Retribution and emotional regulation: The effects of time delay in angry economic interactions

Cynthia S. Wang, Niro Sivanathan, Jayanth Narayanan, Deshani B. Ganegoda, Monika Bauer, Galen V. Bodenhausen, Keith Murnighan

A R T I C L E   I N   F O

Article history:
Received 5 May 2010
Accepted 24 May 2011
Available online xxxx
Accepted by Maurice Schweitzer

Keywords:
Time delay
Retribution
Emotional regulation
Anger
Rumination

ABSTRACT

Individuals driven by negative emotions often punish non-cooperators at a cost to themselves. The current research demonstrates that, although time delays can attenuate this effect, they can also produce unintended consequences. Five experiments investigated the effects of time delays and thought patterns on punishments in direct and third party interactions. The results show that time delays decreased punishment (Experiment 1) by reducing negative emotions (Experiments 2A and 2B). However, thought patterns during a delay were crucially important (Experiments 3A and 3B). People who engaged in a distraction task punished less; people who engaged in affective rumination punished more; and people who engaged in cognitive reappraisal were unaffected by a delay. These differences meant that, after a time delay, affective ruminationists administered greater punishments than cognitive reappraisers or distracted individuals. Implications of these findings for managing punitive impulses via time delays are discussed.

"When angry, count to ten before you speak. If very angry, count to one hundred." – Thomas Jefferson

Anger can lead to costly behavior. From ViaCom CEO Summer Redstone’s decision to pay $1.5 billion more than he intended for Paramount Pictures (Greenwald, Allis, McCarroll, Booth, & Resner, 1994) to PeopleSoft CEO Craig Conway’s battle to block the company’s sale at a significant cost to its shareholders (Weinberger, 2004), the corporate arena is rife with manifestations of anger leading to costly outcomes. Anger seems to blind otherwise rational individuals, derailing their normally deliberative thought-action repertoires (Fredrickson, 1998, 2001) by replacing them with rapid, heuristic judgments (Bodenhausen, Sheppard, & Kramer, 1994). Unfortunately, people often have tremendous difficulty restraining their costly aggressive impulses when they are angry (Berkowitz, 1993).

The current research investigates the effects of an intuitively appealing (but not often tested) behavioral intervention, commonly prescribed to reduce the likelihood and vehemence of costly retributive action – introducing a time delay before permitting a response to a transgression (e.g., Gelfand & Brett, 2004; O’Connor & Adams, 1999; Ury, Brett, & Goldberg, 1988; Walton, 1969). In particular, we investigate when and how people punish unfair negative actions, with a specific focus on the potential effects of short time delays on anger-fueled retributive action. We also investigate the impact of costly punishments that provide no monetary benefit, even in the distant future, to the punisher. Although punishment may provide collective benefits by maintaining social order (Campbell, 1990; Wang & Leung, 2010), we focus our attention and theorizing on costly punishing.

In Experiments 1–2B, we test the basic premise that short time delays can diminish retribution. We also test whether these effects depend on punishers’ cognitions during a time delay. Thus, in Experiments 3A–3B, we show that certain kinds of cognitions can actually lead to increased punishment, even after a time delay. In all five experiments, we investigate punishment decisions in two salient contexts: ultimatum rejections (i.e., when people reject small take-it-or-leave-it offers) and third-party punishments (i.e., when people punish individuals who have taken advantage of others).

Our research provides two novel theoretical contributions. First, although bargaining texts have often suggested that negotiators
should take a break when anger might interfere with their strategic choices and actions (e.g., Adler, Rosen, & Silverstein, 1998; Doner, 1996; Gelfand & Brett, 2004; Goleman, 1995; Hendrix, 1995; O'Connor & Adams, 1999; Ury et al., 1988), there is little empirical evidence to support these suggestions. Second, we show when and how this common advice not only fails, but backfires.

**Time delay**

Effectively managing anger requires considerable self-control (Loewenstein, 1996; Muraven & Baumeister, 2000). In general, emotions typically arise from contact with specific objects (Frijda, 1993; Isen, 1984; Lazarus, 1991): as individuals become further removed from a specific emotion-arousing object, their associated emotions often dissipate (Fridhandler & Averill, 1982; Tyson, 1998). Since emotions have a relatively short lifespan and anger dissipates quickly (Fridhandler & Averill, 1982), the common recommendation of taking time to “cool off” before making important decisions may prove especially effective. A time delay can increase the distance between individuals’ focal decisions and the object of their anger, both temporally and psychologically. Time delays in negotiations and conflict resolution, for instance, are supposed to help bargainers focus on their ultimate goals and aspirations rather than on the cause of their anger (e.g., Adler et al., 1998; Doner, 1996; Gelfand & Brett, 2004; Goleman, 1995; Hendrix, 1995; O'Connor & Adams, 1999; Ury et al., 1988).

