ARTICLE

Self-Control Training Decreased Intensity of Penalty Toward Previous Offender

Wenyuan Wang[1,#], Shuili Luo[1,#], Everett L. Worthington Jr[2] and Haijiang Li[1,3,*]

[1]Department of Psychology, Shanghai Normal University, Shanghai, 200234, China

[2]Department of Psychology, Virginia Commonwealth University, Richmond, VA, 23284, USA

[3]The Research Base of Online Education for Shanghai Middle and Primary Schools, Shanghai, 200234, China

[*]Corresponding Author: Haijiang Li. Email: haijiangli@shnu.edu.cn

[#]Shuili Luo and Wenyuan Wang contributed equally

ABSTRACT

Previous studies have found that self-control training was effective in improving an individual's self-control, which plays an important role in inhibiting negative emotions. However, it is unclear whether self-control training can facilitate refraining from retaliation. This study randomly assigned participants (N = 55) to a training condition (building self-control by avoiding sweets) or a control condition. Before and after training, participants completed the Transgression-Related Interpersonal Motivations Inventory-18 (TRIM-18) and a modified Taylor aggression task once each. Participants in the training condition inflicted more low-intensity penalties on the previous offender compared to control participants. Participants in the training condition reported lower revenge scores after training than before training. These results provide preliminary support that providing people who wish to forgive self-control training might promote forgiveness.

KEYWORDS

Self-control training; avoiding sweets; retaliation

1 Introduction

Our daily life is rife with offenses and conflicts. After being offended by others, individuals tend to be dominated by negative emotions for a long time, avoiding or retaliating against the offender [1]. However, retaliation may give rise to many adverse consequences. For example, retaliating will cause offended individuals to focus their attention continuously on the offender, reinforce negative emotions, and prevent them from getting over the offense [2]. Individuals can also choose to forgive those who hurt them. Forgiveness refers to a prosocial transformation in the individual's cognitive, emotional, motivational, and behavioral responses to the offender [3]. Moreover, forgiveness not only contributes to improving the resilience of relationships and promoting their stability and permanence [4], but also benefits people's mental health [5] and physical health and well-being [6].

Self-control is the ability to change one's behavioral responses to conform to ideals, values, morals, and social expectations in order to achieve one's long-term goals [7]. Effective self-control has been associated with many positive outcomes, including maintaining harmonious social relationships [8] and improving individual well-being and life satisfaction [9]. Moreover, self-control plays a vital role in controlling

negative emotions and inhibiting impulsive behaviors and seems to be a causal factor in reducing immediate retaliation [10,11]. When people are offended, they must overcome their negative reactions to refrain from retaliating aggressively. This process involves self-control [12]. However, self-control behaviors depend on a limited resource of willpower, which, once used, temporarily depletes this resource. Depleted willpower impairs performance on subsequent self-control tasks [7]. Relevant to the present study, people have been found to act more aggressively after being offended because they could not control their negative emotions when the limited resource of willpower was depleted [13,14].

Given the broad traits and benefits of self-control, researchers have considered strategies that can improve self-control. Self-control training (SCT) is one such method. SCT involves the repeated practice of self-control over time [15]. For example, SCT can stimulate self-control by having people modify their manner of speaking [16], sit up straight at all times [17], maintain positive emotional states [17], avoid sweets [18], squeeze a handgrip [18], and engage in logical reasoning exercises [19]. Many studies have found that these methods did improve self-control, Yang et al. [20] found that after comprehensive SCT, depressed individuals with dysfunctional self-regulation showed higher trait self-control scores and greater improvements in depressive symptoms compared to participants in the control condition. Moreover, a meta-analysis, which contains the data from 12 labs, enrolled 1775 participants. Researchers found a small but significant ego-depletion effect on both accuracy and reaction time (d = 0.10) [21].

Conflicts seem to be everywhere in our life. If the conflicts cannot be properly resolved, they may induce problems. Our present study provided a useful way to decrease negative responses toward an offender by improving self-control. We theorize that enhancing self-control increases one's efficacy in responding to offenses with forgiveness. Forgiveness lowers revenge and avoidance motivations, which eventually might also lead to more benevolent motivations [22]. Thus, the avoid-sweets task [18] and a modified Taylor aggression procedure (TAP; [23,24]) were used as SCT to explore whether improving self-control would promote (1) changes in unforgiving motivations (i.e., decreased avoidance and revenge motivations [25]) and (2) increased benevolence motivations [25]—which together constitute forgiveness [25]. Reduced motivations to seek revenge or to avoid the offender would lead to reduced retaliation [7,12]. Increased benevolence motivations would lead to increased prosocial behaviors and emotional forgiveness, which entails more positive emotional states [26]. Those changed behaviors and emotions might be interpreted as effects consistent with forgiveness.

Given that self-control plays a vital role in controlling negative emotions and inhibiting impulsive behaviors, we hypothesized that participants who had been offended and who subsequently finished the SCT would choose more low-intensity penalties for prior offenders [7,12] and also experience less intense negative emotions compared to participants in the control condition.

