

How guilt leads to reparation? Exploring the processes underlying the effects of guilt

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Published online: 5 May 2017
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Abstract It is widely assumed that guilt leads people to engage into reparatory behaviors. However, the processes underlying this effect are in need for further specification. Four studies tested potential underlying cognitive mechanisms. Results suggest that guilt increases attention toward positive and reparation-oriented cues (Study 1) and makes attitudes toward reparation-oriented primes more positive (Study 3). No effect was found for accessibility of reparation words (Studies 2a, b). Taken together, these results suggest that guilt leads people to pay more attention to reparation means and to develop a more positive attitude toward reparation means, but does not render reparatory means more accessible. Implications for a better knowledge of guilt's behavioral consequences are discussed.

Keywords Guilt · Cognitive processes · Attention · Accessibility · Implicit attitude

Introduction

Emotions serve an adaptive role for individuals (Keltner and Haidt 1999; Oatley and Johnson-Laird 1987). They can be portrayed as “mental programs” designed to orient actions toward the goal to be reached given the specific emotion elicited in the individual (Tooby and Cosmides

1990). In this approach, emotions are thus conceived as “motivational states” (DeSteno et al. 2004) aimed at triggering appropriate behaviors. This conceptualization is at the heart of the “feeling is for doing” approach (Zeelenberg and Pieters 2006), according to which specific (discrete) emotions motivate a specific behavior aimed at solving a current problem. For instance, experiencing fear results from a potential threat for physical integrity and would thus motivate the organism to escape and to search a safe place. In other words, this approach suggests that each emotion serves distinct motivational functions according to the goal allotted to that emotion, and that different emotions are associated with distinct goals (Zeelenberg et al. 2008).

Within this perspective, some emotions appear to play a crucial role in social life because they are strongly associated with a specific action repertory that is directed toward the strengthening of social bonds. This is the case for guilt. Guilt is assumed to be a negative emotion experienced as the result of a social misconduct (Tangney and Dearing 2002). In turn, guilt is considered to promote reparative actions in order to repair the harm that has been done. Even though this claim has received strong empirical support (Baumeister et al. 1994; Carlsmith and Gross 1969; Cryder et al. 2012; De Hooge et al. 2007; Ketelaar and Au 2003), the processes underlying these effects remain in need for further specifications (De Hooge et al. 2011; Graton et al. 2016). The present research was aimed at filling this gap and to explore the mechanisms underlying the influence of guilt on reparation.

Reparation: guilt's related behavior

Guilt has long been seen as an emotion promoting socialization processes (e.g., Ausubel 1955). It has for example been shown that guilt increased reparatory intentions

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(Schmader and Lickel 2006) as well as feelings of responsibility toward others (Manstead et al. 1989; McCullough et al. 1997; Stuewig et al. 2008). Guilt was also found to promote apologies (Lewis 1971; Roseman et al. 1994) as well as other actions aimed at avoiding causing harm to other people (Baumeister et al. 1994). A recent body of research also brought evidence that guilt triggers pro-social behaviors (Cryder et al. 2012; De Hooge et al. 2007; Ketselaar and Au 2003; Nelissen et al. 2007). These behavioral consequences seem to be specific to guilt as other negative emotions, like anger or shame, did not produce the same behavioral patterns (see Nelissen et al. 2007; Graton et al. 2016). However, up to now, the processes underlying this association between guilt and reparation remain unclear, the documentation of the mechanisms underlying these effects being scarce (Zeelenberg et al. 2008).

Which processes underlie the impact of guilt on reparatory behaviors?

If emotions are aimed at triggering appropriate behaviors (Zeelenberg and Pieters 2006), they should orient the activity toward the goal this behavior is aimed to reach. As a consequence, attention (i.e., what are the means to cope with the situation?) and the cognitive processes (e.g., categorization) should be actively mobilized. Besides making someone able to react faster (attentional bias), emotions should help individuals by helping them to sort quickly appropriate information (e.g., Niedenthal et al. 1999). As an illustration, it was shown that physical or social needs can facilitate mental accessibility of related words and concepts: participants made thirsty respond faster to drinking-related words in a lexical decision task (Aarts et al. 2001) and evaluate them more positively (Ferguson and Bargh 2004). Thus, if emotions can be considered as motivational states (DeSteno et al. 2004; Zeelenberg et al. 2008), they should make means to satisfy their goal more accessible and more desirable.

Within this framework, how can guilt serve motivation-relevant behavior? It can be argued that guilt would lead people to pay particularly attention to the means that serve the goal associated with this emotion (i.e., reparation). As a consequence, guilty people should perceive more readily stimuli associated with reparation in their environment (e.g., words related to reparation like “help”), making these stimuli more likely to be used. Interestingly, it would also explain why guilty people sometimes react to manipulative intent (e.g., Cotte et al. 2005): by making people particularly attentive to reparation cues, guilt could make them more sensitive to why and by whom these cues are provided (Graton et al. 2016).

It is also possible that guilt activates the goal of repairing and thus makes the means that can help satisfy this aim

particularly accessible (Nabi 2002). This would in turn increase the probability of engaging in reparation (e.g., Bargh 1999). Finally, guilt could make attitudes toward actions associated with reparation more positive, thus more likely to be enacted.

We present four studies designed to test whether these processes are likely to underlie the effects of guilt on reparatory behavior. More specifically, we tested whether guilt increases attention to reparation-related concepts (Study 1), accessibility of these concepts (Studies 2a, b) and whether guilt leads to more positive attitude toward reparation-related actions (Study 3). For the sake of simplicity, we tested these processes independently in different experiments. However, this does not mean that we consider that these processes as mutually exclusive. It is likely that these three processes each contribute to the development of reparatory behavior following guilt experience.

