-control, self-control resource will be consumed and exhausted after individuals conduct purposeful and conscious self-control task. They will be in the state of self-control resource exhaustion.[27] Our research used the self-control scale developed by Tangney et al and revised by Tan and Guo to measure individuals' self-control ability and select individuals with low or high self-control ability.[25,28] We adopted the Stroop task to manipulate participants' self-control resource.[29]

Previous studies have explored the relationship between self-control resource and donation behavior. Fei et al found that compared with individuals with self-control resource exhaustion, those without self-control resource exhaustion engaged in more donation behavior and prosocial behavior.[30] Cantarero and van Tilburg found that compared with control group, the group with self-control resource exhaustion chose to engage in less altruistic behavior and more selfish behavior.[23] Previous studies have reported that the significance of self-control for explaining donation among adults.[31,32] Moreover, a field experiment for children aged between 4–8 found that self-control resources depletion led to significantly lower likelihood of donating.[33] However, few studies have explored the relationship between self-control ability and donation behavior. Whether self-control resource, self-control ability, or both play a major role in improving individuals' donation behavior has not been fully clarified in previous studies and thus should be explored.

Self-Affirmation and Donation Behavior

According to the resource dependence theory,[21] individuals' state factors or internal resources can affect their donation behavior. However, previous studies have mainly investigated the effect of emotion, personality factors, and social factors on donation behavior.[34–36] Few studies explored the effect of individuals' state factors on donation behavior. With further studies, researchers have gradually focused on self-affirmation as an individual's state factor.[37,38] Self-affirmation refers to individuals maintaining or restoring their own global positive self-integrity from threats by affirming some vital aspects of the self that are unrelated to the threatening domain.[39] Self-affirmation can be divided into value affirmation and attribute affirmation.[40] Value affirmation leads individuals to think more regarding their own core values and norms, whereas attribute affirmation leads individuals to affirm their own positive traits and believe that they are more capable.[41] According to previous studies,[42–44] the value scale method was used to manipulate value self-affirmation in the present study.

Previous studies have indicated that self-affirmation could promote prosocial and donation behavior. Thomaes et al found that self-affirmation could increase adolescents' prosocial behavior.[45] In addition, self-affirmation could change individuals' attitudes toward organ donation and increase individuals' organ donation decisions.[38] According to the theory of self-affirmation, individuals who experience self-affirmation can maintain the integrity of the self, pay more attention to others' needs, and make more donation decisions. Because ignoring the demands of others would indicate that an individual is not kind; thus, this behavior can be a threat to the integrity of the self.[38] Therefore, the theory of self-affirmation can explain why individuals with self-affirmation have more donation behavior.

Self-Affirmation and Cost

Previous studies have explored the relationship between self-affirmation and cost. Epton et al found that compared with the nonaffirmation group, the self-affirmation group was more likely to accept high-cost or high-risk information, and change their behavior to complete high-cost or high-risk tasks because they were less sensitive to costs and risks.[46] Furthermore, Wang and Zhao examined the relationship between self-affirmation and individuals' willingness to donate organs and found that self-affirmation enhanced the possibility of individuals to consider future consequences, and reduced the time cost that individuals might think about.[38] Which might suggest that self-affirmation could increase individuals' donation behavior whether donation's cost was high or low, which meant that self-affirmation might increase individuals' donation behavior even under high-cost level.

Self-Affirmation and Self-Control

Previous studies have explored the relationship between self-affirmation and self-control. Harris and Miles reported that self-affirmation could improve individuals' self-control.[47] Schmeichel and Vohs indicated that self-affirmation was regarded as a psychological strategy to enhance self-control when individuals were in a state of self-control resource exhaustion.[48] Furthermore, self-affirmation could reduce restricted eaters' motivation of eating high-calorie foods when they were in a state of self-control resource exhaustion, indicating that self-affirmation could offset the loss of self-control resource and increase individuals' self-control resource to improve their performance.[49] Which might suggest that self-affirmation could increase individuals' donation behavior even if when they were in a state of self-control resource exhaustion. However, whether self-affirmation could increase the donation behavior of individuals with low self-control ability has not been fully clarified. Further, it was not clear that whether self-affirmation could increase the donation behavior of individuals with low self-control ability and individuals with self-control resource exhaustion under different cost levels.

The Present Study

Previous studies have found that individuals would reduce donation behavior under high-cost condition.[16–18] Moreover, individuals in a state of self-control resource exhaustion would also have less donation behavior.[31–33] However, donation behavior plays a crucial role in promoting the development of social and public welfare undertakings.[1,2] Therefore, it is very important to explore how to promote the donation behavior of individuals with self-control resource exhaustion and how to promote the donation behavior of individuals with self-control resource exhaustion even under high-cost condition.

Existing studies have found that self-affirmation could promote donation behavior.[38,45] More importantly, self-affirmation could help people to accept high-cost information and change their behaviors to achieve long-term benefits,[38,46] and self-affirmation could also facilitate self-control when the resource had been exhausted.[48,49] However, whether self-affirmation could increase individuals' donation behavior under high-cost condition has not been fully clarified, whether self-affirmation could increase donation behavior of individuals with low self-control ability and individuals with self-control resource exhaustion has not been fully clarified. Further, it was not clear that whether self-affirmation could increase donation behavior of individuals with low self-control ability and individuals with self-control resource exhaustion even under high-cost condition.

Based on these findings, three experiments were conducted in this study to investigate the effect of cost, self-control, and self-affirmation on individuals' donation behavior from two aspects of self-control ability and self-control resource. The present study aimed to examine (a) whether self-affirmation can increase the donation behavior of individuals with low self-control ability, (b) whether self-affirmation can increase the donation behavior of individuals with low self-control ability under high-cost condition, (c) whether self-affirmation can enhance the donation behavior of individuals in a state of self-control resource exhaustion, and (d) whether self-affirmation can improve the donation behavior of individuals in a state of self-control resource exhaustion under high-cost condition. Specifically, In the preliminary experiment, anonymous donation tasks were performed to investigate the effect of cost on donation behavior and to verify the validity of Carlson's real donation paradigm. In experiment 1, we examined the effects of cost, self-control ability, and self-affirmation on donation behavior. In experiment 2, we examined the effects of cost, self-control resource, and self-affirmation on donation behavior.

The present study could provide insights into factors affecting individuals' donation behavior, enhance the resource dependence theory of donation behavior, and provide a crucial basis for formulating measures to improve individual donation behavior.

Preliminary Experiment

Purpose and Hypothesis

Purpose

The aim was to verify the validity of the real donation paradigm and investigate the effect of cost on individuals' donation behavior.

Hypothesis

Compared with high-cost condition, participants would engage in more donation behavior under medium-cost condition;

Compared with medium-cost condition, participants would engage in more donation behavior under low-cost condition.

Materials and Methods

Participants

We used G*Power 3.1[50] to calculate the required number of participants and these parameters were set as f=0.25, α=0.05, P=0.8. The required total sample size was 28 (Single factor and three levels within-subjects design, two tailed). However, we aimed to recruit as large a sample as we could to maximize the statistical power, we finally recruited 46 participants aged over 18 years old, comprising 18 males and 28 females. Those aged between 18 and 20 accounted for 95.65% of the total number of participants. All participants were right-handed, with a normal or corrected-to-normal vision, and all participants involved in the present study signed informed consent. This study was approved by the Institutional Review Board of Hunan Normal University, Department of Psychology, and the research protocol was approved by the ethics committee. The research was conducted in accordance with the Declaration of Helsinki. Three participants were excluded from the analysis due to the procedural problem that did not record their data.

Experimental Design

A single factor within-subjects experimental design. Cost was a within-subjects factor and divided into three levels (Low vs Medium vs High). Donation proportion was the dependent variable.