Previous studies have found that forgiveness was positively associated with self-control, especially when forgiveness was measured by a revenge indicator [12]. Forgiveness training can enhance moral resolve to forgive (i.e., inhibit revenge and avoidance and encourage benevolence; for a meta-analysis, see [27]). We are proposing, though, that promoting self-control itself, through direct SCT, without referring to forgiveness explicitly can stimulate experiences of forgiveness. We thus measure as outcomes the motivations composing forgiveness (i.e., revenge, avoidance, and benevolence [25], Hypothesis 1), behavior consistent with forgiveness (administering less harsh penalties [7,12], Hypothesis 2), and changed emotional states to reflect more positive emotion, which is indicative of emotional forgiveness [26], Hypothesis 3. So, the Trait Forgivingness Scale (TFS [28]), the Transgression-Related Interpersonal Motivations Inventory (TRIM-18 [29,30]), the amount of penalty enacted in a behavioral rating, and the emotional state were used to assess whether SCT affected forgiveness.

2 Materials and Methods

2.1 Participants

College students (N = 60) were recruited and randomly assigned to the SCT or the control condition, with 30 participants in each condition. Among them, one participant dropped out, and four participants were excluded due to their doubts about the authenticity of the experimental procedure. Of the remaining 55 participants, 27 participants completed the SCT condition (7 males, 20 females, average age = 20.63 years, SD = 2.96) and 28 participants completed the control condition (9 males, 19 females, average age = 20.54 years, SD = 2.29). The current study was approved by the Research Ethics Committee of Shanghai Normal University.

2.2 Materials

2.2.1 Trait Forgivingness Scale (TFS)

The present study measured participants' trait forgivingness through a brief TFS developed by Berry et al. [28] which consists of 10 items. The trait forgivingness score is the sum of the participant's scores on all items. Responses were scored ranging from 1 (not at all) to 5 (very much) [28]. This scale was administered before the modified TAP during the first session. Cronbach's alpha was 0.73.

2.2.2 Transgression-Related Interpersonal Motivations Inventory (TRIM-18)

The TRIM-18 was used to measure participants' state forgiveness [29], which consists of three motivation dimensions: Revenge, Avoidance and Benevolence. This inventory has been found to have good psychometric support in China [30]. Responses were scored ranging from 1 (strongly disagree) to 5 (strongly agree). Before the modified TAP in both session 1 and session 2, participants completed one TRIM-18 in each session. The Cronbach's alpha for the avoidance, revenge, and benevolence subscales of the TRIM-18 at session 1 were 0.59, 0.90, and 0.71, respectively. The alphas of the three subscales in session 2 were 0.69, 0.92, and 0.75, respectively.

2.2.3 Self-Control Scale (SCS)

The present study measured participants' trait self-control through the brief SCS developed by Tangney et al. [31] and revised by Tan et al. [32], consisting of 13 items. Responses ranged from 1 (not at all) to 5 (very much). The SCS was administered before the modified TAP during the first session. The Cronbach's alpha was 0.78.

2.2.4 Positive and Negative Affect Schedule-Expanded Version (PANAS-X)

The participants' basic emotional states (i.e., sadness, anger, fear, and happiness) were measured by PANAS-X developed by Watson et al. [33] based on the PANAS [34]. Responses ranged from 1 (not at all) to 5 (extremely). The PANAS-X was widely used both in clinical and research work and showed good psychometric properties [35,36]. Only the items that related to the basic emotional states (i.e., sadness, anger, fear, and happiness) were used, because the present study focused on those four emotions.

2.3 Procedure

The experiment was conducted over two sessions that were separated by a two-week interim. Participants in the SCT condition were informed before the experiment that the purpose of the study was to investigate the relationship between the avoidance of sweets and weight loss. Participants were asked to sign an informed consent form before the experiment, and the true purpose of the experiment was explained to them after it was over.

Session 1. During the first session, participants were asked to rate "How much of a 'sweet tooth' do you think you have (1 = very dislike to 5 = very like [sweets])?" in order to measure their preference for sweets [37]. They then completed the TFS, the TRIM-18, and the SCS. After a few minutes of rest, participants

completed the PANAS-X and the modified TAP. The modified TAP was divided into two phases. Before the experiment, participants and their online opponents played a game of chance (i.e., rock-paper-scissors) to determine their identity in the game–the active or passive side. The program had been set so that no matter which of the rock-paper-scissors participants chose, they were notified that they would become the passive side in the first stage and the active side in the second stage. There were two online opponents (one male and one female), randomly presented among the different participants.