Research has recently begun to investigate these effects. Finkel, DeWall, Slotter, Oaten, and Foshee (2009), for instance, found that short time delays reduced people’s tendencies to entertain violent thoughts after a partner had angered them. In contrast, Harinck and De Dreu (2008) found that a break not only failed to improve outcomes in a dyadic integrative negotiation, but had detrimental effects. They noted, however, that the cooperative context of the negotiations they studied might have impeded the emergence of negative emotions. In addition, neither of these two studies measured retributive behavior.

Sutter, Kocher, and Straub (2003) tested the effects of time pressure on people’s responses to ultimatum offers, requiring a response in either 10 or 100 s in each of nine rounds of offers. First round offers in this study averaged just over one-fourth of the 10 Euro endowment in both conditions; 59.7% of the time-pressured offers were rejected versus only 21.8% of the unpressured offers. This difference disappeared, however, on all of the eight subsequent rounds of offers. These results provide preliminary evidence for the benefits of time delay but they do not examine the underlying cause of the effects. To expand on this research, we investigate the causes of these effects and extend the phenomenon’s domain to two distinct contexts – direct and third-party economic exchanges. In addition, we draw on the emotion regulation literature (Gross, 1998) to identify when and why time delays are effective, ineffective, and even potentially deleterious.

**The upside and downside of time delays**

People can influence when and which emotions they experience and how they express them. Gross and his colleagues (Gross, 1998; Ray, Wilhelm, & Gross, 2008) have suggested that this regulatory behavior depends on three distinct patterns of thought: distraction, i.e., shifting attention away from the immediate situation (Derryberry & Rothbart, 1988); reappraisal, i.e., reanalyzing and reinterpreting past events less emotionally; or rumination, i.e., focusing on distress symptoms or the person’s negative emotional state (Sukhodolsky, Golub, & Cromwell, 2001). While time delays may help to reduce a person’s negative emotions, their cognitions during a delay may contribute to determining whether a time delay will result in reduced punishments.

**Distraction**

Distraction can help people suppress their negative emotions by shifting their attention from a negative, emotion-laden situation to an alternative, less emotion-provoking situation. By creating thought patterns that are unrelated to the anger-arousing event, distraction can help emotions dissipate (Kalisch, Wiech, Herrmann, & Dolan, 2006). Counting ceiling tiles (Nix, Watson, Pyszczynski, & Greenberg, 1995), performing math equations (Van Dillen & Koole, 2007), or playing a game of Tetris (Holmes, James, Coode-Bate, & Deeprose, 2009), for example, may help people subdue their negative emotions. Although not privy to this research, Thomas Jefferson’s suggestion of counting to 10 uses the same theoretical rationale.

The difficulty with distraction, however, is that it is not always feasible, as some situations may be so compelling that distraction becomes ineffective. In these instances, rumination or reappraisal are potential alternatives.

**Rumination**

Research using both self-reported and physiological measures suggests that rumination maintains and exacerbates negative emotions (Bettencourt, Talley, Benjamin, & Valentine, 2006; Ray et al., 2003, 2008; Segerstrom, Tsao, Alden, & Craske, 2000; Siegle, Steinhauser, Thase, Stenger, & Carter, 2002). When people ruminate about anger-inducing events, their thoughts tend to reactivate their emotions (Denson, Pedersen, & Miller, 2006; Sukhodolsky et al., 2001). Bushman (2002), for example, found that venting (e.g., taking out aggression in a non-retaliatory way) was less effective at reducing anger than letting it dissipate naturally, because venting required a recall of the original negative experiences, which re-roused anger (Fridhandler & Averill, 1982; Tavris, 1984, 1989). Also, since rumination reactivates hot emotions, it can delay anger's dissipation and stimulate continued aggressive reactions (Bushman, Bonacci, Pedersen, Vasquez, & Miller, 2005). As a result, people who ruminate tend to retaliate more often (Collins & Bell, 1997) and with greater fervor than those who ruminate less (Caprara et al., 1987).

**Reappraisal**

Holmes and Murray (1996), however, noted that people can detach themselves from their emotions by cognitively approaching an event in a broad, positive manner. Unlike rumination, reappraisal lets people reanalyze and reinterpret past negative events in a cooler state (Ray et al., 2008). Reappraisals consider alternative interpretations of negative events (Gross, 2001) and the negative events' relevance to a person's goals (Ray et al., 2008). Rather than re-activating negative emotions, reappraisal encourages people to think more objectively, even with a sense of detachment (e.g., Ray et al., 2005). In essence, reappraisal is much like rumination without its associated emotions (Lazarus, 1991; Ray et al., 2008; Scherer, 2001).

