The Satisfaction Is Mine: Extrinsic Reward Reduces Desire for Revenge

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Revenge is often driven by desire to feel gratified. Consequently, extrinsic reward should diminish revengeful cravings. One hundred fourteen participants received either insulting or praising feedback from another individual, were led to believe that they or the other individual won an unexpected monetary reward, and then indicated how much they desired revenge. Participants who received insulting feedback desired revenge more than praised counterparts, yet insulted participants who won the reward desired revenge less than those who did not win. This evidence emphasizes the need for personal satisfaction as fuel for revenge as well as highlights the importance of balancing the scales in retribution seeking.

Keywords: provocation, reward, revenge

Introduction

Revenge -- aggression in response to intentional harm (Stuckless & Goranson, 1992) -- is likely prevalent among humans (e.g., Jackson, Choi, & Gelfand, 2019). People expect retaliating to reduce the pain of transgression (Bies & Tripp, 1996) or give feelings of satisfaction (Carlsmith, Wilson, & Gilbert, 2008; Frijda, 1994). Revenge indeed can be reinforcing (de Quervain et al., 2004; Chester & DeWall, 2016). For example, symbolic aggression against the transgressor is associated with self-reported positive affect (Chester, DeWall, & Enjaian, 2019). Revenge was also found to repair the mood disrupted by insult or rejection (Chester & DeWall, 2017) and to decrease heart rate in response to distress (Verona & Sullivan, 2008). Avengers therefore seek revenge to feel good.

However, revenge is also motivated by anticipated feelings of satisfaction from balancing the scales (McCullough, Bellah, Kilpatrick, & Johnson, 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 found to be associated with 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, Mitschke, & Gollwitzer, 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 done (Carlsmith & Darley, 2008).

We address this line of research and examine whether extrinsic reward diminishes vengeful urge. If revenge is indeed driven out of desire to “reap hedonistic rewards” (Carlsmith et al., 2008, pp. 1316), then gratification should diminish the urge to harm the provocateur. Accordingly, the present experiment examined whether an unexpected monetary reward attenuates desire for revenge in response to provocation. As such, participants were either insulted or praised by another individual, then were led to believe either they or their partner received a reward, and finally expressed to what extent desired revenge upon their partner. The pre-registration for the experiment can be found at:

<https://aspredicted.org/blind.php?x=xy45gd>.

Methods

Participants

The required sample size was computed using G*Power 3.1 (Faul, Erdfelder, Lang & Buchner, 2007) F test family for a two by two interaction effect in ANOVA. The required sample size to discover a between subject interaction effect of medium 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 for a study on “How do we describe imaginations? An interactive study” in exchange for \$2. We required participants to have more than 100 HITs accepted and a 98%

acceptance rate. Following the pre-registration plan, we removed data from 16 participants (11 from experimental and 5 from control research condition) who did not follow instruction in the essay task. Final participants were therefore $N = 114$ (51 female, 63 male; age: $M = 38.73$, $SD = 11.53$; range: 19-67). Sample was 73.7% White American, 9.6% Asian American, 7% African American, 4.4% Latino, 3.5% Other, and 1.8% Native American. The research procedure was approved by the Ethical Research Committee at the SWPS University.

Procedure

The study was carried out using Qualtrics (<https://www.qualtrics.com/>). After providing their informed consent, participants gave their age, gender, and ethnicity. Then, they were informed that they would get to interact with another Amazon Mechanical Turk worker in an interactive task. The aim of the task was to supposedly measure participants' abilities to describe events they have to mentally visualize. As such, we asked participants to write an essay (800 character minimum) about a time they were angry, which they were informed would be exchanged over the Internet with another Amazon Mechanical Turk 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 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.: "*Conversational and to the point*", "*It was a little bit too repetitive and had some grammar issues. Also, there were too many full stops*", or "*Some misspellings and run-on sentences affected the flow of the essay*". After viewing a 25-s loading screen, participants learnt their essay's score and were randomly assigned to receive

either 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 responded to a provocation manipulation check and were then 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-s 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, were probed (no one guessed the purpose of the experiment) 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 received feedback regarding their essays (Denson, von Hippel, Kemp, & Teo, 2010). Participants answered using a scale ranging from 1 (*not at all*) to 5 (*extremely*); $\alpha = .96$, $M = 2.28$, $SD = 1.27$.