The first phase was the passive phase with 80 trials. At the beginning of each trial, the online opponent's photo was presented first. Then two cards appeared on the screen, and the participant chose one of them as soon as possible. In this phase, when the participant chose a card that was not the same as the online opponent, the participant "lost" and was punished by the online opponent. The (ostensible) opponent applied either a high-intensity noise penalty or a low-intensity noise penalty to the participant. The high-intensity and low-intensity noise stimuli selected in this study are 100 and 80 dB, respectively, and they were played through headphones without causing any damage to the hearing or the nervous system [23]. When the participant chose the same card as the opponent, the participant "won" and was not punished. After the participant had selected a card, the intensity of the penalty chosen by the opponent in this round was presented. At the end of the game, the result was presented and if the participant lost, the penalty previously chosen by the opponents would be imposed (Fig. 1).
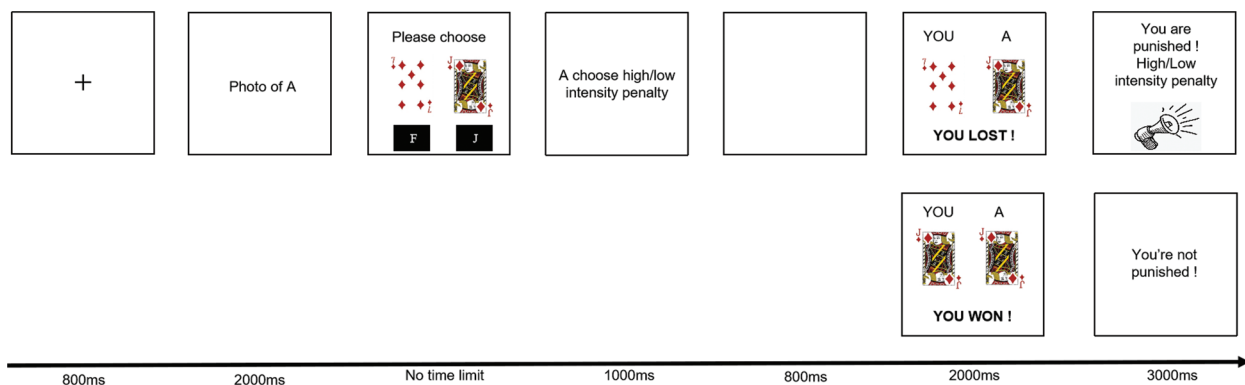

Figure 1: Schematic flow chart of passive phase

The game results were manipulated by the program. The probability of the participant winning in the passive phase was 40% (32 trials), and among all the trials in which the participant lost, the probability of the online opponent choosing a high-intensity noise penalty was 80% (38 trials), and the probability of the online opponent choosing a low-intensity noise penalty was 20% (10 trials). The winning and losing situations were presented randomly.

The second phase was the active phase, with a total of 80 trials. The tasks in this phase were similar to those in the passive phase. At the beginning of each trial, the online opponent's photo was presented first. In this phase, because the participant was in the active position, he or she pre-selected the intensity of the penalty. Participants had to choose the intensity within 5 s. If no response was made within 5 s, the program would choose a high-intensity penalty by default. Then two cards would be presented on the screen. Participants needed to choose one of them as soon as possible. In this phase, when the online opponent chose a different card than the participant, the participant won and could impose the previously chosen penalty on the opponent; when the opponent chose the same card as the participant, the opponent won, and he or she was not penalized. At the end of the game, the result and penalty information were presented on the screen (Fig. 2).
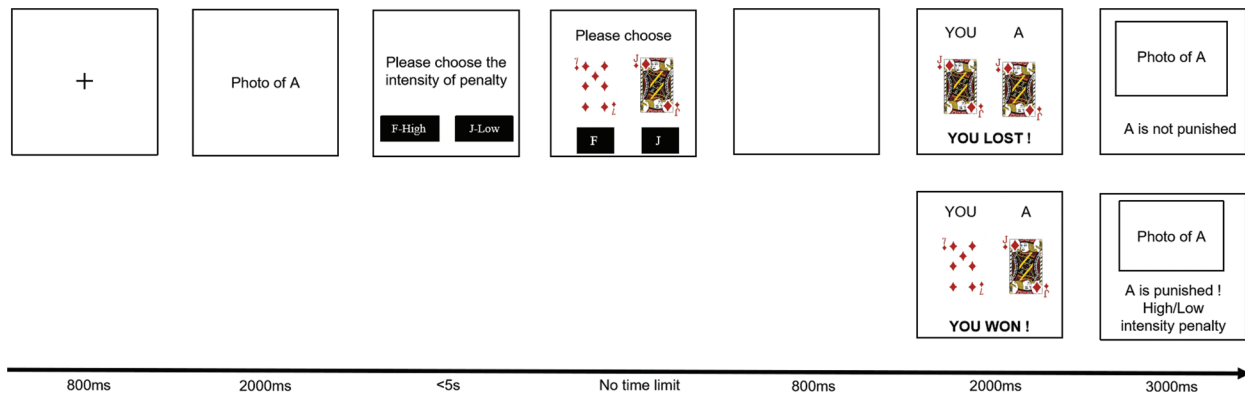
Figure 2: Schematic flow chart of active phase

The results of the second phase of the game were also manipulated by the program. The probability of the participant winning was 50% (40 trials). The winning and losing situations were presented randomly. Participants rated their post-task emotional state.

Two-week interim. The SCT task used in this study was to avoid sweets for two weeks, which has been shown to effectively improve individuals' self-control over a two-week period [18]. During those two weeks, participants in the SCT group were asked to eat as little cake, biscuit, bubble tea, candy, ice cream, and other desserts as possible. During the task, the participants were asked to make as much effort as possible to practice self-control. In addition, participants were required to complete a time-stamped online diary every other day (seven in total) to report on task adherence and difficulty. Participants rated how often they avoided sweets that day (from 1–10, 1 = not at all, 10 = consistently) and how difficult it was (from 1–10, 1 = very easy, 10 = very difficult). Participants were asked to follow the instructions as accurately as possible and were informed that they would not be penalized for not complying with the task's recording. One week into the task, messages were sent to participants to inquire about their progress and to encourage them to stay on task. Participants in the control condition were required to record the time they spent watching the video during the task (no control was required). To keep the task requirements consistent for both conditions, the control condition was also required to complete an online diary every other day.