Thus, reappraisal may lead to reduced punishing. Neurological evidence is consistent with this expectation: a small ultimatum offer led to people experiencing heightened brain activity in the anterior insula, which is associated with negative emotions, and the dorsolateral prefrontal cortex, which is associated with cognition. Rejections of these offers, however, were only associated with heightened activity in the anterior insula, not the dorsolateral prefrontal cortex (Sanfey, Rilling, Aronson, Nystrom, & Cohen, 2003), suggesting that hot negative emotions, rather than cool cognitions, drive costly punishment decisions. As a result, reappraisal should be more effective than rumination in tempering negative emotions and reducing punishments.
The current research

To our knowledge, the combined effects of emotional regulation and time delays on punishing behavior have not been empirically investigated. In five experiments, we tested the prediction that, following a negative event, a time delay will lead to a reduction in punishing behavior for people who reappraise or for people who are distracted, but it will lead to an increase in punishing behavior for people who ruminate. We also predicted that the important mediator in the time delay plus emotional regulation → behavior process will be negative emotions. We investigated costly punishing behavior by both the victim, i.e., direct punishment, and by a third-party observer (Sutter et al., 2003).

Experiments 1, 2A, and 3A used the now-classic ultimatum game (Güth, Schmittberger, & Schwarze, 1982), a mixed-motive interaction in which one party, the offerer, is endowed with a fixed sum of money and can offer any portion of it to a second party, the responder, who can accept or reject the offer. Acceptance results in the responder getting the amount offered and the offerer retaining the rest; rejection results in both parties receiving nothing.

Game theory suggests that, because responders start with nothing and any positive offer gives them positive utility, responders should accept all offers, even those that are extremely small. In practice, however, responders often reject offers that are less than 25% of the total, even when the stakes are high (Roth, 1995). By doing so, responders sacrifice the value of their offers, i.e., their rejections are costly.

A common explanation for these costly rejections is negative emotions (Binmore, Shaked, & Sutton, 1985). Loewenstein (1996) suggested that negative emotions play a central role in the decision to punish, and Pillutla and Murnighan (1996) found that spite and anger led to many rejections of small ultimatum offers. Neurological evidence also finds increased activity in the anterior insula, the area associated with negative emotions, when responders reject less-than-equal ultimatum offers (Sanfey et al., 2003).

Individuals also punish people who are unfair, deceptive, or uncooperative towards others, even strangers (e.g., Fehr & Gachter, 2002), at a direct cost to themselves (Fehr & Fischbacher, 2004a). Anger tends to fuel these third-party punishments (Darley & Pittman, 2003; Fehr & Fischbacher, 2004a, 2004b; Nelissen & Zeelenberg, 2009; Seymour, Singer, & Dolan, 2007) more than a sense of obligation or cognitive rationality (Carlsmitth, 2006; Carlsmith, Darley, & Robinson, 2002; O’Gormana, Wilson, & Miller, 2005). For instance, Buckholtz et al. (2008) found that, as third-party punishments increased in magnitude, so did the activity in a punisher’s amygdala and medial prefrontal cortex, areas of the brain that are consistently linked to emotions (Ammodio & Frith, 2006; Barrett et al., 2007; Lieberman, 2007). This suggests that unfair, inappropriate, or counter-normative social action, even when it is directed at others (Bies & Tripp, 2002), can trigger anger and mobilize people to engage in costly punishing behavior (Bosman, Sutter, & van Winden, 2005; Brosig, Weimann, & Yang, 2003; Pillutla & Murnighan, 1996; Wang, Galinsky, & Murnighan, 2009).

Thus, Experiments 2B and 3B tested whether time delays would influence the punishing behavior of third-parties who had observed an untrustworthy act.

Experiment 1

Method

Participants and design

Forty-nine undergraduates (25 women) from a major university in Singapore received course credit for their participation and were told that they could receive additional money based on their decisions in the experiment. Participants were randomly assigned to make their decisions immediately, after a 5-min delay with no explicit instructions of what to do during the delay, i.e., a one-factor, three-level between-subjects design.

Procedure

Participants’ instructions, displayed on a computer screen, indicated that they would each be interacting in an ultimatum game over a computer network with another participant, an “offerer” who started with an endowment of $10 (but did not actually exist). All of the offers were $2, i.e., less than 25% of the endowment, which make them prime targets for rejection (Roth, 1995).

Participants in the no delay condition were asked for their accept-or-reject decision immediately after they received the offer. Participants in the delay condition with counting read the following instructions: “Before you make your decision, please start writing numbers, starting at 1, and increasing in increments of one (e.g., 1, 2, 3, 4, 5...). Please continue to write down numbers until the next page appears.” The computer screen then displayed a text box in which they could record numbers. After 5 min, the screen prompted participants to make their accept-or-reject decision. Participants in the delay condition with no instructions saw a 5-min on-screen message indicating that the computer was processing information from other participants and that the next screen would appear shortly. They then saw the screen that prompted them to make their decision.

Participants immediately received the payoff that was associated with their choice: if they accepted the offer, they received $2 and the offerer supposedly received $8; if they rejected the offer, both parties received no money.

