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ORIGINAL RESEARCH

Mechanisms of Self-Control in the Influence of Moral Elevation on Pro-Social Behavior: A Study Based on an Experimental Paradigm

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Introduction: Because the mechanisms by which moral elevation triggers an individual's pro-social behavior remain unclear, this study examined the mediating role of self-control resources in the relationship between moral elevation and pro-social behavior.

Methods: Experiment 1 examined the effects of moral elevation on self-control resources using two task paradigms, the Stroop task and the Go/NoGo task, with 80 college students as study participants. Experiment 2 was conducted with an additional 140 college students, using both experimental and questionnaire methods to examine the mediating role of self-control resources in the effects of moral elevation on pro-social behavior.

Results: (1) The results of Experiment 1 showed that the self-control ability of the moral elevation induction group was significantly better than that of the non-induction group. The accuracy rate of self-control tasks in the induction group (0.94 ± 0.01) was significantly higher than that in the non-induction group (0.89 ± 0.01, $F_{(1,79)}$=19.10, p <0.001, η^2=0.50). The mean reaction time of the self-control tasks in the induction group (393.63 ± 3.5) was significantly lower than that in the non-induction group (415.38 ±7.30, $F_{(1,79)}$=5.87, p =0.026, η^2=0.24). (2) The results of Experiment 2 showed a significant positive correlation between moral elevation and self-control resources (r=0.46, p<0.001), a significant positive correlation between moral elevation and pro-social behavior (r=0.33, p<0.001), and a significant positive correlation between self-control resources and pro-social behavior (r=0.31, p<0.001). Not only did moral elevation significantly and positively predict pro-social behavior (β= 0.23, p=0.011), but it also significantly and positively predicted self-control resources (β= 0.46, p<0.001). Self-control resources significantly and positively predicted pro-social behavior (β= 0.20, p=0.025). The bootstrap test for the mediating effect of self-control resources showed that the upper and lower limits of the 95% confidence interval did not include 0 (indirect effect 0.09, 95% CI [0.023, 0.242], p<0.001), and the mediating effect accounted for 28.13%.

Conclusion: This study revealed the mediating role of self-control resources in the relationship between moral elevation and pro-social behavior, which has important theoretical and practical implications for cultivating pro-social behavior and moral education among college students.

Keywords: pro-social behavior, moral elevation, self-control, mediating role, college students

Introduction

Pro-social behavior is an individual's behavior and trend of helping, cooperating, sharing, comforting, etc., in social interaction conducive to others and social harmony[1] and is an important aspect of individual social development. The implementation of pro-social behaviors can enhance the psychological well-being of the initiator of the behavior,[2] subjective well-being,[3] interpersonal relationships,[4] the acquisition of fame and social status,[5] and more prominent personal achievements.[6] Therefore, considering the important role of pro-social behavior in personal development and social harmony, and to cultivate the pro-social behavior of college students better, it is necessary to explore the influencing factors and mechanisms of pro-social behavior.

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Human pro-social behavior and its systematic evolution and development are major scientific issues of great concern to the scientific community.[7] Researchers have long been committed to revealing the origin and development mechanism of human pro-social behavior from social and cultural factors as well as personal factors.[7,8] In recent years, many prosocial studies have consistently shown that moral development, emotion, social cognition, and other factors jointly affect pro-social behavior.[9] When looking for the factors that affect college students' pro-social behavior level, many researchers have favoured moral emotion. Researchers believe that moral emotions such as gratitude,[10] admiration,[11] guilt[12] and shame[13] have played an important role. In addition, Fredrickson[14] broadens and builds a theory of positive emotions suggesting that positive emotions can establish personal resources, social resources, etc., and promote the recovery of personal physical and mental resources. These practical and theoretical studies show that positive moral emotions play an important role in promoting personal pro-social behavior. Those who have had positive emotional experiences are more likely to successed and have highers hopes from themselves. These people are more sensitive to the needs and situations of others and experience less emotional sufferings. These people also exhibit a greater willingness to assist others in their behavior, behavior which is consistent with the idea of "achieving goals and helping the world"[15] However, the internal relationship between positive moral emotions and pro-social behaviors is still less studied and cannot answer the key questions about how or when they affect pro-social behavior, which makes targeted prevention and intervention difficult. This study will use the theory of positive emotion expansion and construction to examine how positive moral emotion affects college students' pro-social behavior and provide targeted recommendations for improving it.

Moral Elevation and Pro-Social Behavior

Moral emotions can motivate individuals to behave morally, inhibit unethical behavior, and encourage individuals to act following accepted standards of right and wrong.[16] As Tangney states, "moral emotions provide the motivation, strength, and energy to do good and avoid doing badly"[17] Researchers have argued that moral emotions are essential to discourage immoral and antisocial behavior.[18,19] Haidt defines moral elevation as a positive moral emotion.[20] Some scholars also believe that this emotion of feeling one's moral sentiment is elevated after hearing and witnessing the moral behavior of others belongs to moral emotion, and moral elevation can promote pro-social behavior and curb antisocial behavior.[21,22] When moral elevation is induced, research subjects produce distinctive physical, emotional, cognitive, and behavioral responses,[23] such as respect, awe, joy, and love;[24] positive cognitions and cognitive changes like positive perceptions of oneself and others; and accompanied by positive motivations such as helping others, being close to others, and emulating the moral behavior of others.[20,24] These studies suggest that moral elevation may have a positive and active effect on behavior and that having a positive self-perception is a core motivation for moral elevation to change behavior when individuals are more inclined to emulate the moral behavior of others to act or try to restrain their immoral behavior from maintaining a positive self. It has also been shown that subjects who experience moral elevation have higher levels of pro-social behavior.[25,26]

