

Guilty conscience: motivating pro-environmental behavior by inducing negative moral emotions

Jonas H. Rees · Sabine Klug · Sebastian Bamberg

Received: 15 January 2014 / Accepted: 2 October 2014
© Springer Science+Business Media Dordrecht 2014

Abstract Conceptual frameworks in the realm of climate-related policy, attitudes and behavior frequently argue that moral emotions play a crucial role in mobilizing pro-environmental action. Yet, little is known about the direct impact of moral emotions on environmental attitudes and behavior. Drawing on emotion research in the context of intergroup relations, the current paper investigates the role of guilty conscience (guilt and shame) as well as other emotions (anger, sadness, pride, and emotional coldness) in motivating pro-environmental behavior intentions and actual behavior as a specific form of reparative action. When confronted with human-caused (vs. seemingly natural) environmental damages, participants ($N=114$) reported significantly more guilty conscience. Importantly, participants in the human-caused condition were significantly more likely to spontaneously display actual pro-environmental behavior (sign a petition addressing environmental issues). Highlighting its psychological significance in motivating pro-environmental behavior, a guilty conscience mediated the experimental manipulation's effect on behavioral intentions as well as on actual behavior. We conclude by discussing the potential of moral emotions in developing timely and sustainable climate policies and interventions.

1 Introduction

Atmospheric pollution by greenhouse gas emissions, consumption of fossil energy, and mountains of plastic waste – by now, these can be considered well-established environmental damages resulting directly from human activities and not only posing a threat to nature and the livelihood of animals and plants, but, ultimately, to humanity itself (e.g., The National Academies of Science 2008). Campaigns to improve environmentally friendly behaviors have focused on persuasive messages aimed at increasing citizens' knowledge regarding climatic

This article is part of a special issue on “Multidisciplinary perspectives on climate ethics” with guest editors Marco Grasso and Ezra M. Markowitz

Electronic supplementary material The online version of this article (doi:10.1007/s10584-014-1278-x) contains supplementary material, which is available to authorized users.

J. H. Rees (✉) · S. Klug

Department of Psychology, Bielefeld University, P.O. Box 100131, 33501 Bielefeld, Germany
e-mail: jonas.rees@uni-bielefeld.de

J. H. Rees · S. Bamberg

Department of Social Sciences, Bielefeld University of Applied Sciences, Bielefeld, Germany

change. Empirical evidence demonstrates that some interventions such as social marketing campaigns can, in fact, help decrease some of humans' destructive behaviors (e.g., Sustrans, 2009). However, these behavioral effects are usually of a small magnitude and tend to decay over time (e.g., Abrahamse et al. 2005; Möser and Bamberg 2008). One reason for this decay might be that purely information-based campaigns, while addressing participants' cognitive awareness, fail to address another important driver of human behavior. The current study was designed to investigate what has been shown to be a powerful motivator of pro-social behavior in other areas of research: negative self-focused moral emotions or a *guilty conscience*.

In this paper we propose a simple yet theory-based way of motivating pro-environmental behavior: eliciting negative self-focused moral emotions (see Giner-Sorolla 2013) without dictating to individuals how they *should* behave. By its very nature, this guilty conscience should lead to pro-environmental attitudes – and even actual pro-environmental behavior.

1.1 Moral emotions and climatic change

There is a long tradition of theorizing moral emotions as one of the core factors influencing human behavior (Schwartz 1977). The basic premise is usually that negative self-focused emotions such as guilt (and, more recently, shame; e.g., Allpress et al. 2014; Gausel et al. 2012) lead to reparative behavior to make up for a harm that has been inflicted on others and that one feels at least partly responsible for (e.g., Lewis 1971; Tangney and Dearing 2002). However, it has been shown that perceived personal responsibility for environmental damages is usually low (Böhm 2003) and obviously, in this case, not other individuals are harmed but an abstract entity such as nature (Tam et al. 2013). Consequently, the question remains if individuals, when confronted with climatic change, feel guilty at all. Only fairly recently, psychological research has set out to explore the role of moral emotions in the context of climatic change and environmental behavior (Ferguson and Branscombe 2010; Harth et al. 2013). Mallett (2012), for example, defined *eco-guilt* as “guilt that arises when people think about times they have not met personal or societal standards for environmental behavior” (p. 223). Eco-guilt has subsequently been linked with environmentally friendly behavior intentions (Mallett 2012, Study 1), support for a pro-environmental group (Mallett et al. 2013), and even actual behavior (choosing to wear a button displaying an environmentally friendly message over other buttons, Mallett 2012, Study 2; see also Harrison and Mallett 2013).

Interestingly, research in the context of moral emotions and climatic change has almost exclusively focused on guilt so far. We believe this focus is due to a classic conceptualization of guilt as the more “pro-social” emotion than shame. However, recent work has demonstrated that shame as well as guilt can lead to reparative behavioral intentions and actual behavior in the context of intergroup relations. Building on this emerging body of research, we argue that both guilt and shame may have similar correlates in the context of climatic change.