Procedure

Donation Task

Each participant needed to complete the experiment in a separate small room. We used the real donation paradigm proposed by Carlson et al,[6] and the experimental procedure was presented in E-prime 2.0. At the beginning of the experiment, participants would get a starting payment of 20 Yuan and were informed related information about the China Charity Federation, including the status of the charity organization and some projects to which they could donate. Next, each participant was told that they needed to complete the donation task consisted of 100 rounds. In each round, he/she would play as a "Donator" to decide whether to accept the donation plan presented in the screen. If he/she accepted the donation plan and pressed the "F" key, the corresponding money would be donated to the Charity. If he/she refused the donation plan and press the "J" key, he/she would get all money and did not donate money to the Charity. Moreover, participants were told that average donation money of all rounds would be considered as the actual donation money to the Charity and it would be deducted from their starting payment. The final participation fee of participants was their starting payment minus the actual donation money, the more money that they chose to donate, the less their final participation fee. Finally, participants were informed that the donation task was anonymous and the total amount they donated would be donated to the China Charity Federation through their official website. For example, the computer showed a donation plan in which participant would receive 1 yuan and the remaining 19 yuan would be donated to the Charity. If participant accepted the donation plan, he/she would receive 1 yuan and 19 yuan would be donated to the Charity. If participant refused the donation plan, he/she would receive 20 yuan (see Figure 1).

Donation Plan

According to the division standard for cost of Carlson et al,[6] 5–35%, 40–60%, and 65–95% of the starting payment could be considered as low, medium, and high cost. These specific donation plans would be presented based on the division standard of cost. In formal experiment, there are 5 blocks and each block had 20 trials, included 7 trials for the high-cost level, 6 trials for the medium-cost level, and 7 trials for the low-cost level. Specifically, for the low-cost level, participants needed to decide whether donated 1, 2, 3, 4, 5, 6, 7 Yuan to the Charity. For the medium-cost level, participants needed to decide whether donated 8, 9, 10, 10, 11, 12 Yuan to the Charity. For the high-cost level, participants needed to decide whether donated 13, 14, 15, 16, 17, 18, 19 Yuan to the Charity, respectively. The formal experiment consisted of 5 blocks and 100 trials in total, there were 35 trials for the high-cost level, 30 trials for the medium-cost level, and 35 trials for the low-cost level. Each participant is required to complete the donation task under all three cost levels. All trials were presented randomly on the computer. Donation proportion was equal to the number of trials that participant chose to donate (accept the donation plan) at each cost level divided by the total number of trials at each cost level.

Statistical Analysis

All data were analyzed by SPSS 24.0. A repeated measure analysis of variance (ANOVA) of 3 (cost: low vs medium vs high) was conducted for the donation proportion. Statistical differences were considered significant at p <0.05. Post hoc comparisons were Bonferroni-corrected

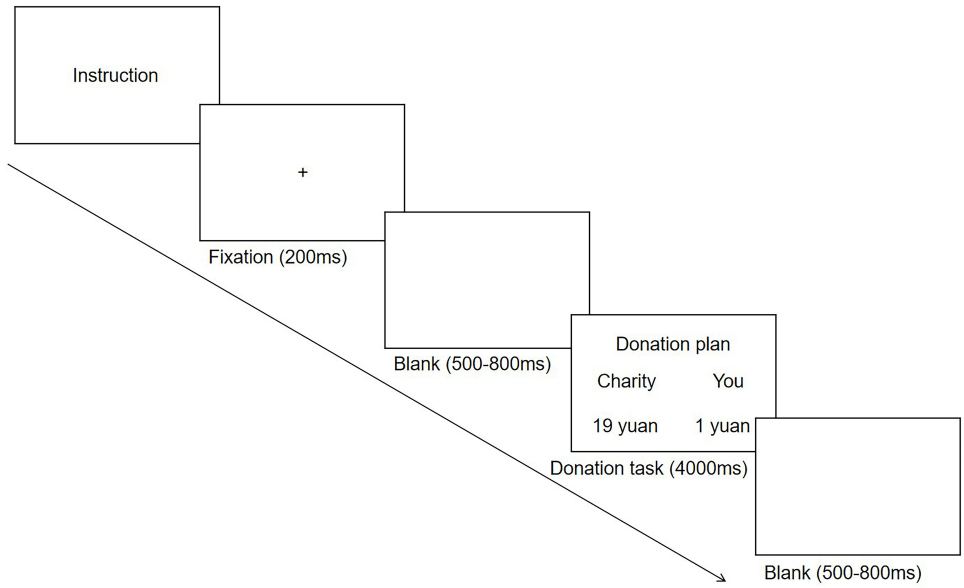

Figure 1 Illustration of the donation task.

at p <0.05, and the partial eta-squared (η_p^2) was reported as a measure of effect size.

Results

Donation Proportion

The main effect of cost was significant (F[2, 40] = 4.791, p = 0.013, η_p^2= 0.105). The donation proportion was significantly higher at the low cost level (M = 0.818, SD = 0.037) than at the medium cost level (M = 0.674, SD = 0.057) and at the high cost level (M = 0.134, SD = 0.032). Furthermore, the donation proportion was significantly higher at the medium cost level than at the high cost level (see Figure 2).

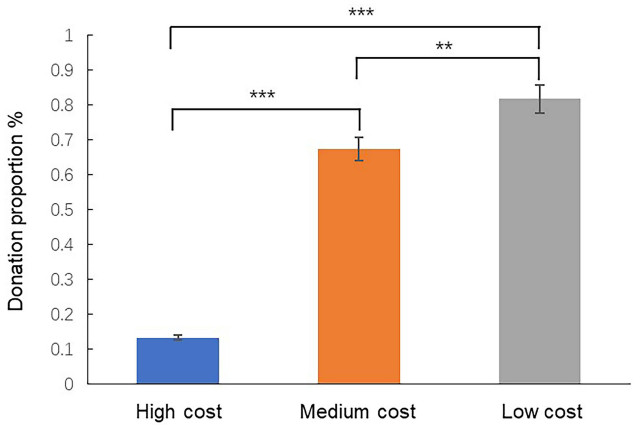

Figure 2 Results of the preliminary experiment: individuals' donation proportion at low-, medium-, and high-cost levels. Error bars indicate standard errors. **p < 0.01, ***p < 0.001.

Discussion

The real donation paradigm proposed by Carlson was used in preliminary experiment, and the results showed that the main effect of cost was significant. In line with our hypothesis, individuals would engage in more donation behavior under low- and medium-cost conditions compared with high-cost condition. This finding is consistent with those of previous studies,[6,51] and it verified the validity of Carlson's real donation paradigm. Previous studies indicated that cost was the main factor for affecting prosocial behavior.[52] Penner et al reported that the probability of engaging in helping behavior would decrease with an increase in cost.[13] Similarly, individuals' donation behavior decreased as donation's cost increased.[16,17] One plausible explanation of this finding is that individuals are inclined to measure their own benefits under high-cost condition and thus reduce their donation behavior to prevent large losses.

Experiment 1

Purpose and Hypothesis

Purpose

The aim was to investigate the effects of cost, self-control ability, and self-affirmation on individuals' donation behavior.

Hypothesis

Self-affirmation would increase individuals' donation behavior under high-cost condition compared with non-affirmation.

Self-affirmation would increase the donation behavior of individuals with low self-control ability compared with non-affirmation.

Self-affirmation would increase the donation behavior of individuals with low self-control ability under high-cost condition compared with non-affirmation.

Materials and Methods

Participants

We used G*Power 3.1[50] to calculate the required number of participants and these parameters were set as f=0.25, α=0.05, P=0.8. The required total sample size was 124 (mixed-design, two tailed). However, we aimed to recruit as large a sample as we could to maximize the statistical power, we distributed self-control ability scales to 278 undergraduates to measure their self-control ability.[28] We successfully received 251 copies. The recovery rate was 90.2%. According to their scores on the self-control ability scale, we selected the top 27% of the undergraduates as exhibiting high self-control ability, and then selected the latter 27% of the undergraduates as exhibiting low self-control ability, and each group included 67 participants. 8 participants were excluded because they did not want to participate in the formal experiment. Finally, we recruited 126 participants aged over 18 years old, comprising 45 males and 81 females. Those aged between 18 and 20 accounted for 89.68% of the total number of participants. A total of 64 participants were gathered (M=35.06, SD=8.07) in the people with high self-control ability, including 25 men. Moreover, 62 participants were in the people with low self-control ability (M=75.97, SD=7.37), including 20 men. All participants were right-handed, with a normal or corrected-to-normal vision, and all participants involved in the present study signed informed consent. This study was approved by the Institutional Review Board of Hunan Normal University, Department of Psychology, and the research protocol was approved by the ethics committee. The research was conducted in accordance with the Declaration of Helsinki.

