The Satisfaction Is Mine: Revenge Seeking Following Extrinsic Reward

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Abstract

The extrinsic reward should impede revenge-seeking if revenge is solely driven by the desire to feel gratified. Study 1 (*N* = 114) showed that satisfaction from receiving monetary compensation decreased thinking about getting back at the provocateur. However, Study 2 (*N* = 213) found that insulted participants aggressed against their partners despite fulfillment from receiving the unexpected monetary reward. This evidence indicates that gratification is insufficient to impede revenge following provocation, suggesting that avengers want to feel pleasure when retaliating and want to balance the scales by sending offenders a message.

Keywords: aggression, provocation, reinforcement, reward, revenge

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Revenge – aggression in response to intentional harm (Stuckless & Goranson, 1992) – is likely prevalent among humans (e.g., Jackson et al., 2019). People expect retaliating to reduce the pain of transgression (Bies & Tripp, 1996) or give feelings of satisfaction (Carlsmith et al., 2008; Frijda, 1994), and often revenge does both (Chester & DeWall, 2017). However, people also seek revenge to fulfill their just desert motives. They want the offender to suffer as they did (Gollwitzer et al., 2011) and to be taught a lesson (Baumeister, 1997) as means of balancing the scales (McCullough et al., 2001). Yet may whim for revenge be impeded in the face of alternative gratification? This research aimed to answer this question.

Rewarding Nature of Revenge: Pleasure Pick and Justice Restoration

Revenge can be reinforcing (de Quervain et al., 2004; Chester & DeWall, 2016). Merely reading about an act of revenge elicits a positive affect (Eadeh et al., 2017), and so does real revenge against the transgressor (Chester et al., 2019). Moreover, revenge helps repair one's mood disrupted by the aversive experiences of insult and rejection (Chester & DeWall, 2017) and brings momentary relief as indicated by decreased heart rate in response to distress (Verona & Sullivan, 2008). In this vein, avengers tend to seek revenge simply to feel good (and not feel bad).

However, revenge is also motivated by anticipated feelings of satisfaction from balancing the scales (McCullough et al., 2001). Respectively, winning the chance to take revenge against the offender activates neural signatures associated with reward processing (i.e., RewP; Threadgill & Gable, 2020). Increased activity of the brain regions associated with reward was associated with a greater desire to retaliate against a person who played unfairly in economic exchange (Singer et al., 2006). Furthermore, seeing the offender in pain was shown to reduce retaliatory aggression (Eder et al., 2020), which suggests that revenge may be satisfactory when the amount of pain between avenger and offender is balanced (Frijda, 1994) and justice has been served (Carlsmith & Darley, 2008).

Reinforcement for Victim and Punishment for Offender

Revenge is driven by a desire to restore intrapersonal (sometimes called “affective homeostasis”; Chester & DeWall, 2017, p. 413) and interpersonal balance. Paying the offender back brings feelings of pleasure to revenge seekers (Chester & DeWall, 2016), making the transgressor understand why the punishment happened (Gollwitzer et al., 2011). Thus, if revenge is merely driven out of a desire to “reap hedonistic rewards” (Carlsmith et al., 2008, pp. 1316), gratification following the provocation should diminish the urge to harm the provocateur. More specifically, gratification for the victim (pleasure fulfillment) and punishment for the offender (justice restoration) should inhibit malevolent intentions.

We address this research gap by testing whether extrinsic reward attenuates the provocation-revenge link. We examined whether an extrinsic reward (i.e., an unexpected monetary reward) attenuates revenge in response to provocation (i.e., insult). Participants were either insulted or praised by another individual, were led to believe either themselves or their partner received a reward, and then expressed to what extent they desired revenge (Study 1) or were allowed to take revenge against their partner (Study 2). Research procedures were in accordance with the Ethical Research Committee at the SWPS University of Social Sciences and Humanities, and studies were carried out using Qualtrics software.