Results and discussion

People rejected over three times as many offers (proportionally) when they made their decision immediately (47.8%) compared to the time delay conditions (14.8%). A binary logistic regression analyzing the effects of time delays on the choice to accept (coded as 0) or reject (coded as 1) was significant, Wald = 5.92, p = .05 (see Table 1 for Experiment 1–2B results). Immediate choice participants were marginally more likely to reject the offer (47.8%) than people who experienced a time delay without instructions (16.7%), Wald = 2.99, B = −1.52, SE = .88, p = .08, and significantly more likely than people who counted numbers during their time delay (13.3%), Wald = 4.24, B = −1.79, SE = .87, p = .04. The latter two conditions were not significantly different, Wald = .06, B = .26, SE = 1.09, p = .81.

Table 1

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Context</th>
<th>Time delay</th>
<th>Punishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ultimatum rejection ($2)</td>
<td>Immediate</td>
<td>48%</td>
</tr>
<tr>
<td>2A</td>
<td>Ultimatum rejection ($1)</td>
<td>5 min (no instructions)</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 min (distraction: count)</td>
<td>13%</td>
</tr>
<tr>
<td>2B</td>
<td>Third-party punishment</td>
<td>5 min (no instructions)</td>
<td>58%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Immediate</td>
<td>6.79 points</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 s (distraction: dots)</td>
<td>5.83 points</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.5 min (distraction: dots)</td>
<td>2.27 points</td>
</tr>
</tbody>
</table>
Experiment 1 suggests that a 5-min distraction and, to a lesser extent, a 5-min open-ended delay, reduced costly rejections of low ultimatum offers. These results are consistent with Thomas Jefferson’s advice – counting did reduce costly aggressive punishments. These data document the effect but do not illuminate the decision makers’ psychological processes. Thus, Experiments 2A and 2B investigated our prediction that a time delay would reduce anger and ultimately punishments in both ultimatum and third-party contexts.

**Experiment 2A**

**Method**

**Participants and design**

Ninety-six (49 females) undergraduates from a major university in Singapore received course credit for participating; they were randomly assigned to either a delay or no delay condition, i.e., a one-factor, two-level between-subjects design. Like Experiment 1, they were told that they would earn the actual monetary amounts in the experiment.

**Procedure**

The game procedures were identical to Experiment 1, except that each offer was now $1 (even more unfair) and did not include the delay–distraction condition. Participants experienced either no delay or a 5-min delay with no instructions. After the screen prompted participants to make their accept–reject decision, participants were asked, “After you received the offer, did you feel: 1 = “extremely disgruntled” to 7 = “extremely pleased”? This item (reverse-coded) provided a measure of their anger. Thus, our two dependent variables were their accept–reject choices and their self-reported feelings of anger.

**Results and discussion**

More than three-fourths of the participants in the no delay condition rejected the offer (39 of 51; 76.5%) compared to 57.8% (26 of 45) in the delay condition, a significant difference: $\text{Wald} = 3.74, B = -.003, SE = .001, p = .05$. Also as predicted, participants who experienced the delay reported feeling significantly less anger ($M = 4.82, SD = .94$) than participants who experienced no delay ($M = 5.25, SD = .96$), $B = -.22, SE = .10, p = .03$.

A final set of analyses tested whether participants’ anger mediated the relationship between time delay and their accept–reject decisions. Following Preacher and Hayes (2008), the analysis included three initial steps: (1) regressing delay on rejection rates, (2) regressing delay on anger, and (3) regressing both delay and anger on rejection rates (Lockwood & MacKinnon, 1998; Shrout & Bolger, 2002). The significant results for Steps 1 and 2 are noted above; Step 3 indicated that, controlling for anger, $Wald = 13.38, B = 1.17, SE = .32, p < .001$, the relationship between time delay and rejection rates was no longer significant, $Wald = 1.36, B = -.002, SE = .002, p = .24$. To confirm the significance of this mediation (Shrout & Bolger, 2002), we created bootstrap confidence intervals by using 5000 bootstrap samples. This yielded a 95% bias-corrected confidence interval of $(-.0041$ to $-.0002$); because the interval does not include zero, it indicates that anger mediated the effect of time delay on accept–reject decisions.

Thus, Experiment 2A supported our central hypothesis that a time delay would reduce anger, which in turn would reduce costly punishments. To test both the reliability and the generalizability of this effect, Experiment 2B investigated time delay’s effects on people (third-parties) who observed norm violations directed towards others (i.e., people were not directly impacted by the norm violation). We also used shorter time delays, a different measure of anger, and a different time delay procedure to test the robustness of our findings.

**Experiment 2B**

**Method**

**Participants and design**

Ninety-four undergraduates (61 females) from a Midwestern US university participated for a payment of $5 plus the potential to earn additional money during the experiment. Experiment 2B included three between-subjects conditions: no delay, a short delay (30 s), and a longer delay (2.5 min).

**Procedure**

The procedures, presented via computer, described a 2-part monetary allocation task. Although participants were told that they would be randomly assigned to one of three possible roles (Player A, B, or C), they were all assigned the role of Player C, a third-party who observed the other two participants’ interaction.