Experimental Design

The experiment had a 3 (Cost: Low vs Medium vs High) × 2 (Self-control ability: Low vs High) × 2 (Self-affirmation: Self-affirmation vs Nonaffirmation) mixed-design. Cost served as a within-subjects factor, self-control ability and self-affirmation were between-subjects factors. Donation proportion was the dependent variable.

Experimental Material

Self-Control Ability Scale

Tan and Gou revised the Self-Control Ability Scale[28] for college students in China and included 19 questions related to 5 dimensions. The internal consistency coefficient (α) was 0.862, which showed good reliability and validity. 5-point Likert scale was used to calculate the score of each question, where a score of 1 indicated "completely inconsistent" and a score of 5 indicated "completely consistent." We used the total score of the scale to represent self-control ability of subjects, and the higher the total score, the lower self-control ability (see Appendix 1).

Self-Affirmation Manipulation

The value scale method reported by Spencer et al was used to induce individuals' self-affirmation and nonaffirmation.[42] Participants with self-affirmation were asked to rank listed values (including 13 values, such as social skills, physical health, and so on) and choose a value that they believed was the most important. Furthermore, they were asked to explain why the selected value was the most important for them and write it on the page. Participants with nonaffirmation were asked to rank listed fruits (including 13 kinds of fruit) and choose their favorite fruit. They were also asked to explain why the selected fruit was their favorite and write it (see Appendix 1).

Self-Affirmation Manipulation Check

We adopted the method reported by Chen and Shi to examine the manipulation of self-affirmation.[40] Two questions were asked to individuals with self-affirmation and those with nonaffirmation: "Do you think about your positive aspects at the moment?" and "Do you think about something that is very important to you at the moment?" We used a five-point Likert scale to calculate the score for each question, where a score of 1 indicated "completely disagree" and a score of 5 indicated "completely agree." The higher the score, the higher level of self-affirmation.

Procedure

Each participant needed to complete the experiment in a separate small room. Moreover, the experimental instruction and experimental procedure were presented on the computer. Firstly, half of 64 high self-control ability participants were selected randomly to complete the manipulation of self-affirmation, and the other half completed the manipulation of nonaffirmation. Similarly, half of 62 low self-control ability participants were selected randomly to

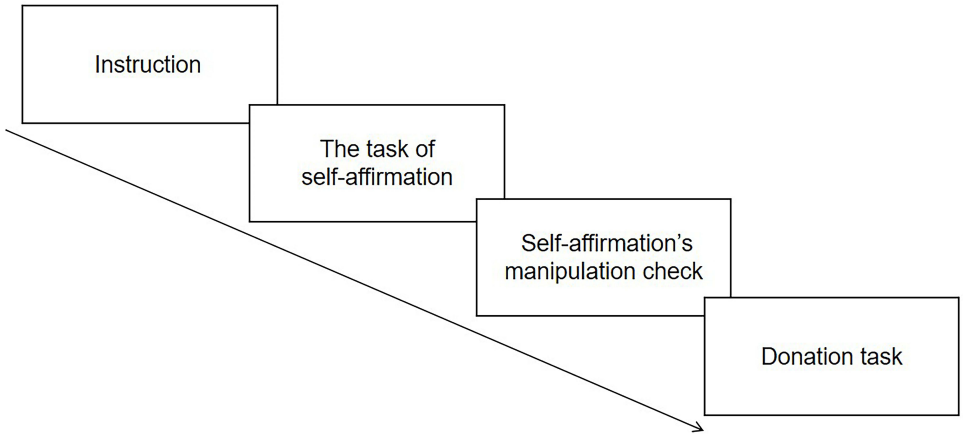

Figure 3 Illustration of the experimental procedure of experiment 1.

complete the manipulation of self-affirmation, and the other half completed the manipulation of nonaffirmation. Finally, each participant completed the donation task under all three cost levels. Experimental procedure is shown in Figure 3.

Donation task and Donation plan: Same as the preliminary experiment.

Statistical Analysis

An independent sample *t*-test was used to analyze the results of self-affirmation's manipulation check. A repeated measure analysis of variance (ANOVA) was conducted for the donation proportion.

Results

Manipulation Check

Significant differences were observed in the scores of two questions between self-affirmation group and nonaffirmation group (see Table 1). According to existing research,[42] the results suggested that the manipulation of self-affirmation was effective.

Donation Proportion

The main effect of cost was significant (F[2, 123] = 372.139, $p < 0.001$, $\eta_p^2 = 0.753$). Individuals' donation proportion was significantly higher at the low cost level ($M = 0.698$, $SD = 0.018$) than at the medium cost level ($M = 0.522$, $SD = 0.017$). Individuals' donation proportion was significantly higher at the medium cost level than at the high cost level ($M = 0.194$, $SD = 0.009$). A significant main effect of self-control ability (F[1, 124] = 12.447, $p = 0.003$, $\eta_p^2 = 0.093$) was observed. The donation proportion was significantly higher for the high self-control ability group ($M = 0.509$, $SD = 0.015$) than the low self-control ability group ($M = 0.434$, $SD = 0.015$). The main effect of self-affirmation was significant (F[1, 124] = 182.675, $p < 0.001$, $\eta_p^2 = 0.600$). The donation proportion was higher for the self-affirmation group ($M = 0.615$, $SD = 0.015$) than for the nonaffirmation group ($M = 0.327$, $SD = 0.015$).

No significant interaction effect was observed between cost and self-control ability (F[2, 120] = 1.888, $p = 0.286$). A significant interaction effect was observed between cost and self-affirmation (F[2, 120] = 13.043, $p < 0.001$, $\eta_p^2 = 0.097$). The simple effect analysis revealed that at the high cost level, the donation proportion was higher for the self-affirmation group than for the nonaffirmation group (F[2, 120] = 262.248, $p < 0.001$, $\eta_p^2 = 0.682$). At the medium cost level, the donation proportion was higher for the self-affirmation group than for the nonaffirmation group (F[2, 120] = 123.830, $p < 0.001$, $\eta_p^2 = 0.504$). At the low cost level, the donation proportion was higher for the self-affirmation group than for the nonaffirmation group (F[2, 120] = 28.624, $p < 0.001$, $\eta_p^2 = 0.190$; see Figure 4).