Study 1: guilt and selective attention

The first study explored whether guilt leads to an increased attention toward reparation-oriented stimuli. By attention bias, we mean that a person will pay more attention to a specific relevant stimulus at the expense of other stimuli. In order to investigate this question, we relied on a dot-probe paradigm (MacLeod et al. 1986). This task has been widely used to measure attention allocation within (e.g., Mogg and Bradley 1999; Tamir and Robinson 2007) and outside (e.g., Alexopoulos et al. 2012) the emotion domain. In order to determine the specific attentional processes associated with guilt, we compared guilt with another close negative emotion, shame, which presents a different motivational function since shame is supposed to trigger a desire to escape and to hide (Tangney and Dearing 2002).

Methods

Participants

Participants¹ were 67 undergraduate students at a French University (51 women,² $M_{\text{age}} = 20.7$, $SD = 2.37$) recruited on a voluntary basis. The data of three participants were

¹ For each study, we planned to run at least 20 participants in each condition (Simmons et al. 2011), and enrolled as many participants as possible in the time devoted to the experimental sessions.

² No moderating effect of gender was found for any of the four studies, $F_s < 1.23$.

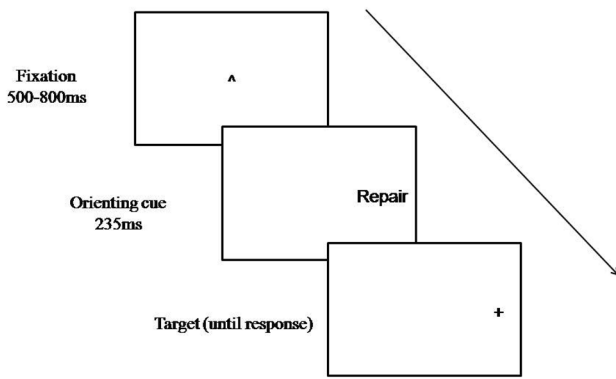


Fig. 1 Example of a valid trial sequence with a reparation cue (Study 1)

removed before analyses because they were not fluent in French³ ($n=2$) or they failed to follow the instructions ($n=1$). The remaining 64 participants were randomly assigned to one of three conditions: guilt versus shame versus control.

Material and procedure

Participants were run individually. They were informed that they would take part in two separate studies. The first study was presented as building an “inventory of life events.” Participants had to write down a short essay (10 min) about a personal experience in which they had experienced guilt, shame, or to describe a typical day of their life (control condition, e.g., Strack et al. 1985). Participants were then asked to report the extent to which they were experiencing guilt, shame, anger, joy, irritation, sadness and embarrassment at the very moment (0 = not at all; 6 = extremely).

In the “second” study, participants were seated approximately 75 cm from a 15” LCD computer screen and were asked to detect as fast as possible on which side of the screen a cross would appear. They answered by pressing either “F” key (left) and “H” key (right) on an AZERTY keyboard. The sequence was as follows (see Fig. 1): a fixation cross appeared for a random duration of 500–800 ms, followed by an orienting word-cue appearing on the left or on the right side (50%) of the screen. Then the target appeared either on the left or on the right side of the screen (1° below the location of the orienting cue) and remained until the participant responded. Orienting word-cues were 14 reparatory-oriented words

(e.g., “help”, “restore”, “repair”, “apologize”, “fix”, “compensate”), 14 escape-oriented words (e.g., “hide”, “escape”, “avoid”, “leave”, “exclude”, “disappear”) and 28 control words. They were selected on the basis of pre-tests. As the reparatory-associated words were inherently more positive than escape-related words, we selected two lists of control words: 14 control words for reparation words matched in length, frequency and valence with reparation words; 14 control words for escape words matched in length, frequency and valence with escape words.

After 15 practice trials, each of the 56 orienting verbal cues appeared either on the left or on the right side of the screen, either on the same side as the target (valid trials) or on the opposite side (invalid trials). Forty additional trials contained no cue (catch trials). Thus, the whole sequence consisted in 264 trials presented in a random order. After completing the task, participants reported their sex and age. They were finally debriefed and thanked.

Results and discussion

Emotion induction

An ANOVA (guilt vs. shame vs. control) conducted on the level of guilt reached significance, $F(2, 61)=14.78$, $p<.001$, $\eta_p^2=0.33$. As expected, guilt participants reported more guilt ($M=3.86$, $SD=1.93$) than control ($M=1.04$, $SD=1.21$), $F(1, 61)=29.5$, $p<.001$, $\eta_p^2=0.32$, and shame participants ($M=2.40$, $SD=1.87$), $F(1, 61)=7.59$, $p<.001$, $\eta_p^2=0.11$, suggesting that guilt induction worked properly.

The ANOVA conducted on the level of shame was significant, $F(2, 61)=21.18$, $p<.001$, $\eta_p^2=0.41$. However, shame participants reported more shame ($M=2.70$, $SD=1.52$) than control ($M=0.32$, $SD=0.64$), $F(1, 61)=30.4$, $p<.001$, $\eta_p^2=0.33$, but did not differ from guilt participants ($M=2.73$, $SD=1.80$), $F<1$. Thus, although the induction of guilt was effective, the induction of shame appears not to be totally efficient.

Response latencies

Incorrect responses (0.75%) were excluded, as were response times shorter than 250 ms and >3 SDs from participants’ overall mean reaction times (0.80%). In order to reduce positive skewness of responses distribution, response times were inverse-transformed (Ratcliff 1993). For reading convenience, we will present untransformed means.

³ Participants were asked what their mother tongue was and, if not French, at what age did learn French. Only French natives and participants who learnt French during early childhood (before 5 years old) were kept.