Session 2. During the second session, participants completed the TRIM-18. After a few minutes of rest, participants completed the modified TAP as the first session. The participants' basic emotional states were measured before the beginning of the experiment, after the end of the passive phase, and after the end of the active phase, respectively. At the end of the experiment, participants were asked about their feelings during the experiment and were paid monetary compensation.

3 Results

3.1 Trait Forgivingness, Trait Self-Control, and Sweets Preference

Independent samples t-tests were computed on the scores of participants in both conditions on the TFS, the SCS, and the sweets-preference questionnaire. No significant differences were found in trait forgivingness, trait self-control, and sweets preference between the two conditions (see Table 1).

Table 1: Descriptive statistics for scales

	SCT condition ($n = 27$)		Control condition ($n = 28$)	
	M	SD	M	SD
SCS	36.30	6.35	36.43	6.94
TFS	28.96	5.27	28.43	5.76
Sweets preference	3.48	0.98	3.25	1.01
Session 1–Avoidance	26.00	4.22	26.32	3.45
Session 2–Avoidance	25.48	4.47	25.89	3.08
Session 1–Revenge	14.78	5.19	15.29	5.12
Session 2–Revenge	12.74	5.27	15.18	4.51
Session 1–Benevolence	14.74	3.55	14.93	4.29
Session 2–Benevolence	15.96	3.76	14.61	3.86

3.2 Manipulation Checks and State Forgiveness

Participants in the SCT condition completed an average of 5.19 diary entries (out of a possible 7; SD = 1.42) during the two-week interim. Most participants reported completing SCT tasks to an appropriate level: M = 8.03 (out of 10; SD = 1.73). As expected, participants in the SCT condition reported moderate difficulty when completing the SCT task (M = 4.05; SD = 2.50). We concluded that participants were sufficiently engaged in the SCT task.

A repeated-measures ANOVA of 2 (condition: SCT condition/control condition) × 2 (time: session 1/ session 2) on participants' scores on the TRIM-18 revenge subscale. There was a significant main effect of time, F (1, 53) = 5.82, $p < 0.05$, $\eta^2 = 0.10$, and a significant interaction effect of condition × time, F (1, 53) = 4.71, $p < 0.05$, $\eta^2 = 0.08$. A simple effect analysis revealed that participants in the SCT condition reported significantly lower revenge scores in session 2 (M = 12.74, SD = 5.27) compared to session 1 (M = 14.78, SD = 5.19), $p < 0.01$. This supported Hypothesis 1. Repeated-measures ANOVA of 2 (condition: SCT condition/control condition) × 2 (time: session 1/session 2) on participants' avoidance and benevolence scores were conducted, no significant effects were found. This finding was not supportive of Hypothesis 1. We concluded that Hypothesis 1 was partially supported.

3.3 Behavioral Measure of Penalty Intensity and Emotional States

The behavioral measure of forgiveness was analyzed using a repeated-measures ANOVA of 2 (condition: SCT condition/control condition) × 2 (time: session 1/session 2) × 2 (penalty intensity: high-intensity noise/low-intensity noise) was computed on the rate of high and low-intensity penalty selected by participants in the session 1 and session 2. There was a significant main effect of penalty intensity, $F(1, 53) = 9.69$, $p < 0.01$, $\eta^2 = 0.16$, and a significant interaction effect of condition × time × penalty intensity, $F(1, 53) = 11.43$, $p < 0.01$, $\eta^2 = 0.18$. A simple effect analysis suggested that people in the SCT condition (M = 51.53, SD = 22.31) selected more low-intensity penalties than did people in the control condition (M = 33.35, SD = 19.76) during the session 2, $p < 0.01$. Compared to the session 1 (M = 37.82, SD = 27.81), people in the SCT condition selected more low-intensity penalties during the session 2 (M = 51.53, SD = 22.31), $p < 0.01$. There was no significant difference between the low-intensity penalty selected in the session 1 (M = 41.52, SD = 27.06) and session 2 (M = 33.35, SD = 19.76) in the control condition (Fig. 3). Our findings supported Hypothesis 2.