Open Science Statement

We report all measures and manipulations. Data, codebooks, and materials for this research are available at Open Science Framework: https://osf.io/vxk32.

Study 1

Study 1 tested whether extrinsic reward attenuates the effect of provocation on the desire for revenge. The registration for the study can be found at: https://aspredicted.org/blind.php?x=xy45gd.

Methods

Participants

The sample size was considered in light of previous research examining the importance of hedonic and just desert motives in revenge-seeking. Accordingly, Gollwitzer and Bushman (2012, Study 2) described an interactive effect of $\eta^2_p = .08$ on a sample of $N = 63$. In turn, Chester and DeWall (2017, Study 3) found an interactive effect of $\eta^2 = .04$ on a sample of $N = 167$. G*Power 3.1 (Faul et al., 2007) F test family for a two-by-two interaction effect in ANOVA showed a required sample size to discover a medium effect size ($f = .25$, corresponding to $\eta^2_p = .06$) with .80 power was $N = 125$.

Participants were 130 adults (56 female, 74 male; age: $M = 38.21$, $SD = 11.44$; range: 19-67) recruited from the Amazon Mechanical Turk in exchange for $2. We required participants to be located in the United States, have more than 100 HITs accepted, and have a 98% acceptance rate. We removed data from 16 participants whose essays were off the topic following the registration plan. Final participants were therefore $N = 114$ (51 female, 63 male; age: $M = 38.73$, $SD = 11.53$; range: 19-67). Participants were 73.7% White American, 9.6% Asian American, 7% African American, 4.4% Latino, 3.5% Other, and 1.8% Native American.

Procedure

After providing their informed consent, participants gave their age, gender, and ethnicity. Then, they were informed that they would get to interact with another AMT worker in an interactive task. The task aimed to supposedly measure participants' abilities to describe events they have to visualize mentally. We asked participants to write an essay (800 characters minimum) about when they were angry. They were informed it would be exchanged over the Internet with another AMT worker who was ostensibly participating in the same study (Chester & DeWall, 2017). After submitting their written essay and viewing a 25-s loading screen, participants viewed an essay ostensibly written by their fictitious partner and rated this essay along with criteria of composition, correctness, grammar, interpunction, and writing style on a scale ranging from 1 (*poor*) to a 7 (*excellent*). Participants were also given an option to write comments on the partner's essay, and many of them did, e.g.,

"*Some misspellings and run-on sentences affected the flow of the essay."* After viewing a 25-second loading screen, participants learned their essay's score and were randomly assigned to receive negative (10/35 points; *N* = 56) or positive (30/35 points; *N* = 58) feedback. A comment from the fictitious partner was shown below each bar graph and it either stated "one of the worst essays that I have EVER read..." (insulting feedback condition) or "great essay!!!" (praising feedback condition). After completing the essay task, participants were asked how the feedback made them feel and were informed that because writing an essay was a difficult task, the system will randomly determine whether they or their fictitious partner will receive an additional $2 reward. After passively viewing 5-second loading screen, participants were informed that either they received the monetary reward ("You, not your partner, received the reward", reward for participant research condition, *N* = 57) or the individual who supposedly evaluated their essay ("Your partner, not you, received the reward", reward for partner research condition, *N* = 57). Next, participants were asked how the information about the lottery outcome made them feel and then indicated to what extent they desired revenge against their fictitious partner. Participants then responded to other measures which are not reported here (see OSF), were probed (no one guessed the purpose of the study) and debriefed.

Measures

Provocation manipulation check was performed by asking participants to what extent they felt: "angry," "annoyed," "grouchy," "hostile," "irritable," "offended," "scornful," and "upset" when they received the feedback (Denson et al., 2010). Participants answered using a scale ranging from 1 (*not at all*) to 5 (*extremely*); α = .96, *M* = 2.28, *SD* = 1.27.