Table 1 Mean correct response times in ms (untransformed) for the types of cue words as a function of emotion (Study 1)

Group	Cue word	
	Reparation	Control
Guilt		
Valid trials	378.5	398.2
Invalid trials	450.2	476.4
Validity effect bias	71.7	78.2
Shame		
Valid trials	407.0	397.8
Invalid trials	432.7	466.7
Validity effect bias	25.7	68.9
Control		
Valid trials	414.0	413.1
Invalid trials	448.7	453.7
Validity effect bias	34.7	40.6

Attentional biases

RTs were submitted to a 3 (emotion) \times 2 (cue validity) \times 4 (word type) ANOVA with the last two factors being within-participants. The global interaction reached significance, $F(14, 427) = 4.10$, $p < .001$, $\eta_p^2 = 0.16$. As expected, a principal effect of cuing was found: Participants were faster to detect the target after a valid cue ($M = 407$ ms, $SD = 34.08$) than after an invalid cue ($M = 456$ ms, $SD = 50.81$), $F(1, 61) = 87.06$, $p < .001$, $\eta_p^2 = 0.58$.

Attentional bias for reparation-oriented cues

To look more precisely at the effect on reparation words, we then conducted a 3 (emotion) \times 2 (cue validity) \times 2 (word type: reparation vs. reparation-control) ANOVA which reached significance, $F(6, 183) = 6.77$, $p < .001$, $\eta_p^2 = 0.18$. Bias indexes (e.g., Asmundson et al. 2005) were then calculated by subtracting the reaction time for valid trials from invalid trials. The higher the score, the more important the attentional bias. A first bias index was calculated for reparation-oriented word cues. The ANOVA (guilt vs. shame vs. control) conducted on this index reached significance, $F(2, 61) = 10.80$, $p < .001$, $\eta_p^2 = 0.26$. Contrast analyses showed that the cueing effect was larger for guilt participants ($M = 71.8$, $ET = 69.5$) than respectively for shame ($M = 25.7$, $ET = 89.0$), $F(1, 61) = 17.03$, $p < .001$, $\eta_p^2 = 0.25$, and control participants ($M = 34.6$, $ET = 112$), $F(1, 61) = 15.08$, $p < .001$, $\eta_p^2 = 0.20$.⁴

⁴ Only inverse-transformed data were used for statistical calculation, including bias indexes. Hence confidence intervals for untransformed data are not relevant and not presented here.

Another bias index was calculated for control words. Results showed an effect of emotion, $F(2, 61) = 6.75$, $p = .02$, $\eta_p^2 = 0.18$. Further tests indicated that the bias index was larger for guilty ($M = 78.2$, $ET = 74.5$) than for control participants ($M = 40.6$, $ET = 60.2$), $F(1, 61) = 10.80$, $p < .001$, $\eta_p^2 = 0.15$. No difference was found between guilt and shame participants ($M = 68.9$, $ET = 76$), $p = .87$. Finally, the shame group presented a higher bias index than the control group, $F(1, 61) = 9.24$, $p < .001$, $\eta_p^2 = 0.13$ (see Table 1).

These results suggest that guilty and ashamed participants presented a larger bias index toward (positive) reparation-control cues. However, guilt leads to a higher attentional bias toward reparation-oriented cues compared with shame and control groups.

Attentional bias for escape-oriented word cues

The 3 (emotion) \times 2 (cue validity) \times 2 (word type: escape vs. escape-control) interaction approached significance, $F(6, 183) = 1.96$, $p = .073$, $\eta_p^2 = 0.06$. Two indexes were then calculated for both escape-oriented cues and escape-control cues following the same procedure as for reparatory words. The ANOVAs showed no effect of emotion on attention toward escape-oriented cues, $F = 2.01$, $p = .14$, or control cues, $F = 0.16$, $p = .85$. Thus, neither guilt nor shame increased attentional bias toward escape-type words.

Altogether, these results suggest that guilt led participants to pay more attention to “reparatory” cues. This bias seems specific to guilt since, as expected, differences were found with both shame and control groups. However, guilt also increased attention toward positive control words. Contrary to our hypothesis, shame did not increase attention toward escape-oriented word but rather toward positive cues (i.e., reparation-control words). It is arguable that both shame and guilt (i.e., “moral emotions”) share a common tendency to increase attention toward positive items, with a specificity for guilt toward reparation-oriented concepts. These results are consistent with a “feeling is for doing” approach of guilt aimed at promoting reparatory behaviors. We should however acknowledge that the results on the manipulation checks of emotion induction are rather puzzling. Even though the effects of emotion induction are clearly significant and in the predicted direction when comparing each emotion condition with the control (neutral) condition, we did not get evidence of a specific induction of shame when compared with the guilt condition. One possibility is that guilt shares some feelings with shame, still being more specific. However, it is still important to note that even if these emotions seem to share some feelings, their consequences in terms of attention allocation are

clearly different as our results illustrate. We will go back to this issue in the “[General discussion](#)” section.

Study 2a: accessibility (LDT)

Study 1 revealed that guilt increases attention toward positive and more specifically toward reparatory stimuli. These findings can help explain why guilt people are more likely to engage in reparatory behavior. Paying attention to reparation stimuli can make them easier to identify and to localize in the environment, thus making them more likely to be used. In a second series of experiments, we tested whether these effects are accompanied by a heightened accessibility of the concept of reparation, as accessibility has been frequently offered as a process by which activated concepts (here reparation) can guide behavior (e.g., Bargh et al. 2001).

Methods

Participants

Seventy-two undergraduate students at a French University (60 women, $M_{\text{age}} = 19.35$; $SD = 3.48$) participated on a voluntary basis. Three participants were removed before the analyses because they were not fluent in French. Three other participants were excluded because they failed to follow the instructions ($n = 2$) or because of a low proportion of correct responses in the lexical decision task ($< 50\%$; $n = 1$). The remaining 66 participants were randomly assigned to one of the three emotion conditions: guilt versus shame versus control.