The Mediating Role of Self-Control

Mention studies have found that moral elevation may be an important factor in pro-social behavior. Still, little research has been done on the direct relationship between moral elevation and pro-social behavior. Some studies have found that whether individuals behave positively or negatively is closely related to self-control.[13,27–29] Individuals with adequate self-control resources show more altruistic behavior and less unethical behavior than those with depleted self-control resources.[13,29] Self-control resources are limited, and both ethical decision-making and ethical behavior require individuals to use self-control resources to overcome the temptation of short-term gain, and individuals are more likely to behave unethically when they are in a depleted state.[30,31] It has been suggested that ego depletion predicts a decrease in pro-social behavior and an increase in immoral behavior in individuals.[32] Individuals who are in a state of ego depletion, they increase their smoking behavior in smokers.[27] They may also developed various impulsive and aggressive behaviors.[28] Baumeister et al, argues that one of the most likely causes of violence is a breakdown in self-control because individuals with ego depletion have more difficulty acting on anger impulses.[31] More importantly, at the moral level, the natural impulse of selfishness and self-interest undermines the production of pro-social behavior when individuals are in a state of ego depletion.[32]

Fredrickson's broaden-and-build theory of positive emotions[14] serves as the theoretical foundation for this study, which investigates the effects of moral elevation on self-control. According to this hypothesis happy emotions can help to build individual and social resources, as well as promote the recovery of individual physical and psychological resources. Implicit positive emotions can compensate for the depletion of self-control resources, while implicit negative emotions exacerbate ego depletion.[33] Jiang[34] conducted positive and neutral emotion elicitation between dual tasks and found that positive emotions mitigated ego depletion, while neutral emotions did not significantly mitigate ego depletion. Self-control is another important influencing factor of pro-social behavior. In contrast, the self-control resource allocation model suggests that individuals regulate the allocation of self-control resources to achieve behavioral goals based on their behavioral motivations.[35] However, there are few academic studies on moral elevation and self-control resources, so their relationship is unclear. The energy conservation perspective states the following: ①Individual self-control needs to consume its self-control resources, and at a certain time, individual self-control resources are limited; ②Self-control resources are related to individual self-control behavior. Successful self-control behavior depends on available self-control resources. The more sufficient the self-control resources are, the better the performance of self-control tasks will be. ③All forms of self-control share the same resources. Even if the precise jobs before and after are in different domains, an individual's previous self-control behavior will almost likely result in a subsequent reduction in self-control behavior. Therefore, can moral elevation as a positive moral emotion for self-control resources explored in this study act as a moral initiation or behavioral motivation to enhance self-control resources in a certain period?

This Study and Hypothesis

In summary, the main purpose of this study is to answer the following questions. First, can moral elevation affect self-control resources? We propose Hypothesis 1: Moral elevation significantly improves self-control resources. Experiment 1 is used to test Hypothesis 1. Second, previous studies have suggested that self-control resources are an important factor influencing pro-social behavior, while moral elevation may also influence self-control resources. Therefore, is the mechanism of moral elevation on pro-social behavior by increasing self-control resources and thus exerting influence? And then we propose Hypothesis 2: Self-control resources mediate the relationship between moral elevation and pro-social behavior. Experiment 2 will be used to test Hypothesis 2.

Experiment 1: The Effect of Moral Elevation on Self-Control Resources

Experimental Purpose and Hypothesis

Experimental purpose: To explore how self-control resources change in individuals whose moral elevation is induced under a dual-task paradigm.

The experimental hypothesis was that the induced group would perform significantly better self-control tasks than the uninduced group.

Methods

Participants

Our sample for this study consisted of 80 undergraduate students from two different universities, not majoring in psychology, with a mean age of 21.28±1.26 years; the number of males and females was 50/50, and the number of majors in science and technology and literature and history was 50/50; 11 participants were freshmen, 34 were sophomores, 23 were juniors, and 12 were seniors; 38 were from rural areas and 42 were from urban areas. All subjects were randomly assigned to the induced×depletion group, induced×undepletion group, uninduced×depletion group, and uninduced×undepletion group, with 20 subjects in each group. The participants in this study were right-handed, had normal bare-eye vision or corrected vision, had not previously engaged in similar experiments, had no history of neurological or psychiatric disorders, and provided with two gifts (a notebook, mask, notepad, or compact stapler) or a monetary reward equivalent in value to the gifts upon completion of the experiment.

Experimental Materials

(1) Emotional Assessment Scale (PANAS).

Referring to previous studies,[36,37] 10 emotional adjectives, including 5 positive emotion words (happy, glad, elated, pleasant, excited) and 5 negative emotion words (sad, angry, sad, scared, nervous) from the Chinese version of the Positive Affect and Negative Affect Scale (PANAS),[38] were extracted to assess individuals' positive emotions and negative emotions. The scale is scored on a 5-point scale (1–5: almost none-extremely many). The internal consistency coefficients Cronbach's α for the scale and the two dimensions of positive emotions and negative emotions were 0.73, 0.71 and 0.67, respectively.

(2) Emotion-evoking material

Moral group video (Moving China—Anti-Cancer Kitchen), intercepted from CCTV Moving China 2020 annual award ceremony; the whole film is 7 minutes 28 seconds long. Control group (landscape promo), intercepted from the National Tourism Administration landscape promo, full length 6 minutes and 30 seconds.

(3) Moral Elevation Scale (MES)

The scale was developed by Ding et al[39] with a sample of college students in Zhejiang Province and was divided into 4 dimensions: affective flow, behavioral tendencies, perceptions of self, and perceptions of others, with 21 questions (eg It's like there's a warm current in my chest.) and scores from 1 to 5 (completely disagree to completely agree). The higher the total score, the higher the level of moral elevation. The internal consistency coefficients of the scale and 4 dimensions of affective flow, behavioral tendencies, perceptions of self, and perceptions of others, Cronbach's α, were 0.95, 0.87, 0.79, 0.78, and 0.84, respectively.

(4) Depletion task operation test materials

A short version of the State Self-Control Capacity Scale (SCCSS), consisting of 5 items, was used to measure the individual's current state of self-control capacity. For example, in "I feel exhausted", each item was scored from 1 to 7 (not at all~completely) in reverse, and the higher the total score, the better the state self-control ability. The scale was reliable and valid.[40] The internal consistency coefficient of the scale, Cronbach's α was 0.84.