We conducted a repeated-measures ANOVA at three-time points (i.e., baseline state, after the passive phase, and after the active phase) for each emotional state to explore the changes in emotional states before and after each stage. The main effect of time was significant, $F_{(2, 53)} = 22.84$, $p < 0.001$, $\eta 2 = 0.30$. The main effect of emotional state was significant, $F_{(3, 52)} = 20.69$, $p < 0.001$, $\eta 2 = 0.28$. There was a significant interaction effect of time × emotional state, $F_{(6, 49)} = 27.00$, $p < 0.001$, $\eta 2 = 0.33$. A simple effect analysis showed that participants reported more negative ($p < 0.001$) and less positive emotions ($p < 0.05$) after completing both the passive and active phases compared to the baseline. After the active phase, compared to the end of the passive phase, participants reported less negative ($p < 0.001$) and more positive emotions ($p < 0.001$; Fig. 4). During session 2, similarly to session 1, we also conducted a repeated-measures ANOVA at three-time points (i.e., baseline state, after passive phase, and after active phase) for each emotional state to explore the changes of emotional states before and after each stage of session 2. Similar results to session 1 were found (Fig. 4). These findings supported Hypothesis 3.
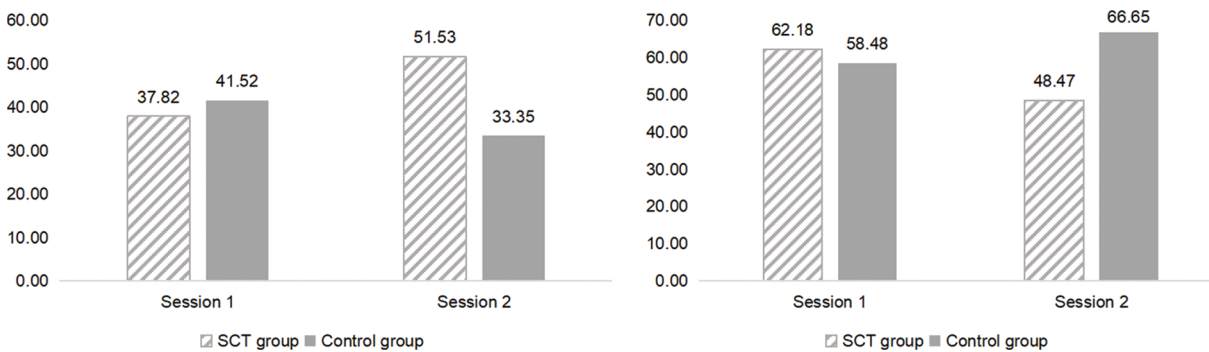

Figure 3: The rate of low-intensity penalty (left) and high-intensity penalty (right) in the active phase
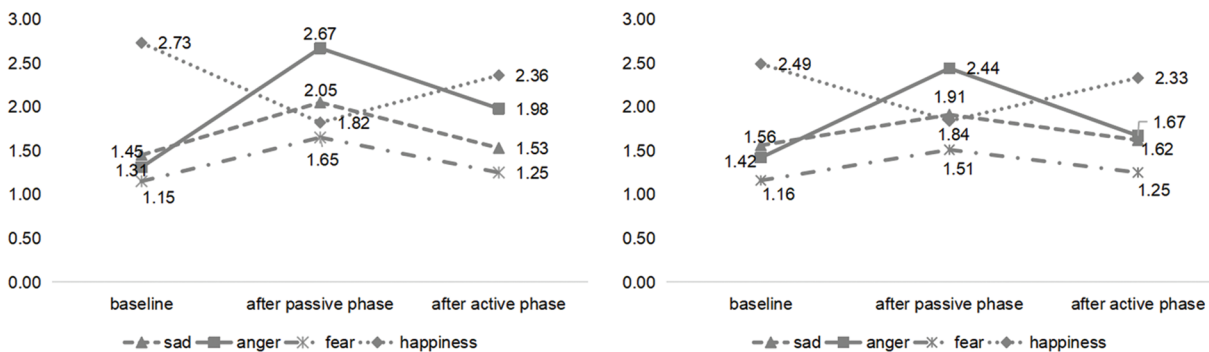

Figure 4: Emotional states in session 1 (left) and session 2 (right)

4 Discussion

This is the first study to explore the effect of self-control training (SCT) on enhancing self-reported forgiveness (Hypothesis 1) and reducing negative behavioral (Hypothesis 2) and emotional (Hypothesis 3) responses to aggression. In the current study, the avoid-sweets task, which was found to be effective in improving individuals' self-control [18], was used as the SCT task. A modified Taylor aggression procedure was used as the behavioral measure of penalty intensity, and the TRIM-18 scale was to measure the level of state forgiveness. Participants who did not differ in trait self-control, trait forgivingness, and sweet preference were invited to the current study. The findings are consistent with our hypotheses that two-week self-control training improved individual state forgiveness and inhibited

negative behavioral responses after being offended. The results are also consistent with studies related to the ego-strength model of self-control in which self-control can be enhanced by practice over time [7,38].

After finishing SCT, participants increased their state forgiveness, partially supporting Hypothesis 1. The effect was solely due to the decrease in revenge motives. Moreover, in a previous study [39], self-control predicted the level of forgiveness. Also, when self-control was depleted, it was hard for individuals to forgive offenders [40].

Analyses of scores on the TRIM-18 showed that, compared to the performance before SCT was conducted, people in the SCT condition showed decreased revenge scores after completing the SCT, while the benevolence and avoidance scores did not change. This may be because inhibiting individuals' retaliatory impulses depends more strongly on self-control than does promoting individuals' benevolent behavior [41,42]. These findings were consistent with a previous study: the association with self-control was stronger when forgiveness was operationalized as suppressing retaliation motives rather than expressing benevolent motives [12]. However, a more mundane explanation might be in order. McCullough [25] treated revenge plus avoidance motives as unforgiveness. Often, revenge motives are changed, but at other times (e.g., with casual acquaintances) avoidance motives are changed. In the present study, participants were strangers to each other, and thus avoidance of strangers is hardly affected by an offense by a stranger. Also, among strangers, there is little benevolence motive. However, among strangers, the motivation to pay the other person back for harm is strong. Thus, the self-control intervention affected precisely what we might expect in a laboratory study that put strangers together.