Procedure

The study was again presented as two independent studies. The emotion induction procedure was similar as in Study 1. After they had completed the measures of emotional state, participants were installed in front of a computer screen (21" and 100 Hz) to perform a lexical decision task (Rubenstein et al. 1971). A fixation point appeared on the center of the screen (500–800 ms random duration) and was followed by a series of letters. Participants were asked to determine as fast and as accurately as possible if the series of letters was a real word or a non-word by pressing a corresponding key (keys were counterbalanced across participants) (see Fig. 2). The display remained until response (or disappeared after 2000 ms). After 10 practice trials, participants were presented the 56 words used in Study 1 and 56 pronounceable nonwords (e.g., “blarute”) in a random order. They were finally thanked and debriefed.

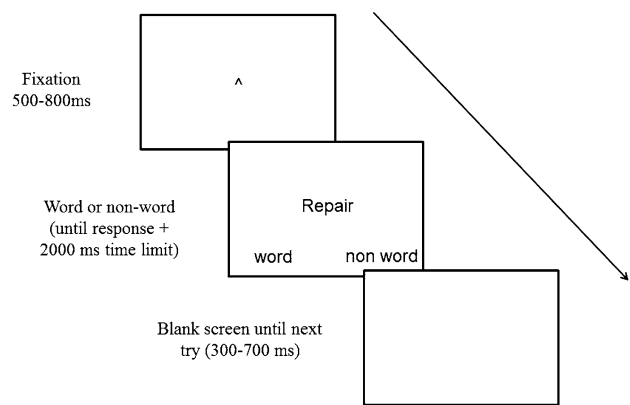


Fig. 2 Example of a trial sequence with a reparation word in Study 2a

Results and discussion

Emotion induction

The ANOVA (guilt vs. shame vs. control) on guilt level was significant, $F(2, 64) = 19.29$, $p < .001$, $\eta_p^2 = 0.37$. Contrast analyses revealed that guilty participants ($M = 3.70$, $SD = 2.08$) reported more guilt than control participants ($M = 0.29$, $SD = 0.56$), $F(1, 64) = 35.9$, $p < .001$, $\eta_p^2 = 0.35$, and showed a trend with shame participants ($M = 2.87$, $SD = 2.40$), $F(1, 64) = 2.40$, $p = .075$, $\eta_p^2 = 0.05$.

The same ANOVA conducted on shame was significant, $F(2, 64) = 11.56$, $p < .001$, $\eta_p^2 = 0.27$. Shame participants reported more shame ($M = 3.43$, $SD = 2.6$) than control ($M = 0.48$, $SD = 0.93$) participants, $F(1, 64) = 21.9$, $p < .001$, $\eta_p^2 = 0.25$. A trend was found with guilt participants ($M = 2.61$, $SD = 2.27$), $F(1, 64) = 2.09$, $p = .085$, $\eta_p^2 = 0.04$.

Responses latency

Incorrect responses for real words (4.0%) as well as RTs below 250 ms and > 3 SDs (0.58%) were excluded. RTs were inverse-transformed (Ratcliff 1993) and submitted to a 3 (emotion) \times 4 (word type) ANOVA, the last factor being within participants. The analysis revealed only a main effect of word type indicating that “emotional” words (escape- and reparation-oriented words, i.e., related to the behavioral tendencies of shame and guilt) were detected more rapidly ($M = 689$ ms, $SD = 154$) than “control” words ($M = 809$ ms, $SD = 190$), $F(3, 192) = 65.7$, $p < .001$, $\eta_p^2 = 0.50$. No other effect approached significance. Thus, the results of Study 2a provide no evidence of the impact of guilt on the accessibility of reparation means. In order to provide another test of this hypothesis, we conducted

another study with another (more efficient) measure of accessibility and with a larger sample of participants.

Study 2b: accessibility (gradual demasking)

Although widely used, the LDT is sometimes considered as being influenced by morphological and semantic characteristics of the words (Balota et al. 2004). Thus, we decided to test accessibility effects with another task: a progressive demasking task (e.g., Alexopoulos et al. 2012). Progressive demasking is argued to be a good measure of verbal processing since it requires the complete identification of words and slows down word recognition, making this task responsive to early stages of visual word recognition (Ferrand et al. 2011).

Methods

Participants

Eighty-five students at a French University (61 women, $M_{age}=18.77$, $SD=1.55$) participated on a voluntary basis. Two participants were excluded because they were not fluent in French. The 83 remaining participants were run individually and randomly assigned to one of three emotion conditions: guilt versus shame versus control.

Procedure

As in the preceding studies, this experiment was presented as two separate studies. Participants first wrote a description of a personal experience of guilt, shame, or of a typical weekday. Participants were then seated in front a computer screen (17", 70 Hz) with the instructions to identify as fast as possible the words that would appear on the screen. Computer programming was performed so that the target word was slowly shading from white to black, rendering it progressively visible in the middle of the screen. Participants were asked to press the space bar as soon as they recognized the target word. They had to type the word in order to check actual correctness of the word. Participants first completed five practice trials. Then, the same 56 words as in Studies 1 and 2a (i.e., reparatory words, escape words and control words for both reparation and escape) were presented in randomized order. RTs and answers were measured. Participants were finally thanked and debriefed.

Results and discussion

Emotion induction

The ANOVA (guilt vs. shame vs. control) on guilt level was significant, $F(2, 80)=26.7$, $p<.001$, $\eta_p^2=0.40$. Guilt

participants ($M=4.18$, $SD=1.94$) reported more guilt than control ($M=0.70$, $SD=0.95$), $F(1, 80)=53.11$, $p<.001$, $\eta_p^2=0.39$, and shame participants ($M=2.20$, $SD=2.11$), $F(1, 80)=17.8$, $p<.001$, $\eta_p^2=0.18$.