(5) Prosocial Tendencies Measure (PTM)

In this study, we used the Chinese version of the Prosocial Tendencies Measure (PTM) revised by Kou, Y. et al[41] which consisted of 6 dimensions of altruism, compliance, emotionality, urgency, anonymity, and openness, respectively, with 26 questions (eg When people ask me for a favor, I rarely say no.), using the Likert 5-point scale, 1~5 ("very unlike me" ~ "very much like me"); the higher the total score, the higher the level of pro-social behavior. The internal consistency coefficients Cronbach's α for the scale and 6 dimensions of openness, anonymity, altruism, emotionality, compliance, and urgency were 0.94, 0.73, 0.78, 0.73, 0.76, 0.80, and 0.67, respectively.

Experimental Design

The experiment used a two-factor between-subjects design of 2 (moral elevation: induced/uninduced)×2 (self-control resources: depleted/undepleted). The dependent variable was performance on the second self-control task.

Experimental Tasks

(1) Self-depletion task: this task was compiled for E-prime 2.0 software and used the Stroop colour-word judgment task as a self-control depletion task.[13,32,34,42,43] The experimental materials were divided into two types of stimuli: consistent colour words and inconsistent colour words, and the words "red", "yellow", "blue", and "green" were written in red, yellow, blue, and green colours. The subjects were asked to press the F key when presented with a consistent stimulus and press the J key when the colour was inconsistent. Failure to perform a key response was noted as an incorrect response. Guideline:

You are welcome to join our experiment!

A red "+" will be displayed in the centre of the screen to remind you to focus, followed by a Chinese character (red, yellow, blue, green) written in different colours (red, yellow, blue, green characters), and you will be asked to respond by pressing a key. When the colour matches the meaning of the character, press the "F" key on the keyboard, for example, "red" for red, "yellow" for yellow, "blue" for blue, and "green" for green; when there is a mismatch between the colour and the meaning of the word, press the "J" key on the keyboard, for example, "yellow, blue, green" for red, "red, blue,

green" for yellow, etc. If you already understand the above rules, please press "Q" to perform the practice task, which can be repeated.

The stimuli were presented on a black background throughout the experiment, and a red "+" gaze dot appeared in the centre of the screen before each stimulus presentation to remind the subjects to focus their attention for 500 ms, and an empty screen of different durations from 500 ms to 1000 ms was presented after each stimulus presentation. The experiment was divided into a practice task and a formal task. The target stimulus of the practice task was presented for 1500 ms with 16 stimuli, and there was task feedback after each keystroke response made by the subjects in the practice task until the subjects agreed to enter the formal task without feedback. The formal task stimuli were presented for 1000 ms, with 120 stimuli, 48 colour-word consistent stimuli, and 72 colour-word inconsistent stimuli. The specific procedure is shown in Figure 1.

(2) Self-control task: The task was prepared by E-prime 2.0 software using the GO/NoGO experimental task with two kinds of equal frequency stimuli: the stimulus that required the subject's response was the Go stimulus, and the stimulus that did not require the subject's response was the NoGo stimulus. The experimental materials were white capital letters "X" and "Y", and the subjects were asked to press the space bar when presented with the "X" stimulus. The failure to respond to the key was recorded as a wrong response. When the "Y" stimulus was presented, no keystroke response was needed, and a keystroke response was recorded as incorrect. Guideline:

You are welcome to join our experiment!

You will now be asked to perform a quick recognition and response task. A red "+" will appear in the recentre of the screen to remind you to concentrate, followed by a white capital letter (X or Y) that requires you to respond to a keystroke. When an "X" appears, press the "space" key on the keyboard; when a "Y" appears, do not press any key. If you have understood the above rules, press "Q" to perform the practice task, which can be repeated.

The stimuli were presented on a black background throughout the experiment, and a red "+" gaze dot appeared in the recentre of the screen before each stimulus presentation to remind the subjects to focus their attention for 500 ms, and an empty screen of different durations from 500 ms to 1000 ms was presented after each stimulus presentation. The experiment was divided into a practice task and a formal task. The target stimulus of the practice task was presented for a duration of 1000 ms with ten stimuli, and there was task feedback after each keystroke response made by subjects in the practice task until the subjects agreed to enter the formal task without feedback. The formal task stimuli were presented for 800 ms, with a total of 120 stimuli, 60 Go stimuli, and 60 NoGo stimuli each. The specific procedure is shown in Figure 2.

Experimental Procedures

(1) Before the experiment started, 3 minutes of soft music was played in the lounge to allow the subjects to obtain sufficient rest and soothe their emotions. At the end of the music, all subjects were asked to fill out the Emotional Rating Scale and the State Self-Control Scale and were informed that different tests assessing learning ability would be administered next. Then, groups of 4 entered the laboratory.

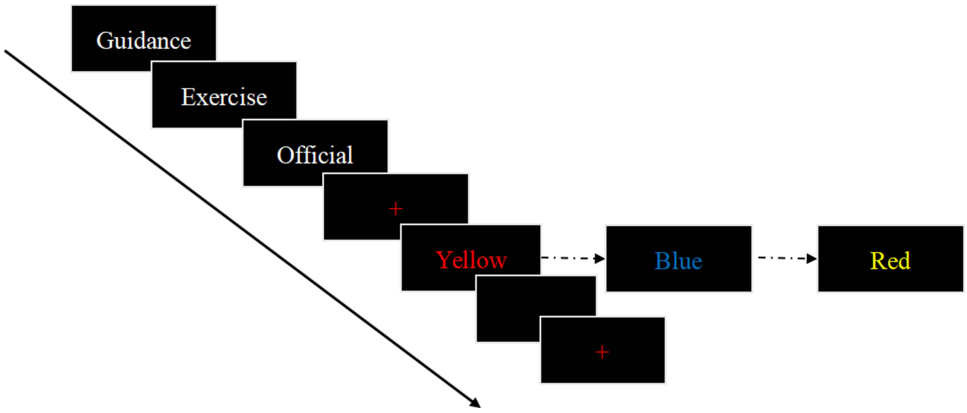

Figure 1 Self-depletion Stroop task flow.