A significant interaction effect was observed between self-control ability and self-affirmation (F[1, 122] = 5.339,

Table 1 Manipulation Check Results for Self-Affirmation in Experiment 1

	Self-Affirmation Group (*M*±*SD*)	Non-Affirmation Group (*M*±SD)	*t*	*p*	Cohen's d
Positive aspects	4.00±0.950	2.21±0.936	10.673	<0.001	1.122
Important things	3.98±0.889	2.44±0.980	9.236	<0.001	1.366

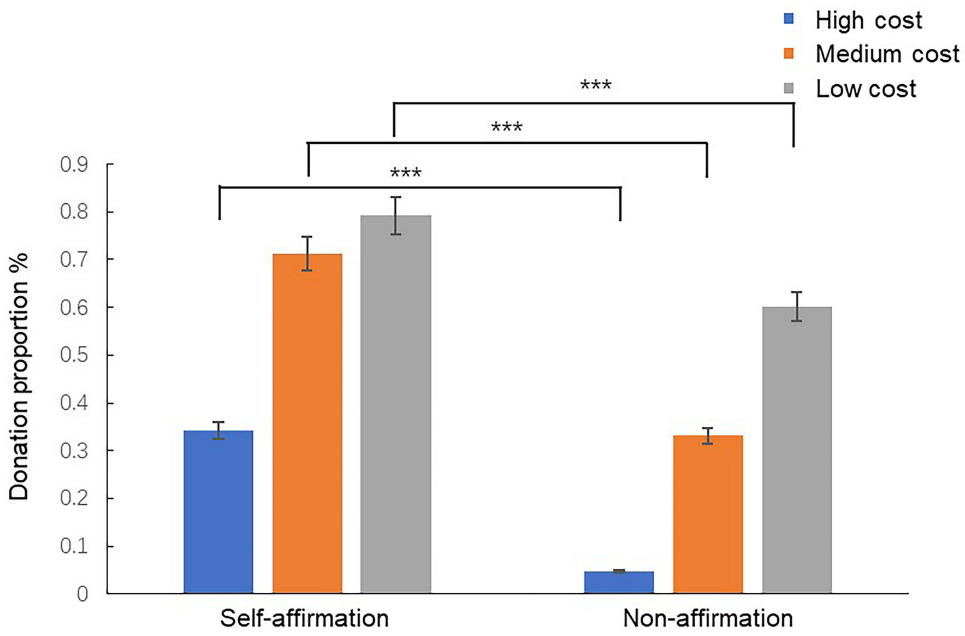

Figure 4 Results of experiment 1: differences in individuals' donation proportion between the self-affirmation group and the nonaffirmation group under low-, medium- and high-cost conditions. Error bars indicate standard errors. ***$p < 0.001$.

$p = 0.021$, $\eta_p^2 = 0.042$). The simple effect analysis revealed that when self-control ability was low, the donation proportion was higher for the self-affirmation group than for the nonaffirmation group ($F[1, 122] = 127.256$, $p < 0.001$, $\eta_p^2 = 0.511$). When self-control ability was high, the donation proportion was higher for the self-affirmation group than for the nonaffirmation group ($F[1, 122] = 61.797$, $p < 0.001$, $\eta_p^2 = 0.336$; see Figure 5).

A significant interaction effect was observed among cost, self-control ability, and self-affirmation ($F[2, 114] = 7.045$, $p = 0.008$, $\eta_p^2 = 0.055$). The simple effect analysis revealed that at the high cost level, the donation proportion was higher for the low self-control ability group that experienced self-affirmation than it was for the low self-control ability group that did not experience self-affirmation ($F[2, 114] = 124.690$, $p < 0.001$, $\eta_p^2 = 0.505$).

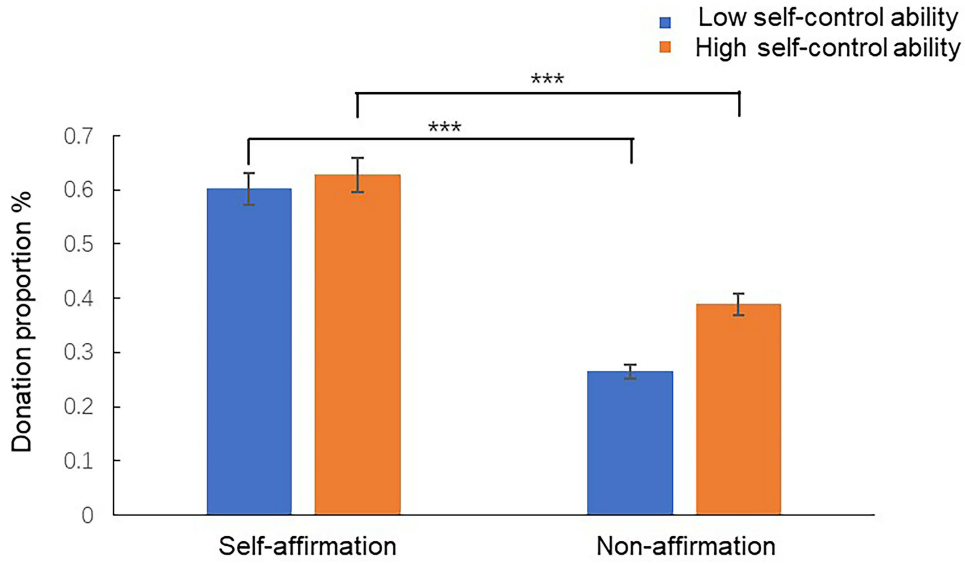

Figure 5 Results of experiment 1: differences in individuals' donation proportion between the self-affirmation group and the nonaffirmation group under low self-control ability and high self-control ability conditions. Error bars indicate standard errors. ***$p < 0.001$.

At the medium cost level, the donation proportion was higher for the low self-control ability group that experienced self-affirmation than it was for the low self-control ability group that did not experience self-affirmation (F[2, 114] = 73.361, $p < 0.001$, $\eta_p^2 = 0.376$). At the low cost level, the donation proportion was higher for the low self-control ability group that experienced self-affirmation than it was for the low self-control ability group that did not experience self-affirmation (F[2, 114] = 40.456, $p < 0.001$, $\eta_p^2 = 0.249$). At the high cost level, the donation proportion was higher for the high self-control ability group that experienced self-affirmation than it was for the high self-control ability group that did not experience self-affirmation (F[2, 114] = 137.631, $p < 0.001$, $\eta_p^2 = 0.530$). At the medium cost level, the donation proportion was higher for the high self-control ability group that experienced self-affirmation than it was for the high self-control ability group that did not experience self-affirmation (F[2, 114] = 57.604, $p < 0.001$, $\eta_p^2 = 0.297$; see Figure 6).

Discussion

The results of our study indicated that the donation proportion was higher for the high self-control ability group than for the low self-control ability group; this finding is consistent with that of a previous study.[31] According to the previous study, individuals with high self-control ability could make more reasonable decisions because their decision-making might be dominated by rational systems. By contrast, individuals with low self-control ability could choose to maximize self-interest because their decision-making might be dominated by intuitive systems, and they would engage in less donation behavior.[53] The results of our study revealed that the donation proportion was higher for the self-affirmation group than for the nonaffirmation group; this finding is consistent with the previous study.[54] According to the theory of self-affirmation,[38] individuals who experience self-affirmation can maintain the integrity of the self, pay more attention to others' needs, and make more donation decisions. Ignoring the demands of others would indicate that an individual is not kind; thus, this behavior can be a threat to the integrity of the self.

The results of experiment 1 showed a significant interaction effect between cost and self-affirmation. Self-affirmation was found to exert a promoting effect on individuals' donation behavior under different cost levels; however, self-affirmation exerted a stronger promoting effect on individuals' donation behavior under high-cost condition than low- and medium-cost conditions. In line with our predictions, self-affirmation could increase individuals' donation behavior even under high-cost condition. These results are consistent with the previous study. Harris and Epton reported that compared with the nonaffirmation

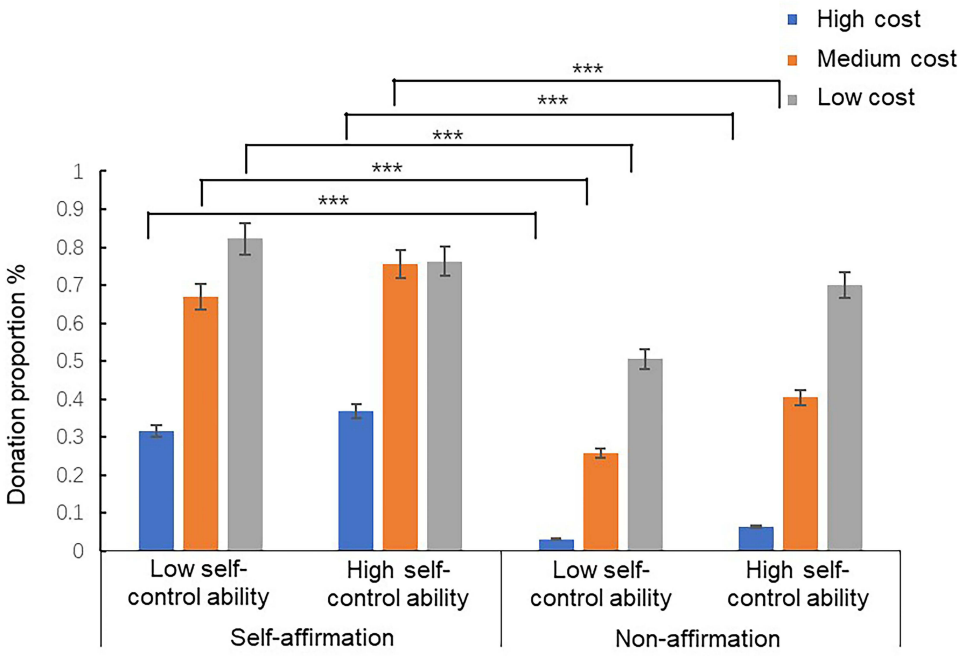

Figure 6 Results of experiment 1: differences in individuals' donation proportion between the low and high self-control ability groups and the self-affirmation and nonaffirmation groups under low-, medium-, and high-cost conditions. Error bars indicate standard errors. ***$p < 0.001$.