The same ANOVA conducted on shame level yielded a significant effect, $F(2, 80)=25.2$, $p<.001$, $\eta_p^2=0.39$.

Shame participants ($M=3.17$, $SD=2.45$) report more shame than control participants ($M=0.22$, $SD=0.64$), $F(1, 80)=33.41$, $p<.001$, $\eta_p^2=0.29$, but did not differ from guilt participants ($M=3.59$, $SD=2.08$), $F<1$.

Responses latency

Incorrect responses (1.9%) and responses below 250 ms or >3 SDs (0.9%) were excluded from analyses. RTs were submitted to a 3 (emotion) \times 4 (type of words) ANOVA with the last factor manipulated within participants. As for study 2a, results showed only a main effect for word type: participants were faster to detect words related to reparation and escape ($M=2495$ ms, $SD=330$) than control words altogether ($M=2544$ ms, $SD=298$), $F(3, 240)=3.08$, $p=.03$, $\eta_p^2=0.06$. No other effect was found, $F_s<0.08$.

Meta-analysis on accessibility processes

Results of Studies 2a and, 2b tend to show that guilt is not accompanied by an increase in accessibility of reparation-oriented words. To strengthen our confidence in this conclusion, we conducted a small-scale meta-analysis (Cumming 2012) on the results on reparation words. For comparison purpose, a DV was created for the two experiments consisting in a "Reparation Accessibility index" ($RT_{reparation-control\ words} - RT_{reparation\ word}$). The higher this score, the faster the participants were to detect reparation compared to control words. Due to our main objective to fathom guilt's processes, we decided to compare guilt participants directly to control participants. ESCI[®] software (Cumming 2012) was used to compute the meta-analysis. The average effect was estimated with a random-effect model (Cumming 2012). Results confirmed the absence of change in accessibility of reparation following the induction of guilt in our studies ($M_{reparationbias}=-13.6$, 95% CI $[-66.2, 38.9]$).⁵

⁵ We should note that a third experiment was carried out on accessibility, using another progressive demasking paradigm ("PDM", Feustel et al. 1983, see also; Ferrand et al. 2011). Like in Studies 2a and 2b, no interaction was found between emotion and word type, $F=0.56$. It is also worth noticing that including this study in the small scale meta-analysis does not modify the results.

Study 3: implicit motivation

The results of Studies 1–2 suggest that guilt could lead people to pay more attention to reparation cues without necessarily increasing the accessibility of reparation means. We finally tested whether guilt could promote reparatory behavior by making it more desirable. Research has indeed brought evidence that the activation of a goal can lead to more positivity toward goal-relevant stimuli (Ferguson 2008; Moore et al. 2011). This “goal-driven implicit affect” (Moore et al. 2011, p. 455) could be an underlying process explaining goal pursuit. According to a motivational approach of guilt oriented toward reparation, we can hypothesize that the link between guilt and reparation could involve increased positivity toward reparation-relevant stimuli. This last experiment was designed to test this possibility.

Methods

Participants

Forty-three undergraduates at a French University (37 women, $M_{\text{age}}=19.97$; $SD=2.05$) participated in this study in exchange for course credits or on a voluntary basis. Three participants were excluded because they were not fluent in French ($n=1$) or because they did not follow the instructions for the emotion recall ($n=2$). One additional participant was removed because the emotional recall was not related to guilt as evaluated by two independent judges. The remaining 39 participants were randomly assigned to one of two conditions: guilt versus control.

Procedure

The emotion recall procedure was the same as in the preceding studies except that only two conditions were included. After the emotion induction, participants were seated in front of a computer screen (15", 50 Hz) for the alleged second study. Participants were asked to determine as fast and as accurately as possible whether words appearing on the screen were positive or negative (Ferguson 2008). They learned that the target words would be preceded by another word that they would have to ignore. The sequence was as follows: A fixation point (500–800 ms random duration) appeared at the center of the screen. It was then replaced by a prime word for 150 ms and then by a target word. The target word was either positive (e.g., “happiness”) or negative (e.g., “war”). Primes were reparation-oriented (50%) and control words (50%) matched in length, frequency and valence. Participants had to press either F or H on an AZERTY keyboard to classify the target as either

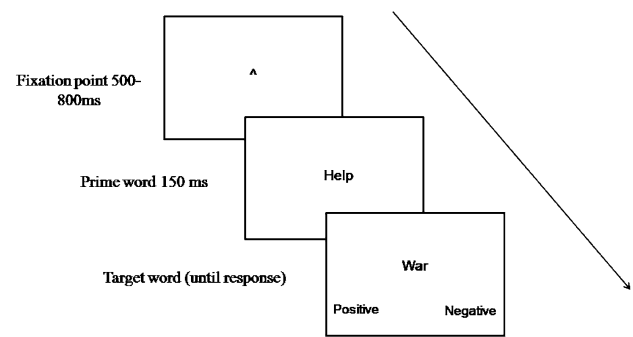


Fig. 3 Example of trial sequence in Study 3 with reparation cue followed by a negative word

positive or negative (see Fig. 3). Letters correspondence was counterbalanced across participants. After 10 practice trials, participants completed 112 trials. Each prime appeared twice in randomized order, half of the times followed by a positive and by a negative word for the other half. Response latencies and accuracy were measured. The participants were finally thanked and debriefed.

Results and discussion

Emotion induction

Guilt participants ($M=2.85$, $SD=2.03$) reported more guilt than control participants ($M=0.78$, $SD=1.43$), $F(1, 37)=13.23$, $p<.001$, $\eta_p^2=0.26$.