Reward manipulation check was measured by asking participants to what extent the lottery outcome made them feel “pleased”, “positive”, “satisfied” (positive affect; $\alpha = .96$, $M = 3.16$, $SD = 1.56$) and “irritable”, “negative”, “vengeful” (negative affect; $\alpha = .87$, $M = 2.22$,

$SD = 1.34$; Carlsmith et al., 2008). Participants responded using a scale ranging from 1 (*not at all*) to 5 (*very much*).

Desire for revenge was assessed with 5-item Revenge subscale of TRIM-18 (e.g., “I’ll make him/her pay”; McCullough, Root & Cohen, 2006). Participants answered using a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*); $\alpha = .92$, $M = 2.19$, $SD = 1.17$.

Results

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, $F(2,109) = 42.12$, $p < .001$, $\eta^2_p = .44$. As expected, participants in the reward for participant condition reported greater positive, $F(1,110) = 69.75$, $p < .001$, $\eta^2_p = .39$ and lower negative affect, $F(1,110) = 32.94$, $p < .001$, $\eta^2_p = .23$ than participants in the reward for partner condition. Importantly, this effect was not qualified by an interaction effect with the feedback condition, $F(2, 109) = 1.92$, $p = .151$, $\eta^2_p = .03$, nor did the main effect of the feedback condition affected the post-reward affect, $F(2,109) = 2.82$, $p = .064$, $\eta^2_p = .05$ (see Figure 1).

[Figure 1 near here]

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, $F(1,110) = 8.94$, $p = .003$, $\eta^2_p = .08$, 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, $p = .022$, $\eta^2_p = .05$. 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, $F(1,110) = 6.26$, $p = .014$, $\eta^2_p = .05$. The simple effect of reward manipulation was insignificant for praised participants, $F(1,110) = 0.58$, $p = .448$, $\eta^2_p = .01$. 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, $F(1,110) = 14.10$, $p < .001$, $\eta^2_p = .11$, whereas for participants in the reward for participants condition, the effect of feedback on desire for revenge was no longer significant, $F(1,110) = 0.23$, $p = .635$, $\eta^2_p = .002$ (see Figure 2).

[Figure 2 near here]

Discussion

We investigated whether extrinsic reward diminishes desire for revenge. In line with our prediction, insulted participants desired revenge more than praised participants, but insulted participants who won the monetary reward desired revenge less than insulted participants who believed their partner won the monetary reward. This evidence corroborates previous works indicating revenge as intrinsically reinforcing behavior driven by desire to feel satisfied (Chester, 2017). Contrary to previous works examining the role of hedonic reward in retribution seeking (e.g., Brüne, Juckel, & Enzi, 2013; de Quervain et al., 2004; Strobel et al., 2011), this study did not use monetary incentive as indicative of punishment for unfair behavior in an economic game. Instead, participants were unexpectedly informed about the possibility of winning two dollars and then learned that either themselves or their offenders won the monetary reward. By doing such, we aimed to put participants in a state of sudden rush of gratification which arises in response to unexpected reward (e.g., Arias-

Carrión, Stamelou, Murillo-Rodriguez, Menéndez-González, & Pöppel, 2010). Dopaminergic neurons become activated in response to such rewards (Berridge & Kringelbach, 2013) and reduced dopaminergic activity is related to aggression (see Seo, Patrick, & Kennealy, 2008).

This experiment not only corroborates previous works on the rewarding nature of revenge (Chester & DeWall, 2016, 2017), but also stresses the importance of just desert motives in revenge seeking (Carlsmith, Darley, & Robinson, 2002; Gollwitzer, 2009). Receiving a monetary reward was compensatory enough to diminish desire for revenge, which suggests that seeing offenders “getting what they deserve” may be satisfactory (see Gollwitzer, Meder, & Schmitt, 2011). As such, this evidence also aligns with research on human inclination to perceive the world as fair (Lerner, 1980), which shows that belief in the just-world is linked to the motivation to seek revenge (Kaiser, Vick, & Major, 2004) and to the past revengeful behaviors (Ferrari & Emmons, 1994). Altogether, this evidence indicates that people seek revenge to restore *both* intrapersonal (Chester & DeWall, 2017) and interpersonal balance (Frijda, 1994; McCullough et al., 2001).