In Part 1, Players A and B, who did not actually exist, ostensibly engaged in a variation of the now-classic Trust Game (Berg, Dickhaut, & McCabe, 1995). They were each endowed with 10 points, with each point worth $10; Player A could transfer from 0 to 10 of their points to Player B, and any points transferred would be quadrupled on route to Player B, who would then choose how much of the quadrupled total to return to Player A. All of the players knew all of the rules, monetary information, and players’ choices.

Player Cs were told that Player A had sent their entire endowment and that Player B had chosen to keep the entire amount (40 points from Player A plus the 10 they started with), returning nothing (zero points). The players’ points were then noted publicly.

Player Cs were endowed with 25 points (also worth $10 cents per point). In Part 2, they could use these points to penalize the other players: each point allotted to punishment reduced the punished player’s outcome by two points. Thus, if Player C used 12 points to penalize Player B, Player C lost 12 points and Player B lost 24. Player Cs kept any points that they did not use for punishments. The number of points used to punish Player B was our behavioral dependent variable. Participants were informed that they might be randomly chosen to keep their points and convert them to cash at the end of the experiment.

In manipulating time delay, we asked participants to make their punishment decisions either immediately after Part 1, or after a short (30 s) or a longer (2.5 min) delay. During the delay, participants completed a modified dot estimation task (Gerard & Hoyt, 1974; Sivanathan, Molden, Galinsky, & Ku, 2008), which asked them to estimate the number of bright dots that appeared for approximately 5 s on their computer screen; they repeated this task until the time delay was complete. After making their punishment decisions, the participants completed three items that measured their anger, disgust, and scorn, e.g., “Indicate to what extent you feel this way at the present time, from 1 = ‘not at all’ to 7 = ‘extremely.’” Their responses were averaged to form an anger index, $\alpha = .78$.

**Results and discussion**

As predicted, a longer time delay led to less punishing: the overall, three-way ANOVA was significant, $F(2, 91) = 3.39, p = .04$. Planned comparisons indicated that no time delay led to more punishment ($M = 6.79, SD = 9.46$) than the longer (2.5 min) delay ($M = 2.27, SD = 3.42, t(91) = 2.50, p = .01$, but the short time delay...
(30 s) did not lead to a significant reduction in punishing ($M = 5.83$, $SD = 7.12$), $t(91) = .53$, $p = .60$. In addition, the longer delay led to marginally less punishing than the short delay, $t(91) = 1.91$, $p = .06$.

Also as expected, the three conditions had an impact on participants’ reports of their feelings of anger, $F(2, 91) = 4.20$, $p = .02$: no delay led to the most anger ($M = 2.27$, $SD = .87$), significantly more than the longer delay ($M = 1.68$, $SD = .74$), $t(91) = 2.77$, $p = .01$, but not significantly more than the short delay ($M = 2.16$, $SD = .95$), $t(91) = .55$, $p = .58$. In addition, the longer delay led to significantly less anger than the short delay, $t(91) = 2.15$, $p = .03$.

As in Experiment 2A, anger mediated the impact of time delay on punishment. Step 1 indicated that time delays led to less punishment, $B = -.03$, $SE = .01$, $t = .05$; Step 2 indicated that time delays and anger were negatively related: $B = -.004$, $SE = .001$, $p = .005$; and Step 3 indicated that, controlling for anger, $B = 2.62$, $SE = .84$, $p = .002$, the effect of time delays on punishment was only marginally significant, $B = -.018$, $SE = .010$, $p = .09$. Bootstrap confidence intervals led to a 95% bias-corrected confidence interval of $(-.0225, -.0018)$, indicating that anger mediated the time delay → punishment effect.

In sum, Experiments 2A and 2B showed that longer time delays (of 2.5 or 5 min rather than 30 s or responding immediately) led to less anger, which in turn reduced costly punishment by people who had been treated unfairly and by third parties who observed their ultimatum offer. In the distraction condition, they were told, “Before you make your decision, tell us about your most recent trip to the grocery store. Please continue writing until the next page appears.” In the reappraisal condition, they were told, “Before you make your decision, tell us what you think about . . .” After either 30 s or 2.5 min, they were asked to accept or reject the $2 ultimatum offer. As in Experiment 1, participants received $2 or nothing, based on their decisions.

To check the effectiveness of the rumination and reappraisal manipulations, two raters who were blind to the conditions independently rated whether participants’ writing focused more on thoughts or feelings: “How much does the statement seem to be describing their thoughts or their feelings about this offer?” (1 = more about thoughts than feelings to 7 = more about feelings than thoughts; $x = .79$). The two raters also provided independent assessments of participants’ anger by coding participants’ writing for its affective content: “How much negative emotion is being expressed in this statement?” (1 = very little to 7 = quite a bit; $x = .87$; coding adapted from Pillutla & Murinughan, 1996). We analyzed the averages of each of the two coders’ ratings.2

Coding participants’ writing in the 30-s conditions was not successful, as more than half of the participants did not write enough to be ratable: on average, participants wrote 9.8 words. Thus, although we were not able to analyze participants’ emotions in these conditions, we were still able to analyze their punishment decisions.