Implicit positivity

Incorrect responses were excluded (2.7%) as well as RTs below 250 ms and >3 SDs (3.4%). Inverse RTs were submitted to a 2 (emotion) \times 4 (word type) with the last factor being within participants. Results show a tendency for the global interaction, $F(3,111)=2.57$, $p=.07$, $\eta_p^2=0.04$ and a main effect for word type, $F(3,111)=4.72$, $p=.03$, $\eta_p^2=0.11$. A measure of positivity toward reparation was computed by first subtracting the RTs to positive targets from the RTs to negative targets following reparation-words cues, and then by subtracting the score for neutral primes from the score for reparation primes (Ferguson 2008). The higher the score, the more implicit positivity a participant shows toward reparation.

Guilt participants presented higher positive attitudes toward reparation ($M=60.55$, $SD=80.66$) than control participants ($M=2.05$, $SD=95.64$), $M_{\text{diff}}=58.5$, 95% CI (1.21, 115.79), $F(1, 37)=4.28$, $p=.046$, $\eta_p^2=0.10$. Moreover guilt participants presented higher bias toward

Table 2 Mean correct response times in ms (untransformed) for the types of cue words as a function of emotion and target positivity (Study 3)

Group	Cue word	
	Reparation	Control
Guilt		
Positive targets	649.8	679.8
Negative targets	705.7	675.1
Implicit positivity bias	55.9	-4.7
Overall reparation positivity bias	60.6	
Control		
Positive targets	636.2	656.5
Negative targets	671.9	690.2
Implicit positivity bias	35.7	33.7
Overall reparation positivity bias	2.0	

reparation words ($M=55.9$, $SD=71.3$) than toward control words ($M=-4.6$, $SD=93.3$), $t(19)=3.35$, $p<.01$, $\eta_p^2=0.10$. No difference was found for control participants, $t=0.27$. As hypothesized, guilt led participants to have a more positive attitude toward reparation-oriented stimuli (Table 2).

General discussion

The results of the studies presented in this article provide insights about the processes underlying the impact of guilt on reparatory behavior. First, guilt appears to increase attention toward reparatory stimuli (Study 1). More precisely, guilt, like shame, fostered greater attention toward positive words (i.e., control words for reparation) compared with control participants. However, guilt *specifically* promotes attention toward reparatory means, as the increase in attention toward words related to reparation was not observed among shame and control participants. These results suggest that although guilt and shame, as general negative emotions, broadly increase attention toward positivity (probably in order to help coping with these emotional states, e.g., Gendolla 2000; see also, Zillmann 1988), only guilt orients attention toward reparation.

We also observed that guilt led to more positive implicit attitudes toward reparation-oriented cues (Study 3). Along with greater attention toward reparation, this positivity bias is consistent with the “feeling-is-for-doing” approach (Zeelenberg and Pieters 2006) of guilt. If guilt leads people to pay more attention to reparatory means and makes reparation-related actions more positive, it should facilitate this behavior. It is also worth noticing that, compared with Study 1, guilt increased positivity only toward reparation.

This could mean that although guilt can broadly increase attention toward positive cues, taken as global possibilities to cope with guilty feelings, reparation cues would be treated in a specific way because they are perceived more positively. In this view, the specificity of guilt, compared with other emotions like shame, would rely both on general attention bias and specific positivity attached to reparation.

It is noteworthy that such motivation toward reparation could partially explain some of the paradoxical effects of guilt, especially in the field of persuasion where guilt appeals sometimes lead to reactance (e.g., Coulter et al. 1997; Graton et al. 2016). Insisting on reparation necessity (e.g., with strong persuasive messages) with guilty persons (i.e., already experiencing a motivation to repair), could actually elicit in them feelings of coercion and limitation of choices and make them express reactance (Brehm 1966).

Of importance, we failed to find evidence for the implication of accessibility. This suggests that both attention and implicit positivity could be involved without higher accessibility of reparation-oriented words, at least at early stages. Although intriguing at first sight, these results echo past studies showing that attention biases toward threat cues are not due to facilitated accessibility of threat information but rather to high processing priorities of threat-related options (Mathews and MacLeod 1994).

As a side note, we should mention that contrary to our hypotheses, we found no clear effect of shame on escape words whereas this emotion is associated with a desire to hide and to escape (Wicker et al. 1983). It is therefore possible that different mechanisms mediate the relation between shame and escape behaviors. Another possibility is that shame’s related behavior is not necessarily to escape. Recent findings showed that shame could also promote prosocial behaviors (De Hooge et al. 2008; Leach and Cidam 2015), for instance when shame induction was relevant for the decision at hand (endogenous shame). It is thus possible that the motivational implications of shame are more context-dependent than for other emotions such as guilt.

However, we must point that the results on the manipulation checks of shame induction were ambiguous, at least in two out of four studies. We observed that participants in the shame condition differed clearly from the control condition in their feelings of shame, suggesting that the shame induction was effective. However, what is more surprising is that they did not differ in the feelings of shame from participants in the guilt condition. This could be explained by the difficulties people usually have to clearly distinguish guilt from shame as emotions (Tangney et al. 1996). We do not believe that this is the case. To prevent from such a possibility, the participants were indeed provided with a brief description of the emotion before they report an autobiographical event

in which they had experienced this emotion. Moreover, the results of Study 1 suggest that the attention pattern observed for guilty and ashamed people is different. It seems more likely that participants have difficulties to distinguish between guilt and shame feelings (Tangney and Dearing 2002) or that feeling guilty implies to experience some kind of shame. This would suggest that guilt is more specific than shame in the feelings it induces. However, these theoretical proposals are speculative and in need for further research.