Reward manipulation check was measured by asking participants to what extent the lottery outcome made them feel "pleased", "positive", "satisfied" (positive affect; α = .96, *M* = 3.16, *SD* = 1.56) and "irritable", "negative", "vengeful" (negative affect; α = .87, *M* = 2.22, *SD* = 1.34; Carlsmith et al., 2008). Participants responded using a scale ranging from 1 (*not at all*) to 5 (*very much*).

The desire for revenge was assessed with the 5-item Revenge subscale of TRIM-

18 (e.g., “I will make him/her pay”; McCullough et al., 2006). Participants answered using a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*); α = .92, *M* = 2.19, *SD* = 1.17.

Results and Discussion

Manipulation checks

T-test revealed that participants who received insulting feedback reported they felt more provoked, *M* = 2.96, *SD* = 1.24, than participants who received praising feedback, *M* = 1.63, *SD* = .93, *t*(112) = 6.48, *d* = 1.21, *p* < .001. Multivariate test: 2 (feedback: insult versus praise) x 2 (recipient of reward: participant versus partner) showed that the main effect of reward was significant, *F*(2,109) = 42.12, *p* < .001, η^2_p = .44. As expected, participants in the reward for participant condition reported greater positive, *F*(1,110) = 69.75, *p* < .001, η^2_p = .39 and lower negative affect, *F*(1,110) = 32.94, *p* < .001, η^2_p = .23 than participants in the reward for partner condition. Importantly, this effect was not qualified by an interaction effect with the feedback condition, *F*(2, 109) = 1.92, *p* = .151, η^2_p = .03, nor did the main effect of the feedback condition affected the post-reward affect, *F*(2,109) = 2.82, *p* = .064, η^2_p = .05.