The relationship between self-control, SCT, and behavioral response to aggression can be observed in the intensity of penalty chosen by participants for previous offenders during the active phase of two rounds of the modified TAP. Hypothesis 2 was supported. After being hurt or offended, people usually feel that their interests have been compromised, and they have a natural urge to avoid or retaliate against the offender [43]. However, based on considerations of social values as well as interpersonal relationships, people often need to overcome these negative natural tendencies and act prosocially. Self-control helps regulate negative impulsive and instinctive behavior [41,42], thus, individuals with high self-control can inhibit their negative emotions and impulses to retaliate when they are offended by others. That is, SCT sets the stage for a change in the propensity to forgive, which eventually presumably leads to reduced retaliation in the aggression task that we used. In general, the results of the present study supported previous findings that the avoid-sweets task enhanced individuals' self-control [15–20] and provided further evidence for SCT could reduce individuals' revenge-related behavior.

In addition, we found that participants felt more negative emotions and less positive emotions after completing the modified TAP compared to their baseline emotional state. These results are consistent with previous studies that used the TAP [44,45]. The TAP has been able to cause participants to experience feelings of offense by inducing situations of interpersonal aggression [46–48]. However, although participants reported more negative and less positive emotions after completing the passive phases compared to the baseline and reported less negative and more positive emotions after completing the active phase, there were no significant differences between the SCT and the control condition. In other words, SCT could not help individuals to prevent negative emotions.

5 Limitations and Future Research

The present study offered evidence that SCT—even when not referring to forgiveness at all—could change revenge motivations, decrease the intensity of the penalty toward the previous offender, and make the emotional state more positive. Aggressive behaviors are serious threats to social harmony, and in the present global climate of polarization, being able to inhibit them can contribute to global peace. Here, we suggested that practicing self-control can promote both reductions in revenge motives and reduction in aggressive behavior and elevation of emotional mood. In some people forgiveness is not valued [49]. But

they might value self-control. Thus, we have illustrated that promoting self-control, even within a self-control task as simple as avoiding sweets, can promote forgiveness—without antagonizing people for whom forgiveness is not valued.

However, there are some limitations of the current study. First, the sample size was relatively small, and the fact that the subjects recruited were undergraduate and postgraduate students affects the generalizability of the findings. Second, there may be some variations in findings when using different behavioral paradigms to examine revenge-related behaviors. So, future research should validate the impacts of SCT on different groups of people by using alternative measurement paradigms. In addition, the temporal validity of the impacts of SCT on individuals still remains unclear. Longitudinal studies should be conducted to provide further solid evidence of how self-control leads to forgiveness over time.

6 Conclusion

The present study provides preliminary evidence that self-control training can inhibit individuals' revenge motives and negative behavioral responses and can increase positive emotional mood. Compared to the control condition, the SCT training condition resulted in people who inflicted less high-intensity punishment on the previous offender, and individuals in the training condition reported lower revenge scores after training. This initial trial suggests that explicitly targeting self-control might help people reduce revenge motives and behaviors—even when people are not inclined to forgive. This study suggests needed research to explore other self-control interventions with larger and more diverse populations.

Conflicts of Interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

1. Akhtar, S., Barlow, J. (2018). Forgiveness therapy for the promotion of mental well-being: A systematic review and meta-analysis. *Trauma, Violence, & Abuse, 19(1),* 107–122. DOI 10.1177/1524838016637079.

2. Carlsmith, K. M., Wilson, T. D., Gilbert, D. T. (2008). The paradoxical consequences of revenge. *Journal of Personality and Social Psychology, 95(6),* 1316–1324. DOI 10.1037/a0012165.

3. Li, H., Wade, N. G., Worthington Jr, E. L. (2020). Understanding the processes associated with forgiveness. *Switzerland: Frontiers in Psychology, 11.* DOI 10.3389/fpsyg.2020.628185.

4. Thompson, B. S., Korsgaard, M. A. (2019). Relational identification and forgiveness: Facilitating relationship resilience. *Journal of Business and Psychology, 34(2),* 153–167. DOI 10.1007/s10869-018-9533-1.

5. Webb, J. R., Toussaint, L. L. (2020). Forgiveness, well-being, and mental health. In: Worthington Jr, E. L., Wade, N. G. (Eds.), *Handbook of forgiveness.* 2nd edition, pp. 188–198. New York: Routledge.

6. Toussaint, L. L., Worthington Jr, E. L., Williams, D. R., Webb, J. R. (2020). Forgiveness and physical health. In: Worthington Jr, E. L., Wade, N. G. (Eds.), *Handbook of forgiveness.* 2nd edition, pp. 178–187. New York: Routledge.

7. Baumeister, R. F., Vohs, K. D., Tice, D. M. (2007). The strength model of self-control. *Current Directions in Psychological Science, 16(6),* 351–355. DOI 10.1111/j.1467-8721.2007.00534.x.

8. Kong, F., Zhang, H., Xia, H., Huang, B., Qin, J. et al. (2020). Why do people with self-control forgive others easily? The role of rumination and anger. *Frontiers in Psychology, 11.* DOI 10.3389/fpsyg.2020.00129.