Results and discussion

A logistic regression analysis of participants’ punishment decisions led to a significant time delay → thought process interaction, $\chi^2 = 8.01$, $p = .02$. Distracted participants in the 30-s delay conditions rejected almost twice as many offers (proportionally) as distracted participants in the 2.5-min delay condition (13 of 24; 54.2% versus 6 of 21; 28.6%); this difference was marginally significant, $\chi^2 = 3.01$, $p = .08$. The different time delays did not affect cognitive reappraisers’ decisions (30-s delay: 8 of 20; 40% versus 2.5-min delay: 8 of 19; 42.1%), $\chi^2 = .02$, $p = .90$, but ruminators rejected over twice as many offers (proportionally) in the 2.5-min delay condition (11 of 14; 78.6%) than they did in the 30-s delay condition (8 of 21; 38.1%); $\chi^2 = 5.55$, $p = .02$ (see Fig. 1).

Also as expected, no significant differences emerged among the distraction, reappraisal, and rumination conditions following the 30-s delay (all $\chi^2$s < 1.2). Analysis of the 2.5-min delay, however, indicated that rumination led to almost three times as many ultimatum rejections as the distraction condition (78.6% versus 28.6%) and almost twice as many as the reappraisal condition (42.1%). The difference between rumination and reappraisal was significant ($\chi^2 = 4.39$, $p = .04$), as was the difference between

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1 As a response to reviewers’ comments, we collected additional 30-s conditions in Experiments 3A and 3B separately from the original 2.5-min conditions. The participants in the 30-s and 2.5-min conditions came from the same university subject pool, and did not differ in age, ethnicity, and gender.

2 In Experiments 3A and 3B, the content of the writings in distraction condition was qualitatively different from the content of the writings in the rumination and reappraisal conditions and was unrelated to the punishment task. As a result, we did not code these participants’ writings in the distraction conditions for affective versus cognitive content.
rumination and distraction ($\chi^2 = 8.41, p = .004$), but the difference between reappraisal and the distraction condition was not ($\chi^2 = .80, p = .37$). Coders’ ratings confirmed that, following the 2.5-min delay, participants in the rumination condition ($M = 4.22, SD = 1.50$) wrote about their feelings more than participants in the reappraisal condition did ($M = 3.07, SD = 1.57$). $F(1, 31) = 5.71$, $p = .02$. In addition, the emotions expressed in the rumination condition were also significantly more negative than the emotions expressed in the reappraisal condition ($M = 4.11, SD = 1.71$ versus $M = 2.66, SD = 1.71$), $F(1, 31) = 5.79$, $p = .02$.

A bootstrap mediation analysis indicated that negative emotions again mediated the effects of participants’ thoughts on their ultimatum rejections. Step 1 results confirmed that rumination led to more rejections than reappraisals ($Wald = 4.09, B = 1.62, SE = .80, p = .04$). Step 2 indicated that negative emotions were associated with rejection rates ($Wald = 9.17, B = 1.01, SE = .33, p = .002$); and Step 3 indicated that, after controlling for negative emotions, $Wald = 7.41, B = .93, SE = .34, p = .006$, how people thought about their offer and their rejection rates were no longer significantly related, $Wald = -.80, B = 1.00, SE = .64, p = .42$. Finally, a 95% bias-corrected confidence interval (.14, 4.10) indicated that the mediation was significant.

These data show that, following an anger-inducing event, the effects of a time delay on punishing behavior depend on the nature of individuals’ thoughts during the delay. Rumination significantly increased punishing behavior. In contrast, distraction had effects that were similar to the effects of a non-directed time delay, and a time delay had minimal effect on reappraisal. In addition, the data continue to show that negative emotions affect punishments: following a 2.5 min delay, ruminators experienced more negative emotions than reappraisers and subsequently rejected more ultimatum offers. To continue our paired-experiments strategy to test the robustness of our effects, Experiment 3B tested these same predictions in the context of third-party punishments.

**Experiment 3B**

**Method**

**Participants and design**

One-hundred thirty-four (88 females) undergraduates from a major university in Singapore received course credit for participating along with the money they received during the experiment. As before, participants acted as third-party observers. The rest of the procedure and design were identical to Experiment 3A.

**Procedure**

Participants observed a Trust Game interaction and wrote about their feelings (i.e., rumination) or cognitive (i.e., reappraisal) reactions to their observations or a recent trip to the grocery store (i.e. distraction) for 30 s or 2.5 min. Then they decided how much to punish Player B. As before, their endowments were 25 points (worth $.10 each) and each point used for punishment reduced the other participant’s payoff by 2 points. At the end of the experiment, each participant was paid $2.50 less $.10 for each point they punished.

The two raters’ codings of participants’ writing for the manipulation check ($\alpha = .82$) and negative emotions ($\alpha = .86$) continued to be reliable. Thus, we again analyzed the average of the two coders’ ratings. As in Experiment 3A, the data in the 30-s essays could not be analyzed.