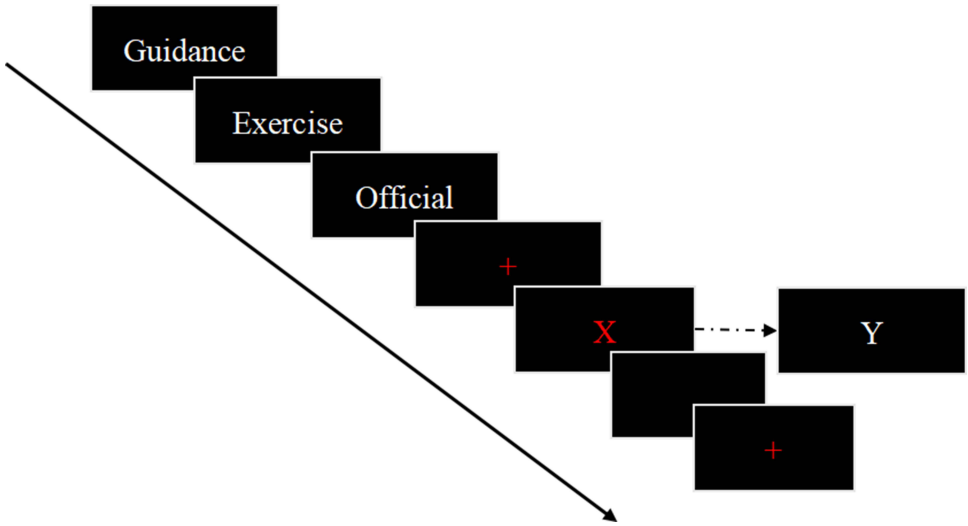

Figure 2 Self-control GO/NoGO task flow.

(2) After subjects entered the laboratory, the two groups that were depleted performed the self-control resource depletion Stroop task, and the two groups that were not depleted completed a short English reading task and then completed the depletion task operational test material. The two groups with emotion elicitation used video elicitation to elicit moral elevation by watching a 7-minute video of moral content. The two groups that were not elicited watched a 6-minute neutral video. Then, the emotion rating scale and the moral elevation scale were completed. The time spent by each group in the experiment was close.

(3) In the second task, to examine their rapid recognition and response abilities, the groups performed a self-control task to examine the subjects' performance on the self-control task after self-loss (non-loss) and moral elevation elicitation (none-licitation). At the end of the experiment, gifts or rewards were distributed.

Data Analysis

In this study, SPSS 22.0 was used for experimental data collection and entry and statistical analysis. One-way ANOVA was used to analyze the positive and negative mood scores (PANAS) of each group of subjects before they performed the first task; paired-samples *t*- test was used to test the differences between positive and negative mood scores of all subjects before and after they performed the first task to avoid ignoring the influence of the subjects' mood states before and during the experiment on the experimental results, thus exaggerating the independent variable the explanatory validity of the dependent variable; an independent samples *t*- test was used to test whether the depletion task caused depletion of subjects' self-control resources, using the subjects' depletion task operational test score (ie, state self-control capacity score, SCCSS) as the dependent variable; an independent samples *t*- test was used to test whether the video elicitation was effective, using the subjects' moral elevation perception score as the dependent variable; and to test the validity of the video elicitation for each group of subjects in both depletion and elicitation conditions Repeated-measures ANOVAs were conducted on the self-control task performance (correctness, mean reaction time) of each group under both depletion and elicitation conditions.

Results

Emotional State Difference Test

ANOVA was conducted on the induced depletion group (positive: 10.10±0.64, negative: 9.95±0.22), the induced non-depletion group (positive: 10.30±0.80, negative: 9.70±0.47), the non-induced depletion group (positive: 10.20 ±0.62, negative: 9.85±0.36), and the non-induced non-depletion group (positive: 10.45±0.76, negative. 9.90±0.31), the results of ANOVA on positive and negative emotions showed that the groups did not differ significantly in the scores of positive emotions ($F(1,78) = 0.89$, $p = 0.45$) and negative emotions ($F(1,78) = 1.87$, $p = 0.14$). It was ensured

that the emotional state of the subjects in each group did not interfere with the experimental task, thus confounding the effect of the independent variable on the dependent variable.

The results of t-tests of positive emotions (pretest: 10.26 ± 0.71, posttest: 10.23 ± 0.69) and negative emotions (pretest: 9.85 ± 0.36, posttest: 9.93 ± 0.38) scores before and after all subjects performed the first task showed that there was no significant difference between positive emotions ($t(79) = 1.00$, $p = 0.32$) and negative emotions ($t(79) = -1.42$, $p = 0.16$). This indicates that the subjects in this study did not significantly develop other negative or positive emotions after performing the first task, avoiding the influence of complex emotions developed after the first task on subsequent self-control tasks.

Operational Validity Check

(1) Depletion of operational test validity test

The results of the independent samples test-test on subjects' depletion task operational test scores showed that the depletion group scored significantly lower (29.28 ± 1.41) than the non-depletion group (30.13 ± 1.74), $t_{(78)} = -2.40$, $p < 0.001$, Cohen's $d = 0.58$.

(2) Emotion-induced operational validity test

The results of the independent samples *t*-test for the subjects' scores on the operational test of emotion elicitation showed that the scores of moral elevation in the elicited group (93.78±3.58), which had significantly higher scores than the uninduced group scores (90.93±2.77), $t_{(78)} = 3.98$, $p < 0.001$, Cohen's $d = 0.88$.

Repeated Measures ANOVA

The results of the repeated-measures ANOVA for the self-control task performance (correct rate, mean reaction time) for each group of subjects are represented in Table 1. Figures 3 and 4 show that the main effect of emotion induction was significant $F_{(1,79)} = 19.10$, $p < 0.001$, $\eta 2 = 0.50$. The correct rate of the self-control task in the induced group (0.94 ± 0.01) was significantly higher than that in the non-induced group (0.89 ± 0.01), and the mean response time for the self-control task in the induced group (393.63 ± 3.5 ms) was significantly lower than that in the non-induced group (415.38 ± 7.30 ms). The main effect of self-control resources was significant $F_{(1,79)} = 6.65$, $p = 0.018$, $\eta 2 = 0.26$, the correctness of the self-control task was significantly higher in the non-depleted group (0.92±0.01) than in the depleted group (0.90±0.01), and the mean reaction time was significantly lower in the non-depleted group (393.89±4.52 ms) than in the depleted group (415.12±3.79 ms). The interaction between the two was not significant. Thus, Hypothesis 1 was supported.