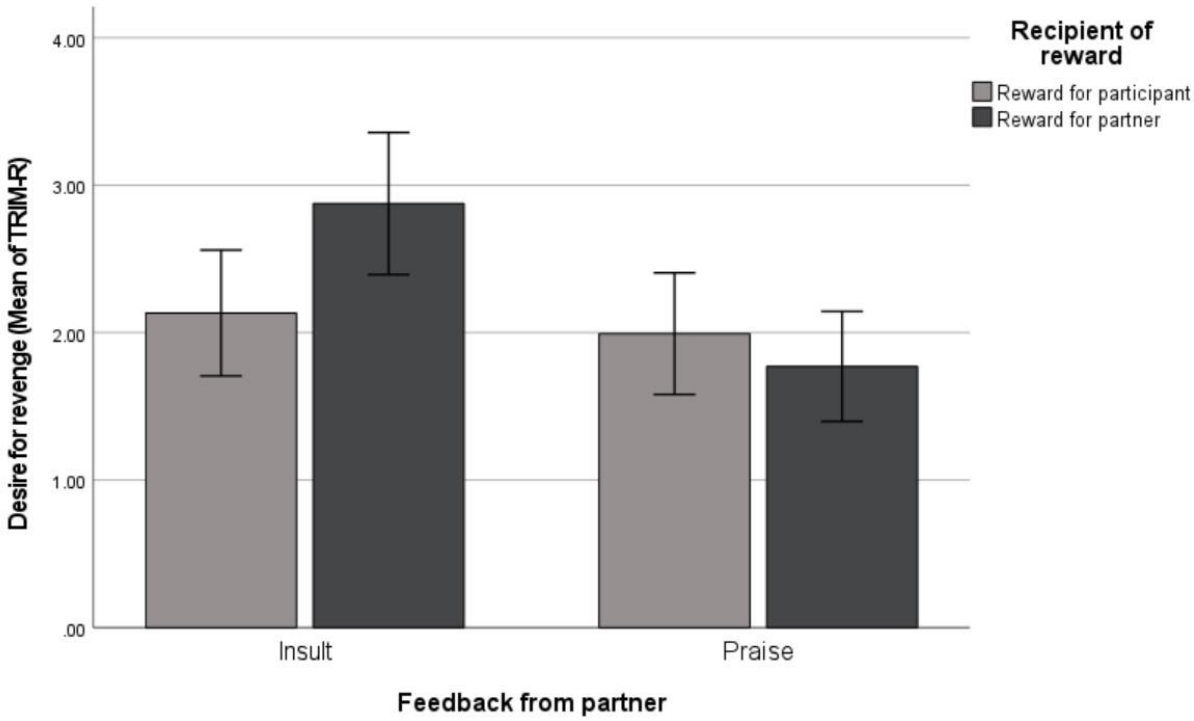
Moderation analysis

A 2 (feedback: insult versus praise) x 2 (recipient of reward: participant versus partner) between subject ANOVA revealed a significant main effect of feedback, *F*(1,110) = 8.94, *p* = .003, η^2_p = .08, showing that insulted participants (*M* = 2.51; *SD* = 1.23) desired revenge more than praised (*M* = 1.89; *SD* = 1.03) participants. This effect was qualified by a significant interaction of feedback and reward manipulation, *F*(1, 110) = 5.37, *p* = .022, η^2_p = .05. As predicted, insulted participants who won the reward desired revenge less (*M* = 2.13; *SD* = 1.08) than insulted participants who believed their partner (*M* = 2.88; *SD* = 1.27) won the reward, *F*(1,110) = 6.26, *p* = .014, η^2_p = .05. The simple effect of reward manipulation was insignificant for praised participants, *F*(1,110) = 0.58, *p* = .448, η^2_p = .01. However, the simple effect of reward manipulation revealed that among participants in the reward for partner condition, the desire for revenge was higher for insulted (*M* = 2.88; *SD* = 1.27) than for praised (*M* = 1.77; *SD* = 0.96) participants, *F*(1,110) = 14.10, *p* < .001, η^2_p = .11, whereas

for participants in the reward for participants condition, the effect of feedback on desire for revenge was no longer significant, $F(1,110) = 0.23$, $p = .635$, $\eta^2_p = .002$ (Figure 1).

Figure 1

Interactive Effect of Feedback and Reward Manipulation on Desire for Revenge in Study 1



Study 1 provided evidence that satisfaction from receiving an unexpected monetary reward decreases the desire for revenge following provocation, thus aligning with research on the reinforcing nature of retaliatory aggression (Chester & DeWall, 2016; 2017). However, it remains unclear whether gratification from receiving an unexpected monetary reward would impede an act of actual revenge. In fact, declarations are not always the best indicators of actions (e.g., Milgram, 1963). Thus, in Study 2, we aimed to replicate this combined effect in the context of behavior on a larger sample of participants.

Study 2

Study 2 tested whether extrinsic reward attenuates the effect of provocation on the act of revenge. The registration for this study is available at: https://aspredicted.org/blind.php?x=QMW_ZJC.

Methods

Participants

The required sample size was computed using G*Power 3.1 (Faul et al., 2007) *F* test family for a two-by-two interaction effect in ANOVA. The required total sample size to discover a between-subject interaction for effect of size (*f* = .20) with .80 power, df = 1 and alpha of .05 (two-tailed) was *N* = 199. Participants were 250 adults (117 female, 130 males, 3 identifying as non-binary; age: *M* = 38.10, *SD* = 10.19; range: 18-74) recruited from the Amazon Mechanical Turk in exchange for $1.50. Participants were required to be located in the United States, have more than 500 HITs accepted, and have a 99% acceptance rate. Following the registration plan, we excluded data from 37 participants whose essays were nonsensical, ending up with the final sample of *N* = 213 (106 female, 104 males, 3 identifying as non-binary; age: *M* = 38.38, *SD* = 10.10; range: 22-74). None of the remaining participants reported being suspicious of the presence of their partner. Participants were 82.6% White American, 6.6% Asian American, 6.1% African American, 2.8% Other, and 1.9% Native American. The sample size of *N* = 213 is sufficient to discover an effect with a magnitude of f = .19 with 80% power (G*Power 3.1; Faul et al., 2007). Such an effect closely resembles the mean effect observed in aggression studies (*r* = .24[1]; Richard et al., 2003).