**Results and discussion**

A significant time delay x thought process interaction emerged, $F(2, 128) = 3.29, p = .04$. Consistent with Experiment 3A, distracted participants who responded after a 30-s delay ($M = 9.61, SD = 8.60$) punished more than the distraction condition did ($M = 3.07, SD = 1.57$), $F(1, 31) = 5.71$, $p = .02$. In addition, they expressed less, but not significantly less, than ruminators who responded after a 2.5-min delay ($M = 7.72, SD = 8.12$) punished, $t(128) = 2.08, p = .02$, and that the latter two were not significantly different from each other, $t(128) = .23, p = .82$.

No differences emerged among distraction, reappraisal, and rumination following the 30-s delay (all $t’s < 1$). A 2.5-min delay, however, led people who had ruminated to punish more than twice as much as reappraisers who responded after a 2.5-min delay ($M = 4.28, SD = 4.95$) and almost twice as much as people in the distraction condition ($M = 4.78, SD = 6.10$). Planned comparisons among these three conditions indicated that rumination punishments were significantly greater than reappraisal, $t(128) = 2.97, p = .004$, and distraction punishments, $t(128) = 2.80, p = .006$, and that the latter two were not significantly different from each another, $t(128) = 2.3, p = .82$.

Coders’ ratings confirmed that participants in the rumination condition ($M = 4.58, SD = 1.55$) wrote about their feelings more often than participants in the reappraisal condition did ($M = 2.92, SD = 1.54$), $F(1, 49) = 14.63, p < .001$.

4 Four participants received a rating <1.5 in the rumination condition and one received a rating >6.5 in the reappraisal condition (1.5 standard deviations away from the mean), suggesting that they did not follow the instructions. As a result, they were dropped from the analyses, leaving a total of 51 participants in the rumination and reappraisal conditions.
significantly more negative emotions (rumination: $M = 4.54$, $SD = 1.55$ versus reappraisal: $M = 3.16$, $SD = 1.81$), $F(1,49) = 8.58, p = .005$.

A bootstrap mediation analysis again indicated that negative emotions mediated the effect of rumination on punishments following the 2.5 min delay. Step 1 was confirmed above: rumination punishments were larger than reappraisal punishments. Step 2 was also confirmed, as negative emotions were associated with increased punishment ($B = 1.45, SE = .58, p = .02$). After controlling for negative emotions, the effect of rumination on punishment was less significant ($B = 5.14, SE = 2.14, p = .02$; dropping from $B = 2.92, SE = .95, p = .003$ without negative emotions in the model), and a 95% bias-corrected confidence interval ($−3.42$, $−0.07$) indicated a significant mediation.

These data again show that the effects of a time delay on punishing behavior depend on the nature of individuals’ thoughts during the delay. As predicted, a 2.5-min time delay led ruminators to punish non-recipients more than distracted participants and reappraisers did, with negative emotions mediating the effect of thought type (rumination versus reappraisal) on punishments; a short time delay had little effect.

In addition, a meta-analysis of Experiments 3A and 3B (Table 2) indicates that, overall, people who engaged in a distraction task punished less after a delay, people who engaged in rumination punished more, and people who engaged in reappraisal were unaffected by a delay. Thus, although a time delay led to reduced punishments in our initial experiments, these final two experiments suggest that this effect depends on the nature of individuals’ thoughts during the delay.

### Table 2

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Effect size estimates ($r$)</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distraction: punish less following a long (versus short) delay</td>
<td>.54</td>
<td>$-61$</td>
</tr>
<tr>
<td>Ruminators: punish more following a long (versus short) delay</td>
<td>.87</td>
<td>$-60$</td>
</tr>
<tr>
<td>Reappraisers: do not punish more following a long (versus short) delay</td>
<td>.05</td>
<td>.30</td>
</tr>
<tr>
<td>$N$</td>
<td>119</td>
<td>134</td>
</tr>
</tbody>
</table>

Note: $M$ represents the weighted average of the effect sizes. Heterogeneity tests were not significant.

General discussion

Anger can lead people to engage in costly retributive action. Across five studies, using different manipulations of time delay, different measures of anger, and different contexts, our results indicate that a time delay can help curtail the anger that fuels costly punishment decisions. These positive benefits, however, were critically dependent on the length of the delay and individuals’ thought processes during the delay. Our initial findings (Experiments 1, 2A and 2B) indicated that, following unfair, inappropriate action, people punished less when their responses were delayed, because of a reduction in negative emotions. When people ruminated during time delay, however, they not only did not reduce their punishment behavior, they increased it. Thus, the effectiveness of a time delay (Experiments 3A and 3B) depended on both the length of delay and individuals’ thought processes during the delay: short delays had essentially no effects but longer delays led ruminators to punish more than reappraisers and distracted participants.

These results suggest that the age-old advice to take a break when angry may need to be reconsidered, as doing so without careful attention to how people think during the delay may not always serve its prescribed purpose. In particular, the nature of an individual’s thoughts about a negative event seem to have potent effects: people who ruminated for only 2.5 min punished more than people who reappraised or were distracted, an effect that was consistently mediated by negative emotions.