Discussion

Experiment 1 used the classic dual-task inter-paradigm for an emotion-inducing design idea to explore the effect of moral elevation on self-control resources by depleting self-control resources through the Stroop task and video-inducing subjects' moral elevation due to witnessing others' moral behavior. The results of the study showed that the main effect of emotion-induced moral elevation was significant, regardless of the depletion of self-control resources. The induction of moral elevation could mobilize individuals' self-control resources and make them perform better on subsequent self-control tasks. This indicates that moral elevation, as a positive moral emotion, is not only effective in mobilizing self-control resources but also has a high capacity for such mobilization. This result is consistent with previous studies.[13,32–34,44] The results validate the positive emotion expansion and construct theory,[14] where moral elevation as a positive moral emotion facilitates the recovery of self-control resources in self-depleted individuals to perform well in morally irrelevant tasks as

Table 1 Repeated Measures ANOVA for Self-Control Task Performance

Dependent Variable	Source of Variation	*df*	*F*	*p*	η^2
Correct Rate	Emotion induced	1	19.10	0.001	0.50
	Depletion	1	6.65	0.018	0.26
	Emotion induced × Depletion	1	0.05	0.826	
Average reaction time	Emotion induced	1	5.87	0.026	0.24
	Depletion	1	23.39	0.001	0.55
	Emotion induced ×Depletion	1	0.08	0.781	

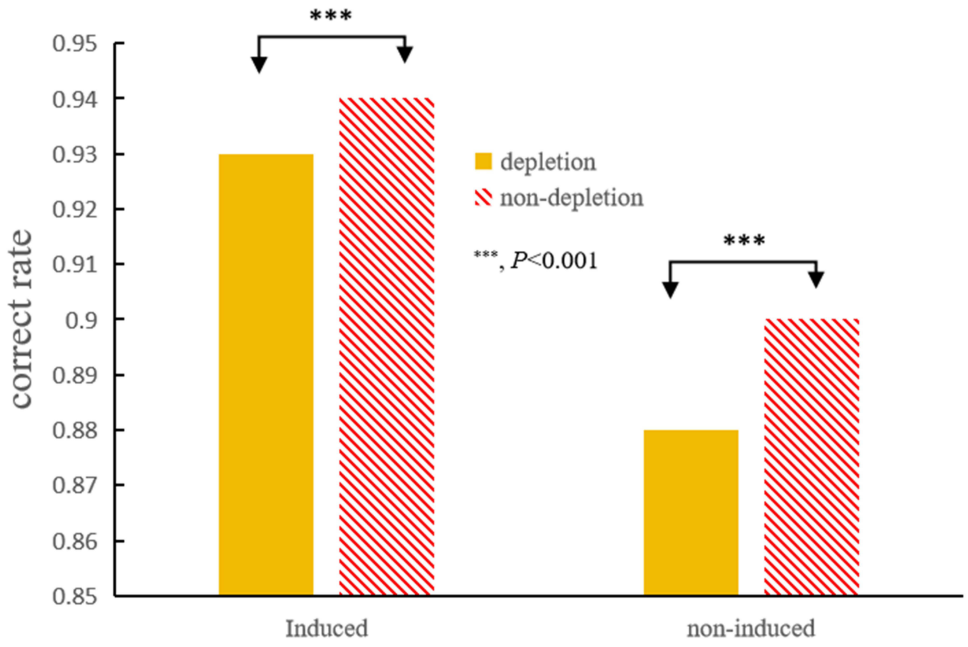

Figure 3 The degree of emotion induced in the correct rate of self-control tasks for participants in different depletion groups; ***, P<0.001.

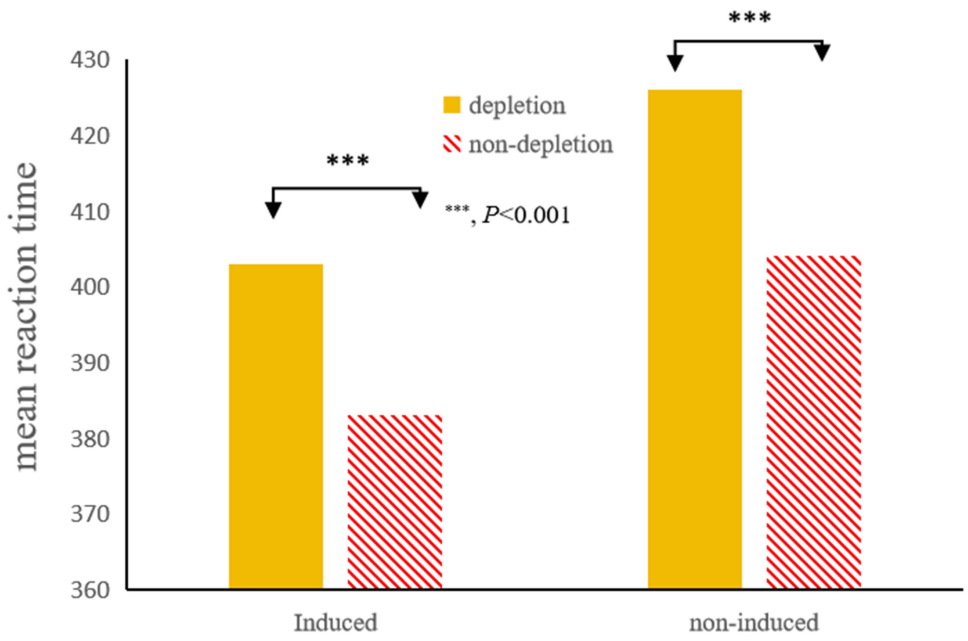

Figure 4 Emotion-induced degree in the mean reaction time of self-control tasks for participants in different depletion groups; ***, P<0.001.

well. It has also been shown that negative emotions, in contrast, not only accelerate ego depletion but are also important factors contributing to self-control failure. For this reason, this study used the subjects' emotional states before and after the task as additional control variables, not only to prevent the subjects' self-contained complex emotions from affecting the subsequent experimental task but also to avoid the effect of emotional states after the first experimental task on subsequent experiments.