9. de Ridder, D., Gillebaart, M. (2017). Lessons learned from trait self-control in well-being: Making the case for routines and initiation as important components of trait self-control. *Health Psychology Review, 11(1),* 89–99. DOI 10.1080/17437199.2016.1266275.

10. Denson, T. F., Pedersen, W. C., Friese, M., Hahm, A., Roberts, L. (2011). Understanding impulsive aggression: Angry rumination and reduced self-control capacity are mechanisms underlying the provocation-aggression relationship. *Personality and Social Psychology Bulletin, 37(6),* 850–862. DOI 10.1177/0146167211401420.

11. Denson, T. F., DeWall, C. N., Finkel, E. J. (2012). Self-control and aggression. *Current Directions in Psychological Science, 21(1),* 20–25. DOI 10.1177/0963721411429451.

12. Burnette, J. L., Davisson, E. K., Finkel, E. J., van Tongeren, D. R., Hui, C. M. et al. (2014). Self-control and forgiveness: A meta-analytic review. *Social Psychological and Personality Science, 5(4),* 443–450. DOI 10.1177/1948550613502991.

13. Barlett, C., Oliphant, H., Gregory, W., Jones, D. (2016). Ego-depletion and aggressive behavior. *Aggressive Behavior, 42(6),* 533–541. DOI 10.1002/ab.21648.

14. Stucke, T. S., Baumeister, R. F. (2006). Ego depletion and aggressive behavior: Is the inhibition of aggression a limited resource? *European Journal of Social Psychology, 36(1),* 1–13. DOI 10.1002/ejsp.285.

15. Beames, J. R., Gilam, G., Schofield, T. P., Schira, M. M., Denson, T. F. (2020). The impact of self-control training on neural responses following anger provocation. *Social Neuroscience, 15(5),* 558–570. DOI 10.1080/17470919.2020.1799860.

16. Gailliot, M. T., Plant, E. A., Butz, D. A., Baumeister, R. F. (2007). Increasing self-regulatory strength can reduce the depleting effect of suppressing stereotypes. *Personality and Social Psychology Bulletin, 33(2),* 281–294. DOI 10.1177/0146167206296101.

17. Muraven, M., Baumeister, R. F., Tice, D. M. (1999). Longitudinal improvement of self-regulation through practice: Building self-control strength through repeated exercise. *The Journal of Social Psychology, 139(4),* 446–457. DOI 10.1080/00224549909598404.

18. Muraven, M. (2010). Building self-control strength: Practicing self-control leads to improved self-control performance. *Journal of Experimental Social Psychology, 46(2),* 465–468. DOI 10.1016/j.jesp.2009.12.011.

19. Bertrams, A., Schmeichel, B. J. (2014). Improving self-control by practicing logical reasoning. *Self and Identity, 13(4),* 419–431. DOI 10.1080/15298868.2013.836562.

20. Yang, X., Zhao, J., Chen, Y., Zu, S., Zhao, J. (2018). Comprehensive self-control training benefits depressed college students: A six-month randomized controlled intervention trial. *Journal of Affective Disorders, 226,* 251–260. DOI 10.1016/j.jad.2017.10.014.

21. Dang, J., Barker, P., Baumert, A., Bentvelzen, M., Berkman, E. et al. (2021). A multilab replication of the ego depletion effect. *Social Psychological and Personality Science, 12(1),* 14–24. DOI 10.1177/1948550619887702.

22. McCullough, M. E. (2000). Forgiveness as human strength: Theory, measurement, and links to well-being. *Journal of Social & Clinical Psychology, 19(1),* 43–55. DOI 10.1521/jscp.2000.19.1.43.

23. Li, S., Zhang, L., Shangguan, C., Wang, X., Li, X. et al. (2021). The influence of relationship closeness and desire for forgiveness on interpersonal forgiveness. *International Journal of Psychophysiology, 167,* 38–46. DOI 10.1016/j.ijpsycho.2021.06.009.

24. Taylor, S. P. (1967). Aggressive behavior and physiological arousal as a function of provocation and the tendency to inhibit aggression. *Journal of Personality, 35(2),* 297–310. DOI 10.1111/j.1467-6494.1967.tb01430.x.

25. McCullough, M. E., Luna, L. R., Berry, J. W., Tabak, B. A., Bono, G. (2010). On the form and function of forgiving: Modeling the time-forgiveness relationship and testing the valuable relationships hypothesis. *Emotion, 10,* 358–376. DOI 10.1037/a0019349.

26. Worthington Jr, E. L. (2020). Understanding forgiveness of other people: Definitions, theories, and processes. In: Worthington Jr, E. L., Wade, N. G. (Eds.), *Handbook of forgiveness.* 2nd edition, pp. 11–21. New York: Routledge.

27. Wade, N. G., Hoyt, W. T., Kidwell, J. E. M., Worthington Jr, E. L. (2014). Efficacy of psychotherapeutic interventions to promote forgiveness: A meta-analysis. *Journal of Consulting and Clinical Psychology, 82(1),* 154–170. DOI 10.1037/a0035268.