group, the self-affirmation group was more likely to accept high-cost or high-risk information and change their behavior to complete high-cost tasks.[55] One plausible explanation of this finding is that value affirmation leads to equal consideration for different cost levels and helps individuals to reduce egoistic thoughts.[46] Another plausible explanation of this finding is that value affirmation may improve individual empathy, previous study showed that individuals who experienced self-affirmation could better perceive other's situation and changed their behavior to help others,[56] so individuals who experienced self-affirmation might increase donation behavior even under high-cost condition.

The results of experiment 1 revealed a significant interaction effect between self-control ability and self-affirmation. Self-affirmation exerted a promoting effect on individuals' donation behavior under conditions of different self-control ability. However, self-affirmation exerted a stronger promoting effect on donation behavior of the low self-control ability group than that of the high self-control ability group. In line with our predictions, self-affirmation could increase donation behavior of individuals with low self-control ability. These results are consistent with previous studies. Self-affirmation led individuals to think more about their value to control crucial results, and it could improve individuals' perception of self-control ability to some extent.[39] Storr and Sparks found that self-affirmation could lead individuals to pay more attention to their value and give up immediate interests.[49] One plausible explanation of this finding is that self-affirmation can strengthen individual's self-concept and enhance self-regulation.[48] Consequently, individuals who experienced self-affirmation could compensate for self-control by attaching importance to individual's self-concept and enhancing self-regulation ability.

The findings of experiment 1 showed a significant interaction effect among cost, self-control ability, and self-affirmation. In line with our predictions, self-affirmation would improve donation behavior of individuals with low self-control ability even under high-cost condition. Previous study indicated that self-affirmation could improve self-control level and that the self-affirmation group was more likely to accept high-cost information and change their behavior to complete high-cost tasks.[47,55] These results suggested that self-affirmation might improve donation behavior of low self-control ability group even under high-cost condition.

Self-control ability is a stable personality trait that is difficult to change or manipulate. However, self-control resource is a state factor that can be manipulated. If self-control resource might affect individuals' donation behavior, we could promote individuals' donation behavior by manipulating individuals' self-control resource. Therefore, in the subsequent experiment, we examined whether self-control resource could affect individuals' donation behavior. Previous studies have reported that self-affirmation could offset the loss of self-control resources and increase individuals' self-control resources to improve their performance in subsequent tasks.[49] Accordingly, in subsequent experiment, we investigated whether self-affirmation could improve the donation behavior of individuals in a state of self-control resource exhaustion. Furthermore, we explored whether self-affirmation could improve the donation behavior of individuals in a state of self-control resource exhaustion under high-cost condition.

Experiment 2

Purpose and Hypothesis

Purpose

The aim was to investigate the effects of cost, self-control resource, and self-affirmation on individuals' donation behavior.

Hypothesis

Self-affirmation would increase individuals' donation behavior under high-cost condition compared with non-affirmation.

Self-affirmation would increase the donation behavior of individuals in a state of self-control resource exhaustion compared with non-affirmation.

Self-affirmation would increase the donation behavior of individuals in a state of self-control resource exhaustion under high-cost condition compared with non-affirmation.

Materials and Methods

Participants

We used G*Power 3.1[50] to calculate the required number of participants and these parameters were set as f=0.25, α=0.05, P=0.8. The required total sample size was 124 (mixed-design, two tailed). Finally, 124 participants with moderate self-control ability were selected and randomly divided into self-control resource exhaustion group and nonexhaustion group, each group had 62 participants. All 124 participants aged over 18 years old, comprising 50 males and 74 females. Those aged between 18 and 20 accounted for 95.96% of the total number of participants. All participants were

right-handed, with a normal or corrected-to-normal vision, and all participants involved in the present study signed informed consent. This study was approved by the Institutional Review Board of Hunan Normal University, Department of Psychology, and the research protocol was approved by the ethics committee. The research was conducted in accordance with the Declaration of Helsinki.

Experimental Design

The experiment had a 3 (Cost: Low vs Medium vs High) × 2 (Self-control resource: Exhaustion vs Nonexhaustion) × 2 (Self-affirmation: Self-affirmation vs Nonaffirmation) mixed-design. Cost served as a within-subjects factor, self-control resource and self-affirmation were between-subjects factors. Donation proportion was the dependent variable.

Experimental Material

Self-Control Resource Manipulation

We used the Stroop task developed by Fan et al to manipulate the state of self-control resource.[29] The Stroop task had two forms, included the task of word-color consistency and the task of word-color inconsistency. In two tasks, participants were asked to identify the word's color that presented in the screen. In the task of word-color consistency, the word's meaning was the same as the word's color (green vs green), but in the task of word-color inconsistency, the word's meaning was not the same as the word's color (green vs red) (see Figure 7).

The task of word-color inconsistency was difficult because participants needed to identify the word's color and avoid the interference from the word's meaning at the same time. Therefore, participants would use more self-control resources to complete the task and their self-control resource would be temporarily exhausted. The task of word-color consistency was easy because participants could easily identify the word's color with the help of the word's meaning. Therefore, their self-control resource would not be temporarily exhausted. In our experiment, self-control resource exhaustion group would complete the task of word-color inconsistency and self-control resource nonexhaustion group would complete the task of word-color consistency.

Manipulation Check for Self-Control Resource

We adopted the manipulation check method developed by Fan et al and used a seven-point Likert scale to measure the exhaustion of participants before and after the Stroop task.[29] Exhaustion was measured by asking "How tired are you now?" Before the Stroop task and "How tired are you after the Stroop task?". A score of 1 indicated "the least fatigue" and a score of 7 indicated "the most fatigue". We used a seven-point Likert scale to measure the difficulty of the Stroop task by asking "How difficult do you think the task is?" A score of 1 indicated "not at all," and a score of 7 indicated "very difficult." We used a seven-point Likert scale to measure the effort level of participants in the Stroop task by asking "How much effort will you have to take to complete the task?" A score of 1 indicated "no effort at all," and a score of 7 indicated "very hard work."

Self-Affirmation Manipulation and Manipulation Check: Same as experiment 1.