Finally, we should note that our research may have several other limitations. First, we directly addressed the impact of guilt on processes that could underlie the impact of this emotion on behavior. Even though the results are interesting in themselves, it will be necessary for future research to test the mediating role of these processes in studies in which reparation behaviors are effectively measured. Another question that should be addressed in future studies is whether these effects take place sequentially (and if it were the case whose effects occur primarily? With which consequences on the second one?), or contribute simultaneously to the occurrence of reparation. We should also note that in order to replicate our findings, further research might use other techniques to assess attention and motivation biases (e.g., eye-tracking). Lastly, the “feeling is for doing” approach is not restricted to moral emotions like shame and guilt and studies in the future could explore the processes underlying the emotion–action association for other emotions.

Compliance with ethical standards

Conflict of interest Aurélien Graton declares that he has no conflict of interest. François Ric declares that he has no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

References

- Aarts, H., Dijksterhuis, A., & de Vries, P. (2001). On the psychology of drinking: Being thirsty and perceptually ready. *British Journal of Psychology*, *92*, 631–642.
- Alexopoulos, T., Fiedler, K., & Freytag, P. (2012). The impact of open and closed mindsets on evaluative priming. *Cognition & Emotion*, *26*, 978–994.
- Alexopoulos, T., Muller, D., Ric, F., & Marendaz, C. (2012). I, me, mine: Automatic attentional capture by self-related stimuli. *European Journal of Social Psychology*, *42*, 770–779.
- Asmundson, G. J. G., Carleton, R. N., & Ekong, J. (2005). Dot-probe evaluation of selective attentional processing of pain cues in patients with chronic headaches. *Pain*, *114*(1–2), 250–256.
- Ausubel, D. P. (1955). Relationships between shame and guilt in the socializing process. *Psychological review*, *62*, 378.
- Balota, D. A., Cortese, M. J., Sergent-Marshall, S. D., Spieler, D. H., & Yap, M. (2004). Visual word recognition of single-syllable words. *Journal of Experimental Psychology: General*, *133*, 283–316.
- Bargh, J. A. (1999). The cognitive monster. In S. Chaiken & Y. Trope (Eds.), *Dual process theories in social psychology* (pp. 361–382). New York: Guilford Press.
- Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A., Barndollar, K., & Trötschel, R. (2001). The automated will: Nonconscious activation and pursuit of behavioral goals. *Journal of Personality and Social Psychology*, *81*, 1014–1027.
- Baumeister, R. F., Stillwell, A. M., & Heatherton, T. F. (1994). Guilt as interpersonal phenomenon. *Psychological Bulletin*, *115*, 243–267.
- Brehm, J. W. (1966). *Theory of psychological reactance*. San Diego, CA: Academic Press.
- Carlsmith, J. M., & Gross, A. E. (1969). Some effects of guilt on compliance. *Journal of Personality and Social Psychology*, *11*, 232–239.
- Cotte, J., Coulter, R. A., & Moore, M. (2005). Enhancing or disrupting guilt: The role of ad credibility and perceived manipulative intent. *Journal of Business Research*, *58*, 361–368.
- Coulter, R. H., Cotte, J., & Moore, M. L. (1997). Guilt appeals in advertising: Are you feeling guilty? In D. T. LeClair & M. Hartline (Eds.), *AMA winter educators' conference: Marketing theory and applications* (pp. 109–115). Chicago: American Marketing Association.
- Cryder, E. C., Springer, S., & Morewedge, C. K. (2012). Guilty feelings, targeted actions. *Personality and Social Psychology Bulletin*, *38*, 607–618.
- Cumming, G. (2012). *Understanding the new statistics*. New York, NY: Routledge/Taylor & Francis.
- De Hooge, I. E., Breugelmans, S. M., & Zeelenberg, M. (2008). Not so ugly after all: When shame acts as a commitment device. *Journal of Personality and Social Psychology*, *95*, 933.
- De Hooge, I. E., Nelissen, R.M.A., Breugelmans, S. M., & Zeelenberg, M. (2011). What is moral about guilt? Acting “prosocially” at the disadvantage of others. *Journal of Personality and Social Psychology*, *100*, 462–473.
- De Hooge, I. E., Zeelenberg, M., & Breugelmans, S. M. (2007). Moral sentiments and cooperation: Differential influences of shame and guilt. *Cognition and Emotion*, *21*, 1025–1042.
- DeSteno, D., Petty, R. E., Rucker, D. D., Wegener, D. T., & Braverman, J. (2004). Discrete emotions and persuasion: The role of emotion-induced expectancies. *Journal of Personality and Social Psychology*, *86*, 43–56.
- Ferguson, M. J. (2008). On becoming ready to pursue a goal you don't know you have: Effects of nonconscious goals on evaluative readiness. *Journal of Personality and Social Psychology*, *95*, 1268–1294.
- Ferguson, M. J., & Bargh, J. A. (2004). Liking is for doing: The effects of goal pursuit on automatic evaluation. *Journal of Personality and Social Psychology*, *87*, 557–572.
- Ferrand, L., Brysbaert, M., Keuleers, E., New, B., Bonin, P., Meot, A., & Pallier, C. (2011). Comparing word processing times in naming, lexical decision, and progressive demasking: Evidence from chronolex. *Frontiers in Psychology*, *42*, 488–496.