We explain from a motivational perspective why subjects are motivated to recover their selves in a self-control task—a task unrelated to morality and individuals who experience moral elevation generate positive self-perceptions, and individuals mobilize more self-control resources in subsequent self-control tasks to better complete the task to maintain

a positive self. That is, having a positive self-perception is the motivation, the individual's specific behaviors are the means, and moral elevation injects new energy into individuals in a state of ego depletion to perform better in subsequent tasks.[13,44] For example, it has been shown that increasing task motivation,[45] smoking,[46] and watching favourite programs[47] can compensate for self-control resources and thus alleviate ego-depletion aftereffects. However, the sources of self-control resources and the ways to supplement individuals' self-control resources remain unknown. Given that moral elevation is an emotion that significantly enhances self-control resources, can moral elevation promote pro-social behavior by enhancing individuals' self-control resources? We designed Experiment 2 for investigation.

Experiment 2: The Effect of Moral Elevation on Pro-Social Behavior: The Mediating Role of Self-Control

Experimental Purpose and Hypothesis

Experimental aim: To investigate the role of self-control resources in the influence of moral elevation of pro-social behavior.

The experimental hypothesis is as follows: individuals whose moral elevation is induced to improve their pro-social behavior by mobilizing self-control resources.

Methods

Participants

147 non-psychology students in two universities were selected as subjects, excluding seven people with emotion-induced failure, leaving 140 people with an average age of 21.00±1.27 years, half male and half female students, 86 in science and technology, 54 in literature and history; 15 freshmen, 65 sophomores, 42 juniors, and 18 seniors; 65 in rural areas, 75 in urban areas. The subjects had no history of neurological or psychiatric disorders, had normal naked eye vision or corrected vision, were right-handed, had not participated in similar experiments, filled out an informed consent form before the experiment, and received 2 gifts (notebook, mask, note pad, or compact stapler) or a monetary reward of equal value to the gifts at the end of the experiment.

Experimental Materials

(1) Moral elevation emotion-inducing material. A new emotion induction paradigm, the recall imagery paradigm, was used to induce different degrees of moral elevation emotions in the subjects, and there are differences in the degree of moral elevation experienced and felt by each person. If video materials of moral deeds are still used for initiation, the differences in the intensity of moral elevation emotions induced by them are small and not conducive to mediated analysis[13] (Fan, W et al, 2019).

(2) Moral Elevation Scale (MES). Similar to Experiment 1, the internal consistency coefficient Cronbach's α of this scale in this study was 0.86.

(3) Pro-social behavior scale (PTM). As in Experiment 1, the internal consistency coefficient Cronbach's α of this scale in this study was 0.92.

Experimental Design

This study used an experimental approach to collect the data needed for the mediation model. The independent variable was the experienced moral elevation score, the mediating variable was the self-control resource (self-control task performance), and the dependent variable was the pro-social behavior score.

Experimental Tasks

(1) Moral elevation emotion-inducing task. In the recall imagery paradigm[13](Fan et al, 2019), subjects were asked to recall a moral act they had heard of and witnessed and then write down the event on paper while completing a moral elevation scale.

(2) Self-control task. Same as Experiment 1.

Experimental Procedures

(1) Before the experiment started in the lounge, 3 minutes of soft music was played to allow the subjects to obtain sufficient rest and soothe their emotions.

(2) All subjects performed a moral elevation emotion induction task and then completed a Moral Elevation Scale.

(3) All subjects performed a self-control task.

(4) All subjects completed the Prosocial Tendencies Measure.

Data Analysis

In this study, the software SPSS 22.0 Chinese was used to collect and enter and statistically analyze the experimental data. Pearson correlation analysis was used to find the correlation coefficients between the variables, and then the mediating effect test was performed by plug-in Process 3.0.

Experimental Results

Correlation Analysis of Each Variable

The results of the two-by-two correlation analysis between moral elevation, self-control resources, and pro-social behavior are shown in Table 2. r=0.46, $p < 0.001$ for the significant positive correlation between moral elevation and self-control resources, r=0.33, $p < 0.001$ for the significant positive correlation between moral elevation and pro-social behavior, and r=0.31, $p < 0.001$ for the significant positive correlation between self-control resources and pro-social behavior, these are satisfying the condition of subsequent mediating effect analysis.

Analysis of the Mediating Effect of Self-Control Resources Between Moral Elevation and Pro-Social Behavior

After standardizing the variables, Using pro-social behavior as the dependent variable and moral elevation as the independent variable to enter the regression equation to test the direct effect of the two. The results indicated that moral elevation significantly and positively predicted pro-social behavior (F=16.37, R^2=0.10, β = 0.33, SE=0.080, $p < 0.001$). Then, the test for mediating effects of self-control resources was conducted using Model 4 in the SPSS macro prepared by Hayes[48] (Model 4 is a simple mediation model) and the bootstrap method of bias correction percentile with repeated sampling of 5000 at a 95% confidence interval, and the results are shown in Table 3 and Figure 5. Moral elevation significantly and positively predicted pro-social behavior (F=10.99, R^2=0.13, β = 0.23, SE=0.089, p = 0.011), significantly and positively predicted self-control resources (β = 0.46, SE=0.076, $p < 0.001$), and self-control resources significantly and positively predicted pro-social behavior (β = 0.20, SE=0.089, p = 0.025). Bootstrap tests for the mediating effect of self-control resources indicated that the upper and lower limits of the 95% confidence interval did not include 0 (indirect effect 0.09, SE=0.069, $p < 0.001$, 95% CI [0.023, 0.242]), with a mediating effect of 28.13%. Thus, self-control resources partially mediated the effect between moral elevation and pro-social behavior, and the experimental hypothesis was validated. Thus, Hypothesis 2 was supported.