Limitations and Future Directions

Prospective research would do well from replicating this experiment in the laboratory on a larger sample of participants. In addition, future works would benefit from assessing both desire for revenge and for forgiveness in order to examine whether reward not only diminishes revengeful urges, but also increases benevolent intentions. This research is based solely on self-report measurement of affect and people tend to mispredict their affective states (Carlsmith et al., 2008). Hence, to further increase validity of our findings, the future research could employ, for instance, physiological assessment of affect changes such as electrodermal activity or heart-rate variability.

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Declaration of interest statement

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.

Data availability statement

We report all measures and manipulations. Data, codebook and materials for this study are available at Open Science Framework at <https://osf.io/ch7jy/>.

References

Arrias-Carrión, O., Stamelou, M., Murillo-Rodriguez, E., Menéndez-González, M., &

Pöppel, E. (2010). Dopaminergic reward system: A short integrative review.

International Archives of Medicine, 3, 24. <https://doi.org/10.1186/1755-7682-3-2>

Berridge, K. C., & Kringelbach, M. L. (2013). Neuroscience of affect: Brain

mechanisms of pleasure and displeasure. *Current Opinion in Neurobiology*,

23, 294-303. <https://doi.org/10.1016/j.conb.2013.01.017>

Bies, R. J., & Tripp, T. M. (1996). Beyond distrust: "Getting even" and the need for revenge.

In R. M. Kramer & T. R. Tyler (Eds.), *Trust in organizations: Frontiers of theory and research* (pp. 246–260). Sage Publications, Inc.

<https://doi.org/10.4135/9781452243610.n12>

Brüne, M., Juckel, G., & Enzi, B. (2013). “An eye for an eye”? Neural correlates of retribution and forgiveness. *PLOS one*, 8(8): e73519.

<https://doi.org/10.1371/journal.pone.0073519>

Carlsmith, K. M., & Darley, J. M. (2008). Psychological aspects of retributive justice. *Advances in Experimental Social Psychology*, 40, 193–236.

[https://doi.org/10.1016/S0065-2601\(07\)00004-4](https://doi.org/10.1016/S0065-2601(07)00004-4)

Carlsmith, K. M., Darley, J. M., & Robinson, P. H. (2002). Why do we punish? Deterrence and just deserts as motives for punishment. *Journal of Personality and Social Psychology*, 83(2), 284-299. <https://doi.org/10.1037//0022-3514.83.2.284>

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. <https://doi.org/10.1037/a0012165>

Chester, D. S. (2017). The role of positive affect in aggression. *Current Directions in Psychological Science*, 26(4), 366-370. <https://doi.org/10.1177/0963721417700457>

Chester, D. S., & DeWall, C. N. (2016). The pleasure of revenge: Retaliatory aggression arises from a neural imbalance toward reward. *Social Cognitive and Affective Neuroscience*, 1173-1182.

<https://doi.org/10.1093/scan/nsv082>

Chester, D. S., & DeWall, C. N. (2017). Combating the sting of rejection with the pleasure of revenge: A new look at how emotions shape aggression. *Journal of Personality and Social Psychology*, 112, 413-430.

<https://doi.org/10.1037/pspi0000080>

- Chester, D. S., & DeWall, C. N., & Enjaian, B. (2019). Sadism and aggressive behavior: Inflicting pain to feel pleasure. *Personality and Social Psychology Bulletin*, 45(8), 1252-1268. <https://doi.org/10.1177/0146167218816327>
- de Quervain, D. J. F., Fischbacher, U., Treyer, V., Schellhammer, M., Schnyder, U., Buck, A., & Fehr, E. (2004). The neural basis of altruistic punishment. *Science*, 305, 1254-1258. <https://doi.org/10.1126/science.1100735>
- Denson, T. F., von Hippel, W., Kemp, R. I., & Teo, L. S. (2010). Glucose consumption decreases impulsive aggression in response to provocation in aggressive individuals. *Journal of Experimental Social Psychology*, 46, 1032-1028. <https://doi.org/10.1016/j.jesp.2010.05.023>
- Eder, A. B., Mitschke, V., & Gollwitzer, M. (2020). What stops revenge taking? Effects of observed emotional reactions on revenge seeking. *Aggressive Behavior*, 46(4), 305-316. <https://doi.org/10.1002/ab.21890>
- Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G * Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39 , 175-191. <https://doi.org/10.3758/BF03193146>
- Ferrari, J. R., & Emmons, R. A. (1994). Procrastination as revenge: Do people report using delays as strategy for vengeance? *Personality and Individual Differences*, 17(4), 539-544. [https://doi.org/10.1016/0191-8869\(94\)90090-6](https://doi.org/10.1016/0191-8869(94)90090-6)
- Frijda, N. H. (1994). Varieties of affect: Emotions and episodes, moods, and sentiments. In P. Ekman & R. Davidson (Ed.), *The nature of emotions: Fundamental questions* (pp. 59-67). Oxford University Press.