Procedure

Each participant needed to complete the experiment in a separate small room. Moreover, the experimental instruction and experimental procedure were presented on the computer. Firstly, self-control resource exhaustion group

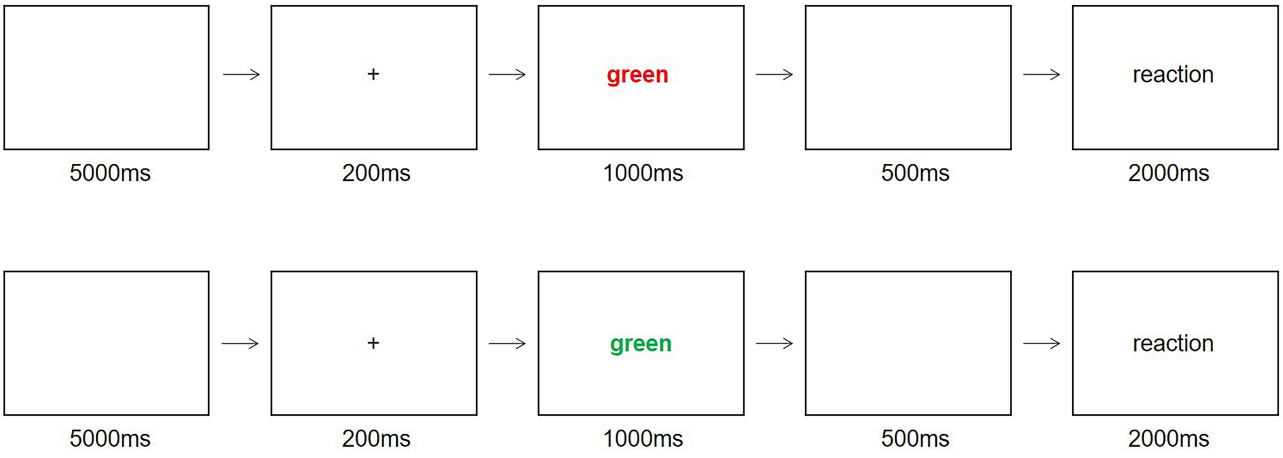

Figure 7 Illustration of the stroop task.

completed the Stroop task of word-color inconsistency and nonexhaustion group completed the Stroop task of word-color consistency. Then, half of 62 self-control resource exhaustion participants were selected randomly to complete the manipulation of self-affirmation, and the other half completed the manipulation of nonaffirmation. Similarly, half of 62 self-control resource nonexhaustion participants were selected randomly to complete the manipulation of self-affirmation, and the other half completed the manipulation of nonaffirmation. Finally, each participant was asked to complete the donation task under all three cost levels. Experimental procedure is shown in Figure 8.

Donation task and Donation plan: Same as the preliminary experiment.

Statistical Analysis

An independent sample *t*-test was used to analyze the results of self-control resource's manipulation check and self-affirmation's manipulation check. A repeated measure analysis of variance (ANOVA) was conducted for donation proportion.

Results

Manipulation Check

Significant differences were observed in the scores of exhaustion difference, task difficulty, and effort level between the group with self-control resource exhaustion and the group without self-control resource exhaustion (see Table 2). According to existing research, the results suggested that the manipulation of self-control resource was effective.[29]

Significant differences were observed in the scores of the two questions between self-affirmation group and non-affirmation group (see Table 3). According to existing research, the results suggested that the manipulation of self-affirmation was effective.[42]

Donation Proportion

The main effect of cost was significant ($F[2, 121] = 374.360$, $p < 0.001$, $\eta_p^2 = 0.757$). Individuals' donation proportion was significantly higher at the low cost level ($M = 0.718$, $SD = 0.021$) than it was at the medium cost level ($M = 0.390$, $SD = 0.023$). Individuals' donation proportion was significantly higher at the medium cost level than at the high cost level ($M = 0.210$, $SD = 0.017$). A significant main effect of self-control resource was observed ($F[1, 122] = 5.169$, $p = 0.024$, $\eta_p^2 = 0.051$). The donation proportion was higher for the group without self-control resource exhaustion ($M = 0.475$, $SD = 0.015$) than for the group with self-control resource exhaustion ($M = 0.400$, $SD = 0.015$). The main effect of self-affirmation was significant ($F[1, 122] = 153.739$, $p < 0.001$, $\eta_p^2 = 0.558$). The donation proportion was higher for the self-affirmation group ($M = 0.583$, $SD = 0.015$) than for the nonaffirmation group ($M = 0.295$, $SD = 0.015$).

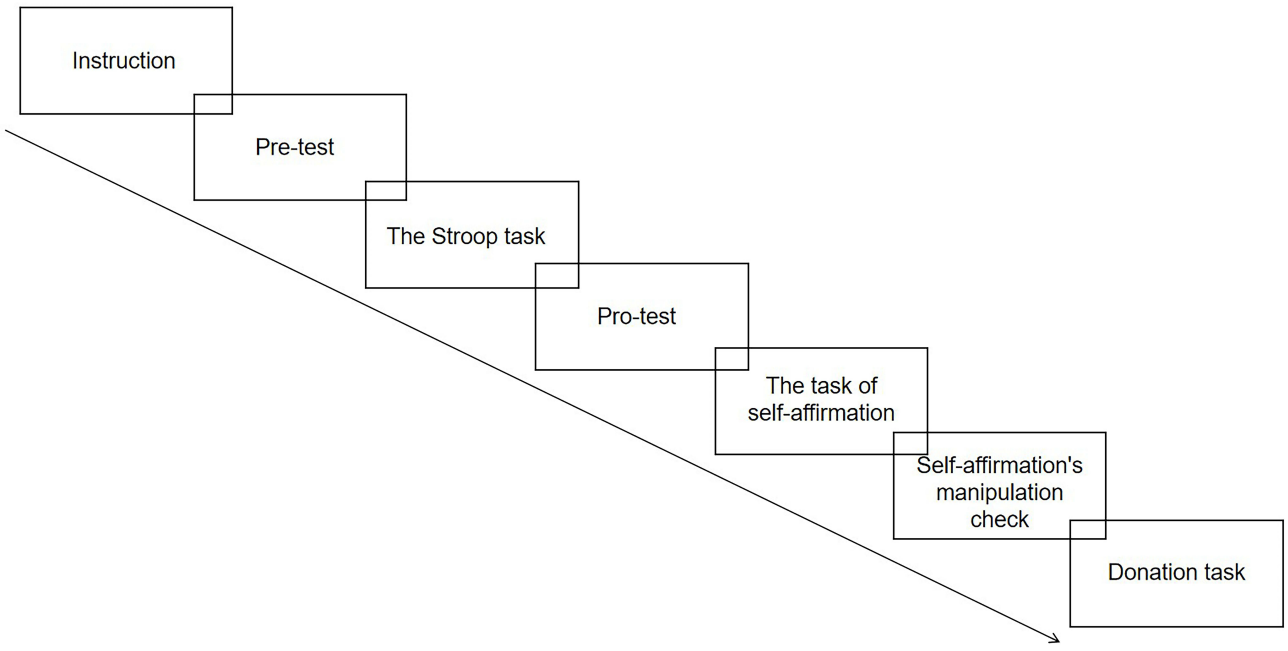

Figure 8 Illustration of the experimental procedure of experiment 2.

Table 2 Manipulation Check Results for Self-Control Resource

	Exhaustion Group (*M*±*SD*)	Non-Exhaustion Group (*M*±*SD*)	*t*	*p*	Cohen's d
Exhaustion difference	2.65±1.319	0.60±1.123	9.309	<0.001	1.331
Task difficulty	4.24±1.141	2.44±1.002	9.369	<0.001	1.340
Effort level	4.18±1.420	3.35±1.427	3.217	0.002	0.476

Table 3 Manipulation Check Results for Self-Affirmation in Experiment 2

	Self-Affirmation Group (*M*±*SD*)	Non-Affirmation Group (*M*±*SD*)	*t*	*p*	Cohen's d
Positive aspects	4.03±0.975	2.21±0.943	10.581	<0.001	1.541
Important things	4.08±0.963	2.47±0.936	9.456	<0.001	1.377

No significant interaction effect was observed between cost and self-control resource (F[2, 118] = 1.677, p = 0.362). A significant interaction effect was observed between cost and self-affirmation (F[2, 118] = 10.875, $p < 0.001$, $\eta_p^2 = 0.083$). The simple effect analysis showed that at the high cost level, the donation proportion was higher for the self-affirmation group than for the nonaffirmation group (F[2, 118] = 270.475, $p < 0.001$, η_p^2 = 0.693). At the medium cost level, the donation proportion was higher for the self-affirmation group than for the nonaffirmation group (F[2, 118] = 117.554, $p < 0.001$, η_p^2 = 0.495). At the low cost level, the donation proportion was higher for the self-affirmation group than for the nonaffirmation group (F[2, 118] = 26.676, $p < 0.001$, η_p^2 = 0.182; see Figure 9).