Procedure

We followed the analogical procedure as in Study 1. Thus, after consenting and completing a demographic questionnaire, participants were asked to write an essay about a time they were angry, and later allegedly exchanged with their non-existing partner. After

[1] Corresponding to *d* = 0.49; f = .24, η^2_p = .06.

receiving insulting (*N* = 112) or praising (*N* = 101) feedback, participants were asked how the feedback made them feel and were informed that either themselves (*N* = 106) or their partner (*N* = 107) gets an additional $1.50 for participating. They then indicated how the lottery outcome made them feel and were informed that either themselves or their partner would be asked to thoroughly describe gruesome images such as animal carcasses or surgical operations. Another will be responsible for choosing the number of images the other participant will need to describe to complete the study. After viewing the 5-second loading page, participants were informed that they were selected to choose the number of images. After assigning the number of images, participants were probed (no one guessed the aim of the study) and debriefed. No other measures were included in the study.

Measures

Provocation manipulation check was performed by asking participants to what extent the feedback made them feel “angry’, “offended” (negative affect; *M* = 2,25, *SD* = 1.36) and “glad”, “happy” (positive affect; *M* = 2.62, *SD* = 1.46). Participants answered using a scale ranging from 1 (*not at all*) to 5 (*extremely*).

Reward manipulation check was performed analogically as the provocation manipulation check (negative affect: *M* = 2.00, *SD* = 1.27; positive affect: *M* = 3.01, *SD* = 1.60). Participants responded using a scale ranging from 1 (*not at all*) to 5 (*extremely*).

Act of revenge was assessed as the number of gruesome images (0-9) assigned by participants to their partner for detailed description (i.e., Gruesome Image Aggression Task; Chester et al., 2019; Gollwitzer & Bushman, 2012); *M* = 2.88, *SD* = 3.08.

Results and Discussion

Manipulation checks

In line with our expectations, participants who received insulting feedback reported greater negative affect (insulting feedback condition: *M* = 2.98, *SD* = 1.32, praising feedback condition: *M* = 1.44, *SD* = .85, $t(211) = 9.94$, $d = 1.38$, $p < .001$) and lower positive affect (insulting feedback condition: *M* = 1.54, *SD* = .91, praising feedback condition: *M* = 3.82, *SD* = .92, $t(211) = -18.02$, $d = 2.49$, $p < .001$) than participants who received praising feedback.