28. Berry, J. W., Worthington Jr, E. L., O'Connor, L. E., Parrott, L., Wade, G. N. (2005). Forgivingness, vengeful rumination, and affective traits. *Journal of Personality, 73(1),* 183–225. DOI 10.1111/j.1467-6494.2004.00308.x.

29. McCullough, M. E., Root, L. M., Cohen, A. D. (2006). Writing about the benefits of an interpersonal transgression facilitates forgiveness. *Journal of Consulting and Clinical Psychology, 74(5),* 887–897. DOI 10.1037/0022-006X.74.5.887.

30. Zhang, S., Tang, H., Liu, Y., Lv, S. (2015). Transgression sensitivity and interpersonal forgiveness: Mediating of anger rumination. *Chinese Journal of Clinical Psychology, 4,* 706–708. DOI 10.16128/j.cnki.1005-3611.2015.04.031.

31. Tangney, J. P., Baumeister, R. F., Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality, 72(2),* 271–322. DOI 10.1111/j.0022-3506.2004.00263.x.

32. Tan, S., Guo, Y. (2008). Revision of self-control scale for Chinese college students. *Chinese Journal of Clinical Psychology, 5,* 468–470.

33. Watson, D., Clark, L. A. (1994). *The PANAS-X: Manual for the positive and negative affect schedule-expanded form*. Iowa City: University of Iowa. DOI 10.17077/48vt-m4t2.

34. Watson, D., Clark, L. A., Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54(6),* 1063–1070. DOI 10.1037/0022-3514.54.6.1063.

35. Bagozzi, R. P. (1993). An examination of the psychometric properties of measures of negative affect in the PANAS-X scales. *Journal of Personality and Social Psychology, 65(4),* 836–851. DOI 10.1037/0022-3514.65.4.836.

36. Costa, P. A., Tasker, F., Ramos, C., Leal, I. (2020). Psychometric properties of the parent's versions of the SDQ and the PANAS-X in a community sample of Portuguese parents. *Clinical Child Psychology and Psychiatry, 25(2),* 520–532. DOI 10.1177/1359104519891759.

37. Laeng, B., Berridge, K. C., Butter, C. M. (1993). Pleasantness of a sweet taste during hunger and satiety: Effects of gender and "sweet tooth". *Appetite, 3,* 247–254. DOI 10.1006/appe.1993.1043.

38. Hagger, M. S., Chatzisarantis, N. L. D., Alberts, H., Anggono, C. O., Batailler, C. et al. (2016). A multilab preregistered replication of the ego-depletion effect. *Perspectives on Psychological Science, 11(4),* 546–573. DOI 10.1177/1745691616652873.

39. Balliet, D., Li, N. P., Joireman, J. (2011). Relating trait self-control and forgiveness within prosocials and proselfs: Compensatory versus synergistic models. *Journal of Personality and Social Psychology, 101(5),* 1090–1105. DOI 10.1037/a0024967.

40. Zhou, Y., Zhao, L., Yang, Y., Liu, X. (2021). Influence of ego depletion on individual forgiveness in different interpersonal offense situations. *Frontiers in Psychology, 12,* 631466. DOI 10.3389/fpsyg.2021.631466.

41. Finkel, E. J., Campbell, W. K. (2001). Self-control and accommodation in close relationships: An interdependence analysis. *Journal of Personality and Social Psychology, 81(2),* 263–277. DOI 10.1037/0022-3514.81.2.263.

42. Righetti, F., Finkenauer, C., Finkel, E. J. (2013). Low self-control promotes the willingness to sacrifice in close relationships. *Psychological Science, 24(8),* 1533–1540. DOI 10.1177/0956797613475457.

43. Tripp, T. M., Bies, R. J., Aquino, K. (2007). A vigilante model of justice: Revenge, reconciliation, forgiveness, and avoidance. *Social Justice Research, 20(1),* 10–34. DOI 10.1007/s11211-007-0030-3.

44. Gilam, G., Abend, R., Shani, H., Ben-Zion, Z., Hendler, T. (2019). The anger-infused ultimatum game: A reliable and valid paradigm to induce and assess anger. *Emotion, 19(1),* 84–96. DOI 10.1037/emo0000435.

45. Kogan-Goloborodko, O., Brügmann, E., Repple, J., Habel, U., Clemens, B. (2016). Experimentally assessed reactive aggression in borderline personality disorder. *PLoS One, 11(11)*. DOI 10.1371/journal.pone.0166737.

46. Worthington Jr, E. L., van Zyl, L. E. (2022). The future of evidence-based interventions in temperance. *Frontiers in Psychology, 12*. DOI 10.1177/19397909211036140.

47. Beyens, U., Yu, H., Han, T., Zhang, L., Zhou, X. (2015). The strength of a remorseful heart: Psychological and neural basis of how apology emolliates reactive aggression and promotes forgiveness. *Frontiers in Psychology, 6*. DOI 10.3389/fpsyg.2015.01611.

48. Li, H., Lu, J. (2018). A review of the behavioral measures of forgiveness and its cognitive neural mechanism. *Journal of Psychological Science, 3,* 700–705.

49. McNulty, J. K. (2020). Highlighting the dark side of forgiveness and the need for a contextual approach. In: Worthington Jr, E. L., Wade, N. G. (Eds.), *Handbook of forgiveness*. 2nd edition, pp. 33–42. New York: Routledge.