A significant interaction effect was observed between self-control resource and self-affirmation (F[1, 120] = 4.899, p = 0.032, η_p^2 = 0.039). The simple effect analysis showed that in a state of self-control resource exhaustion, the donation proportion was higher for the self-affirmation group than for the nonaffirmation group (F [1, 120] = 122.125, $p <$ 0.001, $\eta_p^2 = 0.504$). Without self-control resource exhaustion, the donation proportion was higher for the self-affirmation group than for the nonaffirmation group (F[1, 120] = 61.715, $p < 0.001$, $\eta_p^2 = 0.340$; see Figure 10).

A significant interaction effect was observed among cost, self-control resource, and self-affirmation (F[2, 112] = 4.690, p = 0.01, η_p^2 = 0.038). The simple effect analysis showed that at the high cost level, the donation proportion was higher for the group with self-control resource

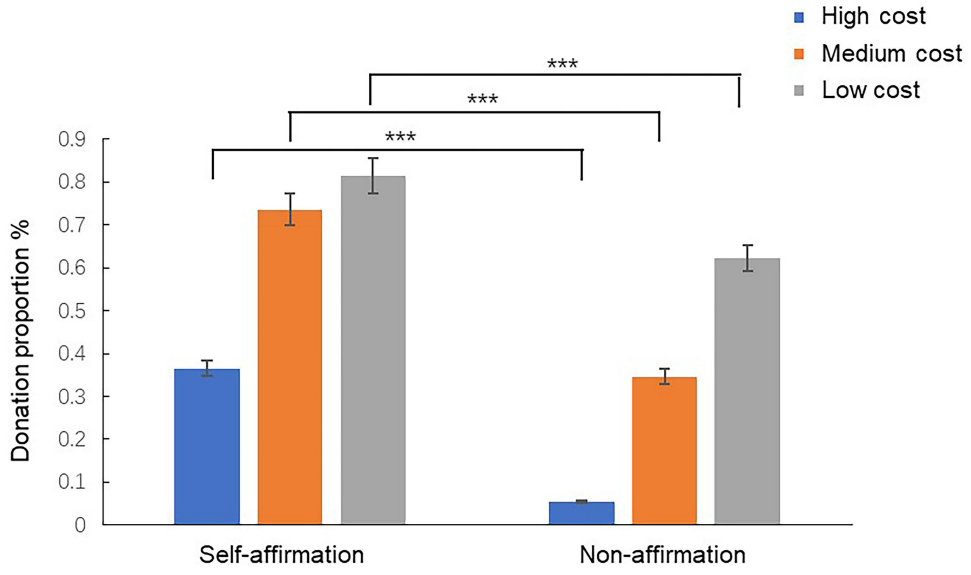

Figure 9 Results of experiment 2: differences in individuals' donation proportion between the self-affirmation group and the nonaffirmation group under low-, medium-, and high-cost conditions. Error bars indicate standard errors. ***$p < 0.001$.

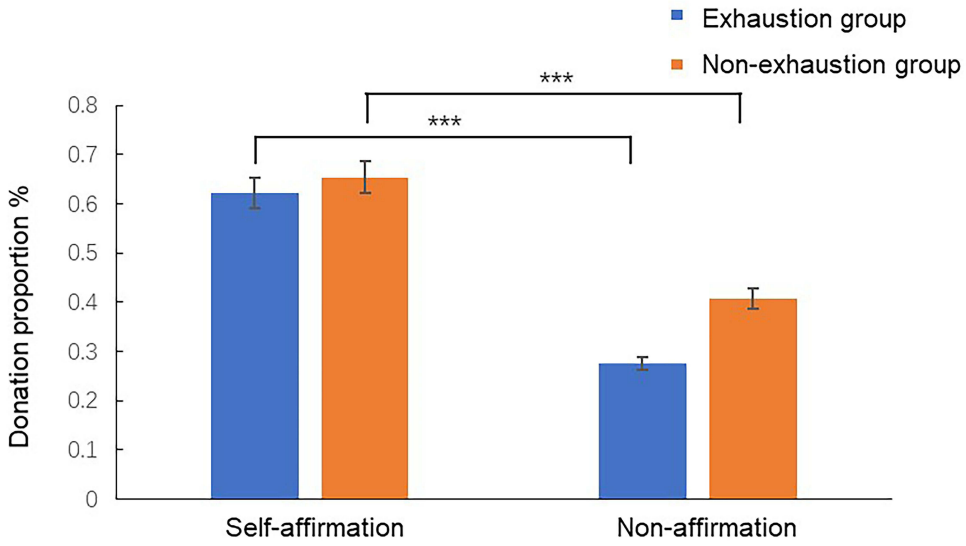

Figure 10 Results of experiment 2: differences in individuals' donation proportion between the self-affirmation group and the nonaffirmation group under conditions of with and without self-control resource exhaustion. Error bars indicate standard errors. ***$p < 0.001$.

exhaustion that experienced self-affirmation than for the group with self-control resource exhaustion that did not experience self-affirmation ($F[2, 114] = 135.097$, $p < 0.001$, $\eta_p^2 = 0.530$). At the medium cost level, the donation proportion was higher for the group with self-control resource exhaustion that experienced self-affirmation than for the group with self-control resource exhaustion that did not experience self-affirmation ($F[2, 114] = 71.008$, $p < 0.001$, $\eta_p^2 = 0.372$). At the low cost level, the donation proportion was higher for the group with self-control resource exhaustion that experienced self-affirmation than the group with self-control resource exhaustion that did not experience self-affirmation ($F[2, 114] = 33.530$, $p < 0.001$, $\eta_p^2 = 0.218$). At the high cost level, the donation proportion was higher for the group without self-control resource exhaustion that experienced self-affirmation than for the group without self-control resource exhaustion group that did not experience self-affirmation ($F[2, 114] = 135.378$, $p < 0.001$, $\eta_p^2 = 0.530$). At the medium cost level, the donation proportion was higher for the group without self-control resource exhaustion group that experienced self-affirmation than for the group without self-control resource exhaustion group that did not experience self-affirmation ($F[2, 114] = 47.702$, $p < 0.001$, $\eta_p^2 = 0.284$; see Figure 11).

Discussion

The results of our study demonstrated that the donation proportion was higher for the group without self-control resource exhaustion than for the group with self-control resource exhaustion; this finding is consistent with that of a previous study.[31] According to the model of self-control resource, when individuals' self-control resource is depleted, they are more inclined to pursue immediate temptation and pay less attention to others' needs.[29] This eventually affects their next task, and they may engage in less donation behavior.

The results of experiment 2 revealed a significant interaction effect between self-control resource and self-affirmation. In line with our predictions, self-affirmation could increase donation behavior of individuals in a state of self-control resource exhaustion. These results are consistent with previous studies. Self-affirmation can improve individuals' self-control resource by enhancing their level of psychological explanation.[12] According to temporal construal theory, high-level construals can lead individuals to make more rational psychological explanations and be capable to understand the core of things.[57] One plausible explanation of this finding is that individuals who experience self-affirmation have high-level construals and can offset the loss of self-control resource or increase their self-control resource, thus improving their performance in subsequent tasks.[48] Another plausible explanation of this finding is that self-affirmation can strengthen individual's self-concept and enhance self-regulation.[48] Consequently, individuals who experience self-affirmation can offset self-control resource exhaustion by attaching importance to individual's self-concept and enhance self-regulation ability.