- Gollwitzer, M. (2009). Justice and revenge. In M. E. Oswald, S. Bieneck, & J. Hupfeld-Heinemann (Eds.), *Social psychology of punishment of crime* (pp. 137–156). Wiley.
- Gollwitzer, M., Meder, M., & Schmitt, M. (2011). What gives victim satisfaction when they seek revenge? *European Journal of Social Psychology*, 41, 364-374.
<https://doi.org/10.1002/ejsp.782>
- Jackson, J. C., Choi, V. K., & Gelfand, M. J. (2019). Revenge: A multilevel review and synthesis. *Annual Review of Psychology*, 70: 319-345.
<https://doi.org/10.1146/annurev-psych-010418-103305>
- Kaiser, C. R., Vick, S. B., & Major, B. (2004). A prospective investigation of the relationship between just-world beliefs and the desire for revenge after September 11, 2001. *Psychological Science*, 15(7), 503–506.
<https://doi.org/10.1111/j.0956-7976.2004.00709.x>
- Lerner, M. J. (1980). *The belief in a just world: A fundamental delusion*. Springer.
- McCullough, M. E., Bellah, C. G., Kilpatrick, S. D., & Johnson, J. L. (2001). Vengefulness: Relationships with forgiveness, rumination, well-being, and the Big Five. *Personality and Social Psychology Bulletin*, 27(5), 601-610.
<https://doi.org/10.1177/0146167201275008>
- 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.
<https://doi.org/10.1037/0022-006X.74.5.887>

Seo, D., Patrick, C. J., & Kennealy, P. J. (2008). Role of serotonin and dopamine system interactions in the neurobiology of impulsive aggression and its comorbidity with other clinical disorders. *Aggression and Violent Behavior*, 13(5), 383–395.

<https://doi.org/10.1016/j.avb.2008.06.003>

Singer, T., Seymour, B., O’Doherty, J.P., Stephan, K.E., Dolan, R.J., & Frith, Ch.D. (2006). Empathic neural responses are modulated by the perceived fairness of others. *Science*, 439(7075): 466-469. <https://doi.org/10.1038/nature04271>

Strobel, A., Zimmermann, J., Schmitz, A., Reuter, M., Lis, S., Windmann, S., & Kirsch, P. (2011). Beyond revenge: Neural and genetic base of altruistic punishment. *NeuroImage*, 54, 671-680. <https://doi.org/10.1016/j.neuroimage.2010.07.051>

Stuckless, N., & Goranson, R. (1992). The Vengeance Scale: Development of a measure of attitudes toward revenge. *Journal of Social Behaviour and Personality*, 7(1), 25-42.

Threadgill, A. H., & Gable, P. A. (2020). Revenge is sweet: Investigation of the effects of approach-motivated anger on the RewP in the motivated anger delay (MAD) paradigm. *Human Brain Mapping*, 41(17), 5032-5056. <https://doi.org/10.1002/hbm.25177>

Verona, E., & Sullivan, E. A. (2008). Emotional catharsis and aggression revisited: Heart rate reduction following aggressive responding. *Emotion*, 8, 331-340. <https://doi.org/10.1037/1528-3542.8.3.331>

Figures

Figure 1. The effect of reward manipulation on self-reported positive and negative affect

Figure 2. Interactive effect of feedback and reward manipulation on desire for revenge, whereby the effect of insult on desire for revenge was attenuated among participants in the reward for participant condition