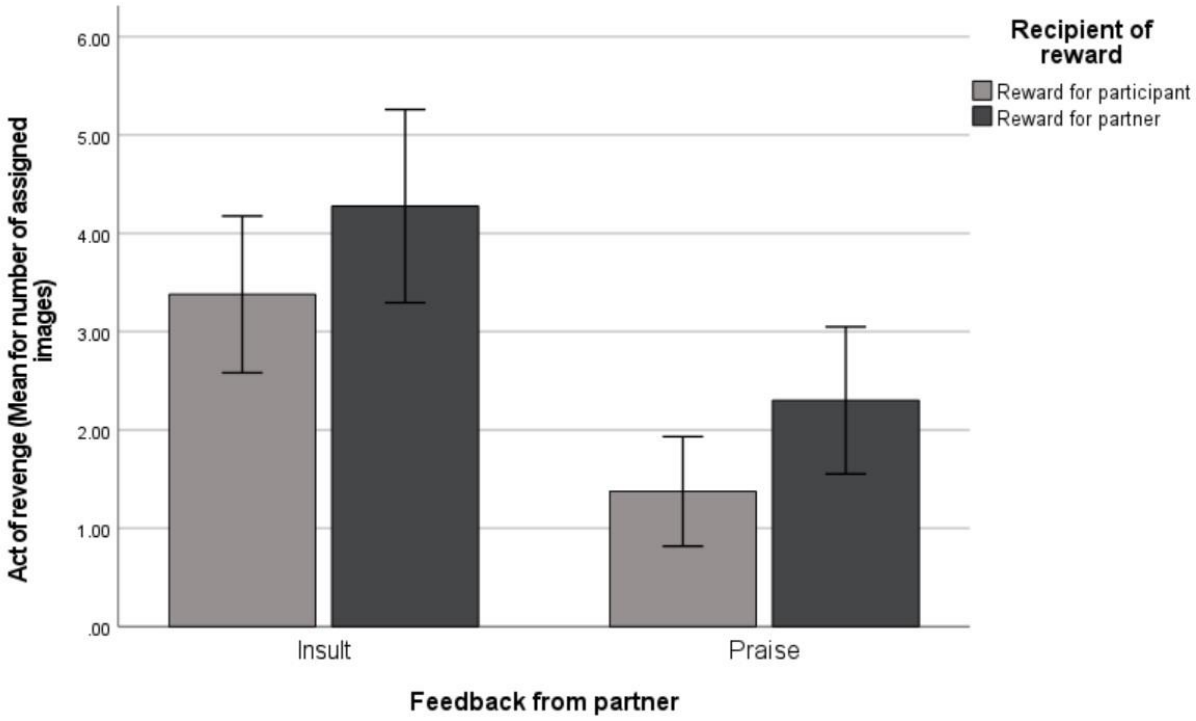
Multivariate test: 2 (feedback: insult versus praise) x 2 (recipient of reward: participant versus partner) showed that the main effect of reward was significant, $F(1, 209) = 119.82$, $p < .001$, $\eta^2_p = .53$. Participants in the reward for participant condition reported greater positive, $F(1, 209) = 233.36$, $p < .001$, $\eta^2_p = .52$ and lower negative affect, $F(1, 209) = 57.50$, $p < .001$, $\eta^2_p = .21$ than participants in the reward for partner condition. This effect was not qualified by an interaction effect with the feedback condition, $F(1, 209) = 1.15$, $p = .316$, $\eta^2_p = .01$, nor did the main effect of the feedback condition affected the post-reward affect, $F(1, 209) = 2.49$, $p = .085$, $\eta^2_p = .02$.

Moderation analysis

A 2 (feedback from partner: insult versus praise) x 2 (recipient of reward: participant versus partner) between subjects ANOVA revealed a significant main effect of feedback, $F(1, 209) = 24.83$, $p < .001$, $\eta^2_p = .10$, showing that insulted participants ($M = 3.81$; $SD = 3.33$) were more revengeful than praised ($M = 1.86$; $SD = 2.40$) participants. Contrary to our registered predictions, this effect was not qualified by an interaction of feedback and reward manipulation, $F(1, 209) = .001$, $p = .97$, $\eta^2_p = .000$. However, the main effect of reward manipulation revealed that participants in the reward for partner condition assigned more images to partner ($M = 3.29$, $SD = 3.32$) than did participants in the reward for participants condition ($M = 2.47$, $SD = 2.76$), $F(1, 209) = 5.22$, $p = .023$, $\eta^2_p = .024$ (Figure 2).

Figure 2

Interactive Effect of Feedback and Reward Manipulation on the Act of Revenge in Study 2



In opposition to our expectations, Study 2 did not support our predictions for the interactive effect of provocation and extrinsic reward in predicting revenge. Though insulted participants were more revengeful than praised counterparts, so were those who were led to believe their partner received an unexpected reward. Gratification from receiving the unexpected reward did not attenuate the provocation-aggression link.

General Discussion

We investigated whether extrinsic reward impedes the desire for revenge (Study 1) as well as a factual act of revenge (Study 2) following provocation (i.e., insulting feedback from another individual). Study 1 found that insulted participants desired revenge more than praised participants. However, insulted participants who won the unexpected monetary reward desired revenge less than insulted participants who believed their partner won the unexpected monetary reward. Contrary to our predictions, Study 2 did not replicate this

interactive effect in the context of retaliatory aggression. Unexpectedly, gratification from receiving an unexpected monetary reward did not attenuate the provocation-aggression link.