Discussion

The results of Experiment 2 showed that self-control resources play a mediating role in the process of moral elevation influencing pro-social behavior, which is consistent with the experimental hypothesis. The results of the present study

Table 2 Results of Descriptive Statistics and Correlation Analysis for Each Variable

Variables	M±SD	1	2	3
1. MES	93.37±3.84	1		
2. SCR	0.91±0.07	0.46***	1	
3. PTM	97.29±15.37	0.33***	0.31***	1

Note: ***p<0.001.

Abbreviations: MES, The score of Moral Elevation Scale; SCR, Self-Control Resources; PTM, The score of Prosocial Tendencies Measure.

Table 3 The Mediating Role of Self-Control Resources

Paths	Effect Value	*SE*	LL	UL
MES→SCR→PTM	0.09	0.069	0.023	0.242
Direct effect	0.23	0.089	0.056	0.409

Abbreviations: MES, The score of Moral Elevation Scale; SCR, Self-Control Resources; PTM, The score of Prosocial Tendencies Measure; *SE*, Standard Errors; LL, lower limit of 95% confidence intervals; UL, upper limits of 95% confidence intervals.

suggest that the mechanism by which moral elevation affects pro-social behavior is by increasing self-control resources to suppress selfish and self-interested impulses and thus exhibit socially normative behavior. This finding is consistent with previous research that self-control resources are critical in influencing moral behavior, and Muraven's research argues that many human behaviors carry selfish tendencies and that maintaining effective and stable socially cooperative behavior requires overcoming such tendencies, a process in which self-control plays an important role.[49] When individuals feel their moral character is enhanced by witnessing the moral behavior of others, they develop positive self-perceptions and positive motivation to be close to others and emulate the moral behavior of others, and this motivation increases the subject's self-control resources.[20,24] It is this resource that individuals use to achieve their ends and increase pro-social behavior, while the results suggest that self-control resources play a partially mediating role in this process. Thus, we suggest that the mechanism by which moral elevation influences pro-social behavior may be that moral elevation have a direct effect on pro-social behavior and can also do so through the pathway of increasing self-control resources.

The results of the present study not only reaffirm the theory of positive emotion expansion and construction but are also consistent with the view of the process model of self-control depletion, which suggests that self-control failure is not caused by a lack of total self-control resources but rather by a lack of task motivation.[50] The control behaviors initially adopted by college students in the process of completing a self-control task lead to a shift in task goals from a "required" task to a "voluntary" task. Students often choose "required" tasks out of responsibility and obligation. In contrast, when college students complete "voluntary" tasks, they can experience a sense of responsibility and meet social expectations and are more likely to complete "voluntary" goals. Thus, from a motivational perspective, the depletion effect emerges because college students prefer to choose self-determined "voluntary" tasks over nonself-determined "required" tasks at the request of an outside party after a series of behaviors that require self-control efforts. Moral elevation, as a positive moral emotion, is also a positive behavioral motivation, and smoking[46] and watching favourite TV shows[47] can increase task motivation,[45] allowing self-control resources to be replenished and ego depletion to be mitigated. Depletion makes individuals less motivated on "required" tasks,[51] but the positive moral emotion of moral elevation provides an injection of new goal-"voluntary" tasks. "voluntary" tasks,[50] thereby increasing individuals' willingness to behave prosocially. Moreover, moral elevation itself possesses the motivation to motivate individuals to be close to others and imitate others' moral behavior, which ultimately manifests as moral elevation that can influence pro-social behavior not only directly but also by mobilizing self-control resources.

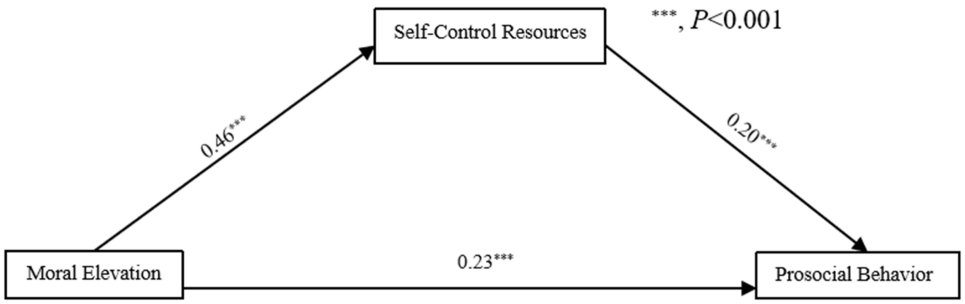

Figure 5 Mediating effects of (standardized) self-control resources; ***, P<0.001.

General Discussion

Moral Elevation and Pro-Social Behavior

Both Experiment 1, using video induction, and Experiment 2, using the recall imagery paradigm, caused subjects to experience significant moral elevation due to the moral behavior of others and significantly predicted subjects' pro-social behavior. This result is consistent with previous studies.[20,24–26] It is evident that positive self-perceptions resulting from experiencing a greater moral elevation promote behavioral motivation to be close to others, to help others, and to emulate others, which in turn increases pro-social behavior. This result is also in line with Horberg's moral amplifier theory of emotions based on the core evaluative perspective of emotions.[52] The theory suggests that the generation of emotions is based on certain cognitive evaluations, which can stimulate and maintain specific emotions. Therefore, the cognitive evaluation related to these emotions will restrict the impact of the emotions on subsequent social judgments, which is mainly achieved by giving priority to specific concerns related to previous cognitive evaluation. Different emotions emphasize different social and moral concerns, which will lead to different moral judgments.[52] Specifically, emotions in specific areas significantly affect behaviors in specific areas, and feelings of moral elevation resulting from hearing and witnessing others' moral behavior significantly influence moral behavior. Notably, as a positive self-perception,[24] moral elevation enables individuals to relate to their negative situations (eg, "When in a difficult situation, I believe that there are good people in the world") and to accept their inner feelings (eg, "I want to be like him/her", "I want to help others as he/she does"). This not only contributes to the enhancement of college students' self-esteem and optimism but also helps them develop pro-social behaviors. Therefore, the importance of moral elevation for college students lies in the fact that individuals maintain positive self-perceptions by rejecting immoral and unhealthy behaviors that are "detrimental to the positive self".