- Feustel, T. C., Shiffrin, R. M., & Salasoo, A. (1983). Episodic and lexical contributions to the repetition effect in word identification. *Journal of Experimental Psychology: General*, *112*, 309–346.
- Gendolla, G. (2000). On the impact of mood on behavior: An integrative theory and a review. *Review of General Psychology*, *4*, 378–408.
- Graton, A., Ric, F., & Gonzalez, E. (2016). Reparation or reactance? The influence of guilt on reaction to persuasive communication. *Journal of Experimental Social Psychology*, *62*, 40–49.
- Keltner, D., & Haidt, J. (1999). Social functions of emotions at four levels of analysis. *Cognition & Emotion*, *13*, 505–521.
- Ketelaar, T., & Au, W. T. (2003). The effects of feelings of guilt on the behaviour of uncooperative individuals in repeated social bargaining games: An affect-as-information interpretation of the role of emotion in social interaction. *Cognition and Emotion*, *17*, 429–453.
- Leach, C. W., & Cidam, A. (2015). When is shame linked to constructive approach orientation? A meta-analysis. *Journal of Personality and Social Psychology*, *109*, 983.
- Lewis, H. B. (1971). *Shame and guilt in neurosis*. New York: International Universities Press.
- MacLeod, C., Mathews, A. M., & Tata, P. (1986). Attentional bias in emotional disorders. *Journal of Abnormal Psychology*, *95*, 15–20.
- Manstead, A. S. R., Tetlock, P. E., & Manstead, T. (1989). Cognitive appraisals and emotional experience: Further evidence. *Cognition and Emotion*, *3*, 225–239.
- Mathews, A., & MacLeod, C. (1994). Cognitive approaches to emotion and emotional disorders. *Annual Review of Psychology*, *45*, 25–50.
- McCullough, M. E., Worthington, E. L. Jr., & Rachal, K. C. (1997). Interpersonal forgiving in close relationships. *Journal of Personality and Social Psychology*, *73*, 321–336.
- Mogg, K., & Bradley, B. P. (1999). Orienting of attention to threatening facial expressions presented under conditions of restricted awareness. *Cognition & Emotion*, *13*, 713–740.
- Moore, S. G., Ferguson, M. J., & Chartrand, T. L. (2011). Affect in the aftermath: How goal pursuit influences implicit evaluations. *Cognition & Emotion*, *25*, 453–465.
- Nabi, R. L. (2002). Discrete emotions and persuasion. In J. Dillard & M. Pfau (Eds.), *Handbook of persuasion* (pp. 289–308). Thousand Oaks, CA: Sage.
- Nelissen, R. M. A., Dijker, A. J. M., & deVries, N. K. (2007). How to turn a hawk into a dove and vice versa: Interactions between emotions and goals in a give-some dilemma game. *Journal of Experimental Social Psychology*, *43*, 280–286.
- Niedenthal, P. M., Halberstadt, J. B., & Innes-Ker, A. H. (1999). Emotional response categorization. *Psychological Review*, *106*, 337.
- Oatley, K., & Johnson-Laird, P. N. (1987). Towards a cognitive theory of emotions. *Cognition and Emotion*, *1*, 29–50.
- Ratcliff, R. (1993). Methods for dealing with reaction time outliers. *Psychological Bulletin*, *114*, 510–532.
- Roseman, I. J., Wiest, C., & Swartz, T. S. (1994). Phenomenology, behaviors, and goals differentiate discrete emotions. *Journal of Personality and Social Psychology*, *67*, 206–221.
- Rubenstein, H., Lewis, S., & Rubenstein, M. (1971). Evidence for phonemic recoding in visual word recognition. *Journal of Verbal Learning & Verbal Behavior*, *10*, 645–657.
- Schmader, T., & Lickel, B. (2006). The approach and avoidance function of guilt and shame emotions: Comparing reactions to self-caused and other-caused wrongdoing. *Motivation and Emotion*, *30*, 43–56.
- Simmons, J. P., Nelson, L. D., & Simonsohn, U. (2011). False-positive psychology: Undisclosed flexibility in data collection and analysis allows presenting anything as significant. *Psychological science*, *22*, 1359–1366.
- Strack, F., Schwarz, N., & Geschneidinger, E. (1985). Happiness and reminiscing: The role of time perspective, affect, and mode of thinking. *Journal of Personality and Social Psychology*, *49*, 1460–1469.
- Stuewig, J., Tangney, J. P., Heigel, C., & Harty, L. (2008). Shaming, blaming, and maiming: Links among the moral emotions and aggression. In J. Stuewig (Ed.), *Inside the criminal mind: Findings from the GMU Inmate Study*. Boston, MA: Symposium conducted at the annual convention of the American Psychological Association.
- Tamir, M., & Robinson, M. D. (2007). The happy spotlight: Positive mood and selective attention to rewarding information. *Personality and Social Psychology Bulletin*, *33*, 1124–1136.
- Tangney, J. P., & Dearing, R. (2002). *Shame and Guilt*. New York: Guilford.
- Tangney, J. P., Miller, R., Flicker, L., & Barlow, D. (1996). Are shame, guilt, and embarrassment distinct emotions? *Journal of Personality and Social Psychology*, *70*, 1256–1269.
- Tooby, J., & Cosmides, L. (1990). The past explains the present: Emotional adaptations and the structure of ancestral environments. *Ethology and Sociobiology*, *11*, 375–424.
- Wicker, F. W., Payne, G. C., & Morgan, R. D. (1983). Participant descriptions of guilt and shame. *Motivation and Emotion*, *7*, 25–39.
- Zeelenberg, M., Nelissen, R. M., Breugelmans, S. M., & Pieters, R. (2008). On emotion specificity in decision making: Why feeling is for doing. *Judgment and Decision Making*, *3*, 18–27.
- Zeelenberg, M., & Pieters, R. (2006). Feeling is for doing: A pragmatic approach to the study of emotions in economic behavior. In D. DeCremer, M. Zeelenberg & J. K. Murnighan (Eds.), *Social psychology and economics* (pp. 117–137). Mahwah, NJ: Erlbaum.
- Zillmann, D. (1988). Mood management: Using entertainment to full advantages. In L. Donohew & H. E. Sypher (Eds.), *Communication, social cognition, and affect* (pp. 147–171). Hillsdale, NJ: Erlbaum.