The findings of experiment 2 showed a significant interaction effect among cost, self-control resource, and

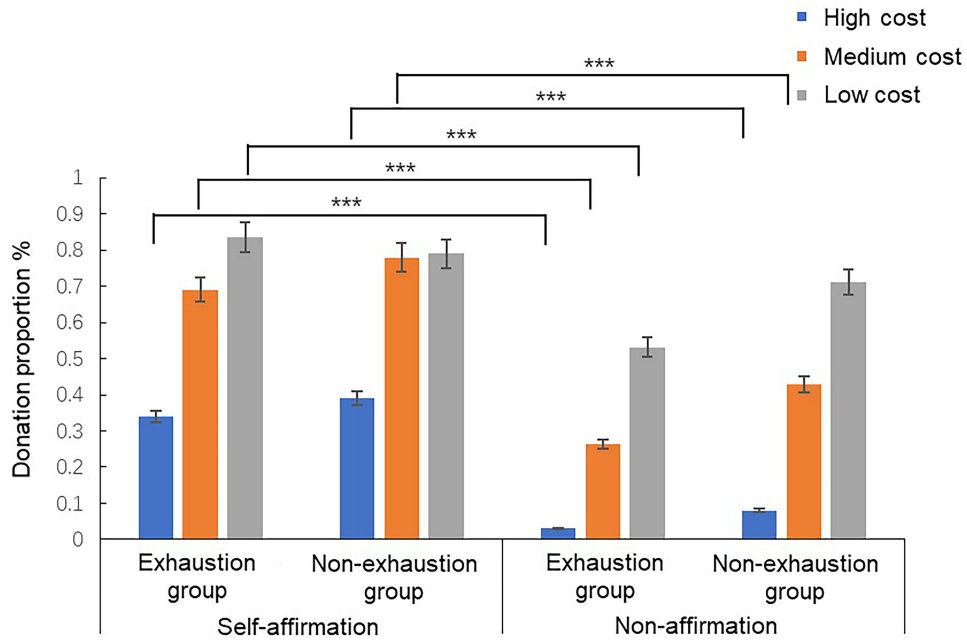

Figure 11 Results of experiment 2: differences in individuals' donation proportion between the groups with and without self-control resource exhaustion and the self-affirmation and nonaffirmation groups under low-, medium-, and high-cost conditions. Error bars indicate standard errors. ***$p < 0.001$.

self-affirmation. In line with our predictions, self-affirmation would improve donation behavior of individuals in a state of self-control resource exhaustion even under high-cost condition. Self-affirmation is regarded as a psychological strategy to enhance self-control when individuals are in a state of self-control resource exhaustion, and it leads individuals to make more valid decisions based on higher values and goal.[58] The self-affirmation group was more likely to accept high-cost or high-risk information and change their behavior to complete high-costs tasks,[55] and self-affirmation enhanced the possibility of individuals to consider future consequences and reduced the time cost of an individual may think about.[38] These results suggested that self-affirmation might improve donation behavior of the group with self-control resource exhaustion even under high-cost condition.

General Discussion

Self-Affirmation Improved Donation Behavior of Individuals with Low Self-Control Ability and Those with Self-Control Resource Exhaustion

The results of experiments 1 and 2 showed that self-affirmation exerted a promoting effect on the donation behavior of individuals with low self-control ability and those with self-control resource exhaustion. One plausible explanation of these findings is that self-affirmation can lead individuals to think more about their values to control crucial results and can improve individuals' perception of self-control ability to some extent.[39] Storr and Sparks found that self-affirmation could lead individuals to pay more attention to their values and give up immediate interests.[49] Another plausible explanation of these findings is individuals who experienced self-affirmation had high-level construals that could offset the loss of self-control resource or increase their self-control resource, thus improving their performance in subsequent tasks.[48] Previous study had revealed that self-affirmation, as a psychological intervention, facilitated self-control when the resource had been exhausted.[48] Researchers suggested self-affirmation could counteract self-control resource exhaustion by promoting high levels of mental construal.[48] Moreover, previous studies had indicated that high levels of mental construal contributed to successful self-control.[59–61] Self-control resource exhaustion individuals operated at relatively concrete or low levels of mental construal.[62] Thus, a manipulation that boosts levels of mental construal should have a greater impact on depleted individuals, whereas nondepleted individuals (who are presumed to be at relatively high levels of construal) benefit less. This is precisely the pattern we

observed in our results. A third possible explanation of these findings is that self-affirmation can strengthen individual's self-concept and enhance self-regulation.[48] Consequently, individuals who experience self-affirmation can offset self-control resource exhaustion and compensate for self-control by enhancing self-regulation ability.

Promoting Effect of Self-Affirmation on Individuals' Donation Behavior Under Different Cost Levels

Self-affirmation could increase donation behavior of individuals with low self-control ability and individuals with self-control resource exhaustion under different cost levels. On the one hand, previous study showed that the self-affirmation group was more likely to accept high-cost or high-risk information and change their behavior to complete high-cost or high-risk tasks.[55] Value affirmation might lead to equal consideration for different cost levels and helped individuals to reduce egoistic thought.[46] One plausible explanation of these findings is that self-affirmed participants are more likely to focus on long-term consequences than short-term defensive reactions, they are more likely to accept persuasive messages and change behaviors to achieve long-term benefits.[12,46,56] Crocker et al speculated that self-affirmation might increase levels of oxytocin, a hormone that increased feelings of love and trust.[63] Moreover, donation behavior could help more people to achieve long-term benefits.[1] Therefore, even under high-cost condition, individuals could engage in more donation behavior after self-affirmation. On the other hand, Steele found that self-affirmation could lead individuals to think more about their values to control crucial results and improve individuals' perceptions of self-control ability to some extent.[39] Self-affirmation was regarded as a psychological strategy to enhance self-control when individuals were in a state of self-control resource exhaustion and led individuals to make more valid decisions based on the higher value and goal.[58] Our results suggest that even under high-cost condition, individuals with low self-control ability and those with self-control resource exhaustion could engage in more donation behavior after self-affirmation. However, self-affirmation could not improve the donation behavior of individuals with high self-control ability or those without self-control resource exhaustion under low-cost condition. According to the model of dual self, the short-run self only considers immediate interests and pays less attention to an individual's values or what they think about others' needs, the long-run self uses self-control to influence the short-run self's mind and behavior and further lead them to make rational decisions and consider long-term interests.[64] Under low-cost condition, the long-run self might execute self-control to realize their long-term goals and would not be affected by other factors. However, the underlying influencing mechanism should be further explored in the future.

Theoretical Implications and Practical Implications

Our results highlight that even under high-cost condition, self-affirmation (individual's state factor) exerts a promoting effect on donation behavior of individuals with low self-control ability and those with self-control resource exhaustion. Our study provides new insights into influencing factors of individuals' donation behavior, enhances the resource dependence theory of donation behavior. On the other hand, our study provides empirical basis for boosting individual donation behavior, provides a crucial basis for formulating measures to improve individual donation behavior.

Limitations and Prospects

First, we selected college students as participants, and they are a zero-income group. This might affect the experimental results. Future studies should include a diverse sample and explore the donation behavior of different groups. Moreover, although the sample size of the present study has reached the appropriate effect size calculated by G*Power, the sample size can be increased in the future studies. Which could make the findings of the research have better generalization and stronger explanatory power.

Second, previous studies found that emotion or gratitude might exert effects on donation behavior. Future studies should further exclude other irrelevant variables that might influence individuals' donation behavior to acquire more valid results.

Third, self-affirmation can be divided into value affirmation and attribute affirmation. We only explored the effect of value affirmation on donation behavior. Future studies could further examine the effect of attribute affirmation on donation behavior.

Conclusion

Individuals with high self-control ability engaged in more donation behavior than did those with low self-control ability. Individuals without self-control resource exhaustion engaged in more donation behavior than did those with self-control resource exhaustion.

Self-affirmation could increase donation behavior of individuals with low self-control ability and improve donation behavior of individuals with self-control resource exhaustion.

Even under high-cost condition, individuals with low self-control ability and those with self-control resource exhaustion could engage in more donation behavior after self-affirmation.

Ethical Approval

The Institutional Review Board (IRB) of the Hunan Normal University in Hunan approved the study (2021-274).

Acknowledgments

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors have declared no competing interests in this work.

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