Moral Elevation Promotes Pro-Social Behavior by Increasing Self-Control Resources

When individuals are in a state of self-depletion, their various socially adaptive behavioral abilities are correspondingly impaired and manifest as inefficiency,[50] while in terms of behavioral control, individuals with depleted self-control resources may exhibit undesirable behaviors such as deception and aggression. Therefore, how to effectively increase or restore self-control resources is a very important topic. Inzlicht argues that it is more relevant to talk about how to improve self-control from the perspective of motivation.[50] In this paper, we explain this view through an empirical study in which moral elevation as a positive emotion explores newly available self-control resources by generating new motivation, and moral elevation spurs individuals to improve self-control resources. Thus, the results both complement the positive role of moral elevation and refine the relevant research on self-control resources.

The present study found that self-control resources partially mediated the role between moral elevation and pro-social behavior, which is in line with previous studies regarding the positive function of high levels of moral elevation on pro-social behavior.[20,24–26] Positive emotions facilitate the recovery of self-control resources,[13,29] and self-control resources are essential influences on pro-social behavior.[32] Research evidence is consistent. The present study included all three variables in the examination simultaneously, revealing that moral elevation is an essential factor in enhancing pro-social behavior and in promoting self-control resources. Individuals who experience more moral elevation develop positive self-perceptions and, driven by the motivation to maintain a good ego, and individuals increase their self-control resources to be able to express an excellent moral ego through subsequent behaviors (eg, "by being close to others, helping others, emulating others' moral behavior, etc.").

On the other hand, college students who have more experience with moral elevation are more likely to engage in pro-social behavior. Specifically, (1) deeply influenced by traditional Chinese culture, the ideas of "reaching the goal of helping the world" and "learning from others" make such individuals more willing to imitate others' moral behavior and help others.[15] (2) Such individuals easily perceive the positive results brought by pro-social behaviors and are more likely to engage in pro-social behaviors.[53] (3) Such individuals are better at managing their own emotions and cognition and have stronger psychosocial functions, so they are more likely to pay attention to the needs of others and make corresponding positive responses. Moreover, the individuals' happiness of positive emotional experience is more substantial,[54] and their happiness is more conducive to helping individuals.[55] (4) The persistence of such individuals

in the face of difficulties and adversity means that they have a better ability to cope with stress and manage emotions and are less affected by negative emotions, enabling them to have more energy to help others.[56] In short, a higher level of moral elevation means that individuals have a better understanding and expectation of themselves, others, and the environment. It not only makes individuals have more orientation toward others in the process of interpersonal communication but also mobilizes individual self-control resources to a greater extent. Therefore, when their own needs are met, they can have more resources to help those in need. Thus, when subsequent tasks can help them achieve this goal, individuals mobilize as many self-control resources as possible to achieve it. Moral elevation, as a positive moral emotion, is also a positive behavioral motivation,[20,22,24] which allows self-control resources to be replenished by increasing task motivation and mitigating the self-depletion aftereffect. Although the self-depletion task decreases individuals' attention on the "must" task, the positive moral emotion of moral elevation energizes the new goal, the "voluntary" task, thus enhancing individuals' pro-social behavior and increasing individuals' willingness to behave prosocially.[50] The results also validate positive emotion expansion and construction theory and the self-control depletion process model and further deepen the research on the relationship between moral elevation and pro-social behavior among college students by exploring the mediation mechanism between moral elevation and pro-social behavior for the first time.

Conclusion and Implications

Conclusion

In two studies, we examined how moral elevation and self-control resources influence pro-social behavior among college students. The current research indicates that inducing a sense of moral elevation can easily encourage college students to engage in pro-social behavior. In addition, we identified self-control resources as a mediating factor in the positive effect of moral elevation on pro-social behavior among college students. Our research findings may open new avenues of research and expand knowledge about the antecedents of pro-social behavior. In addition, our research provided relevant insights for the cultivation of pro-social behavior among college students.

Research Implications

Although studies have confirmed the stable predictive effect of higher levels of moral elevation on pro-social behavior, there is limited evidence on the promotion of pro-social behavior by moral elevation and its underlying mechanisms. This study extended the research on factors influencing pro-social behavior among college students and examined the relationship and mechanisms between moral elevation and pro-social behavior based on positive emotion expansion and construct theory and a self-control resource allocation model in the context of positive psychology. The results enriched the research in the field of positive psychology of college students and provided an adequate empirical basis and suggestions for their pro-social behavior cultivation.

First, to address the positive effects of moral elevation on pro-social behavior, in the process of cultivating cultivating college students' pro-social behavior, educators should consciously develop individuals' moral elevation by encouraging students to participate in volunteer activities,[57] recall virtuous behaviors in their lives,[26] and keep a journal of moral behavior situations,[58] which can effectively enhance individuals' moral elevation level, thus facilitating the development of their pro-social behavior. Second, the mediating role of self-control resources between moral elevation and pro-social behavior suggests that educators can train students to consciously strengthen self-control by encouraging them to adhere to the above behavioral training, thus promoting the cultivation of pro-social behavior among college students.

Limitations and Future Directions

This study also has some shortcomings that need to be further improved in future studies. First, the study used an experimental design combined with a questionnaire method. Although the previous theoretical and empirical evidence provided a solid foundation for this study, it did not establish a causal relationship between the variables. Second, some of the data in this study were self-reported by college students, which may lead to a social approval effect. For example, college students may tend to portray an excellent moral image, so they may give dishonest answers.

Based on the shortcomings of the above research, we believe that future research should focus on the following points: First, the mediating role of self-control resources between moral elevation and prosocial behavior needs to be further explored and verified. The external validity of the experimental method should be improved in order to reveal the mechanisms of interaction between variables more deeply. Second, future research can consider collecting data from multiple sources of information, such as family members, friends, teachers, and colleagues, to promote the reliability and validity of experimental results. Finally, future research should explore different populations or use multiple methods to test the mediating role of self-control resources between moral elevation and pro-social behavior.

Data Sharing Statement

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Ethics Approval and Consent to Participate

All the methods were performed in accordance with the Declaration of Helsinki. The study was approved by the Ethical Committee of Anhui Normal University. All the participants provided written informed consent.

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Disclosure

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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