Unlike previous works examining the role of hedonic reward in retribution seeking (e.g., Brüne et al., 2013; de Quervain et al., 2004; Strobel et al., 2011), this research did not use monetary incentives as indicative of punishment for unfair behavior in an economic game. Instead, participants were unexpectedly informed about the possibility of winning a monetary reward and then learned that either themselves or their offenders won this reward. We wanted to put participants in a state of a sudden rush of gratification that arises in response to an unexpected reward (e.g., Arias-Carrión et al., 2010). Dopaminergic neurons become activated in response to such rewards (Berridge & Kringelbach, 2013), and reduced dopaminergic activity is related to aggression (Chester et al., 2016; Seo et al., 2008).

In line with our expectations, positive affect associated with receiving the unexpected monetary reward decreased thinking about getting back at the wrongdoer, which fits into works showing that experiencing positively-valenced affective states broadens the cognition (Isen et al., 1987; Rowe et al., 2007) and boosts personal resources (Fredrickson, 2001). It also corresponds to research indicating that experiencing negatively-valenced affective states; particularly anger, is related to thinking about getting back at a transgressor (Aquino et al., 2006; McCullough et al., 2001; Stuckless & Goranson, 1992).

However, receiving an unexpected monetary reward, a pleasurable compensation for experienced wrongdoing, did not stop participants from retaliating. This evidence corroborates the findings of Gollwitzer and Bushman (2012), showing that retributive punishment (unlike venting anger) is not driven by hedonic motives but rather to send offenders a message (Gollwitzer et al., 2011) or teach them a lesson (Baumeister, 1997) for what they did (Kim & Smith, 1993). Thus, financial compensations, though momentarily reinforcing, likely do not satisfy victims of injustice in the long run in the same way as “justice being served” (e.g., Gollwitzer et al., 2014).

Our findings also align with works showing that avengers want to give their offenders what they deserve (Bies & Tripp, 1996), consequently stressing the importance of just desert

motives in revenge-seeking (Carlsmith et al., 2002; Gollwitzer, 2009). In fact, belief in the just world (Lerner, 1980) has been linked to motivation to seek revenge (Kaiser et al., 2004) and to past revengeful behaviors (Ferrari & Emmons, 1994). Altogether, our evidence indicates that people may seek revenge to restore *both* intrapersonal (Chester & DeWall, 2017) and interpersonal balance (Frijda, 1994; McCullough et al., 2001).

Limitations and Future Directions

Given the ongoing debate over Internet data quality (e.g., Chmielewski & Kucker, 2019), prospective works would do well by replicating our research in the laboratory setting. Though we did our best to ensure that the data was of the best possible quality, laboratory-based research would still provide a more controlled environment. A laboratory setting would also be convenient for employing alternative assessments of revenge such as the Taylor Aggression Paradigm (Taylor, 1967) or Point Subtraction Aggression Paradigm (Golomb et al., 2007).

Another important limitation is the fact that we examined the role of unexpected extrinsic reward in impeding revenge solely in a between-participants design. Participants who allegedly received the reward were less revengeful than those who did not. Thus, prospective works would do well testing our hypothesis in a within-design to see whether receiving an unexpected reward is effective in reducing revenge. It would also be advantageous to examine the role of extrinsic reward in reducing revenge in a between-design but with changed order of manipulations, that is, reward first and provocation second.

Since positively-valenced affective states facilitate prosocial behavior (e.g., Fredrickson, 1998), future works would also benefit from assessing both the desire for revenge and for forgiveness in order to examine whether reward not only diminishes revengeful urges but also increases benevolent wishes. At last, this research is based solely on self-report measures of affect and people tend to mispredict their affective states (Carlsmith et al., 2008). Hence, to further increase the validity of our findings, future research could employ, for instance, physiological assessment of affect changes such as electrodermal activity or heart-rate variability.

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