Although ruminating after a negative event may allow people to understand their negative emotions, it can come at an economic cost. Other work has shown that rumination also leads to less systematic problem solving (Carver, Scheier, & Weintraub, 1989), decreased attention span and concentration (Brockner & Hulton, 1978), fewer solutions to interpersonal problems (Nolen-Hoeksema, Morrow, & Fredrickson, 1993), and even long-term adverse health outcomes (Dickerson & Kemeny, 2004; Thomsen et al., 2004). Given the sparse data available examining the long-term impact of rumination on punishment behavior, one future research opportunity is to directly compare short- versus long-term repercussions of rumination on punishment behavior.

In contrast, the current data’s upside suggests that reappraisal can allow people to distance themselves from their anger and take a more ‘objective’ view of their situations. Kross and Ayduk (2008), for instance, found that taking a self-distinct (akin to reappraisal) versus self-immersed (akin to rumination) perspective led to quicker recovery following a negative experience. Denson, Fabiansson, Cresswell, and Pedersen (2009) also demonstrated that taking a self-distinct versus a self-immersed view decreased cortisol levels. Our comparisons of rumination and reappraisal provided specific tests of the consequences of different thought processes on subsequent interpersonal behavior in economic exchanges. Our findings compliment prior research by showing that reappraisal, compared to rumination, may arouse less negative emotions and in turn less costly punishment decisions. A fruitful avenue for future research might be to delineate the impact of rumination and reappraisal on both punishing and rewarding behaviors. For instance, third-party observers may not only have the option to punish non-cooperators, they may also be able to compensate victims. Examining a full range of behaviors may further elucidate the underlying psychological and physiological processes of rumination and reappraisal.

We focused on anger as the central emotion that drives punishment behavior because it is characterized by high other-control: people feel angry when perceiving another person as responsible (Dunn & Schweitzer, 2005). Other emotions, e.g., anxiety, may also affect punishment decisions. Future research might examine how time delays affect a full spectrum of emotions, both negative (i.e., anxiety, fear) and positive (i.e., gratitude, happiness) and how they might differentially affect a variety of different emotion-driven decisions.

One unexpected finding in the current research was the observation that reappraisal led to only a small reduction in punishing behavior ($M = .30; p = .14$, in the meta-analysis). We expected that reappraisal would give people time to think about and reduce the economic impact of a potential punishment decision. One reason why this did not occur may be that the manipulation of reappraisal, which prompted people to ‘think’ about their offer, was too general, leading people to engage in a host of different cognitive analyses. Perhaps a more directed reappraisal prompt, such as one used by Ray et al. (2008), directing participants to view an event from the perspective of an ‘impartial observer’ would have...
produced more powerful results. Thus, future research might test various manipulations of reappraisal to address this issue.

Rumination and retribution: potential benefits

Although anger and the impulse to punish can be economically costly for individuals, punishing normative transgressors is often collectively beneficial, as it can discourage subsequent anti-normative behaviors (Fehr & Fischbacher, 2004a; Hoffman, McCabe, & Smith, 1998). The mere threat of punishment, for example, can help maintain cooperation and reduce competitive behavior (e.g., Fehr & Gachter, 2002). Recent findings suggest that individuals frequently do engage in costly punishing behavior; as it becomes more frequent, large groups may benefit (Boyd, Gintis, & Bowles, 2010). This suggests that the social regulatory effects of enforcement behavior may improve collective fitness. Thus, we do not suggest that the expression of anger is uniformly non-adaptive – it may be critical, for instance, for preserving collective benefits and, in so doing, individual punishers may actually experience a net benefit. Moreover, research has shown that displays of anger in social interactions can result in individual monetary gains (e.g., Andrade & Ho, 2009), suggesting that at times, punishment can serve as an individually adaptive response, even without collective benefits.

Rumination is not always an individual affliction; instead, it can also serve a beneficial purpose – encouraging moral emotions such as anger (Haidt, 2003; Rozin, Lowery, Inada, & Haidt, 1999) that can result in socially-adaptive punishment behavior. Our findings provide a nuanced, psychological understanding of when these punishments are likely to emerge, particularly when rumination and time delay are combined.

Conclusion

The ebb and flow of human interactions can be emotionally charged and often lead to actions that actors or observers might see as interpersonally inappropriate or unfair. These perceptions naturally lead to emotional reactions and occasionally to retaliation. Across a set of five experiments, in varying economic exchanges, we have attempted to highlight both the benefits and the unintended, negative consequences of time delays and thought processes on individuals’ choices to engage in costly punishing behavior. Thomas Jefferson’s sage advice to count – to combat the unintended, negative consequences of time delays and thought processes - seems to have considerable, general validity. At the same time, the current research suggests that it is also important to understand what people are actively thinking during a time delay.

Acknowledgements

This research was supported by research grants from the National University of Singapore (R-317-000-073-112/133 and R-317-000-068-112/133) and the Northwestern University Dispute Resolution Research Center.

References