1.2 Group-based guilt and shame in intergroup relations

In social psychology, *group-based emotions* are conceptualized as emotions that are experienced because of one's mere association with a group, for example one's nationality (Doosje et al. 1998; Johns et al. 2005; Rees et al. 2013). Generally, Smith (1993) theorized that whenever “group membership is salient, the group functions as a part of the self, and therefore [...] situations appraised as self-relevant trigger emotions just as they always do” (p. 303). Hence, it is still an individual experiencing the emotion (e.g., group-based pride because the local football team has won a match, or group-based shame because one's nation has been linked with war crimes). However, the individual experiences this emotion *as a member of a*

specific group and this group-based emotion will differ from the corresponding individual-level emotion. After all, there would be no reason to be proud because one has only been cheering for the football team from the stands or the couch; and there would be no reason to feel ashamed because one was not personally involved in the war crimes (Smith et al. 2007). Even though the emotions may differ with regard to the context in which they are experienced – as a member of a group versus as an individual –, much research has conceptualized the respective emotions (e.g., individual-level shame and group-based shame) as functioning in a similar fashion. Research on group-based emotions in intergroup relations suggests more sophisticated hypotheses regarding the differences or, as we shall see, similarities between guilt and shame and their respective links with reparative intentions and behavior.

Research in this area has traditionally conceptualized group-based guilt as negative emotion resulting from a focus on a certain behavior and how this behavior has affected or harmed others. Group-based shame, on the other hand, has traditionally been understood as an emotion that is caused by a perception of global defectiveness that is reflected in the behavior (Gausel and Leach 2011; see also Harth et al. 2008). Allpress et al. (2010) summarize the traditional view of guilt and shame: “guilt arises because one has behaved badly, whereas shame arises because one is a bad person” (p. 77). Guilt has consequently been linked with pro-social behaviors and shame with anti-social behaviors. In other words, when one has behaved badly, one can apologize or repair the damage done. But if one is a bad person, the only possible ways of avoiding the negative emotion would be to hide or avoid the issue according to the traditional conceptualization.

This traditional view, however, has been challenged by ambiguous findings (Allpress et al. 2010; Brown et al. 2008; Brown and Čehajić 2008; Iyer et al. 2007) and recent theoretical work (Allpress et al. 2014; Gausel and Leach 2011). Gausel et al. (2012) suggest that these ambiguities in the literature on group-based guilt and especially shame might be due to a lack of methodological clarity: In past research, measures of shame have frequently confounded feelings of shame with other feelings (e.g. rejection) and appraisals (e.g. being condemned by others). According to Gausel and colleagues, what has been conceptualized as the anti-social side of shame are in fact a concern for condemnation and felt rejection; “pure” shame, on the other hand, should have the potential of leading to pro-social reactions (see also Allpress et al. 2014).

What can be learned from this brief excursion into the area of intergroup relations? Even though there is an extensive body of research on group-based guilt and shame, there is also disagreement with regard to the precise conceptualization and pro-social potential of these emotions. Following the more recent conceptualizations of guilt and shame (e.g., Allpress et al. 2014; Gausel 2012; Rees et al. 2013), we argue that both emotions should have similarly pro-social, reparative correlates. While it may be useful to tease these emotions apart under certain conditions, they may even form a more general construct of a “guilty conscience” under other conditions (see Rees and Bamberg 2014).¹ Following this logic, we predicted that in the context of climatic change, pro-environmental behavior can be understood as a specific type of reparative behavior, where it is not another group that has been harmed, but the natural environment – and, as such, this pro-environmental behavior may be motivated by a guilty conscience. Moreover, because everybody contributes to the problem of climate change via their carbon footprint, it is difficult or impossible to identify particular “perpetrators” in this context. Apart from a methodological argument (i.e. measuring “pure” shame), this was a theoretical argument for us to expect shame to have

¹ As our predictions for both emotions were very similar, we deliberately refrain from an approach treating guilt and shame as discrete emotions in the current study. We will, however, report results for guilt and shame separately where appropriate.

similarly positive correlates in our study: feelings or appraisals leading to negative reactions in a context of intergroup conflict should be negligible or absent in the context of climate change. As everybody is at least partly responsible for the problem, who would reject or condemn someone else for climate change?

1.3 Group-based guilt and shame in environmental psychology

Recent studies have, in fact, applied the concept of group-based emotions in the context of climatic change. When confronted with their national greenhouse gas emissions, for example, American participants felt more group-based guilt when they believed that global warming is caused by humans and they were consequently more supportive of pro-environmental policies (Ferguson and Branscombe 2010). In two scenario studies, Harth et al. (2013) found that group-based guilt for their nation's contribution to environmental pollution predicted Germans' intention to repair the damage (see also Mallett et al. 2013). Finally, elsewhere, we have recently shown that a group-based guilty conscience (guilt and shame) for environmental damages predicted individuals' intention to participate in a neighborhood-based climate protection initiative (Rees and Bamberg 2014).

Overall, previous research suggests that negative moral emotions may have the potential to motivate pro-environmental behavior (Böhm 2003; Mallett 2012; Onwezen et al. 2013; Rees and Bamberg 2014). However, at the same time, these emotions bear the risk of aversive reactions – they are negative emotions, after all. Shame, when co-occurring with a feeling of inferiority, has been linked with anti-social reactions such as withdrawal or denial of the issue (e.g. Tangney et al. 1996). Similarly, Täuber and Van Zomeren 2013; Täuber et al. this issue) have argued that threats to the moral status of one's group when communicating climate issues can backfire by leading to defensive avoidance of the topic. We argue, however, that these undesirable reactions can be circumvented if negative self-focused moral emotions are triggered without telling individuals what they *should* do in response (i.e. without directly implying a moral imperative or threat). Research has shown that emotions are strongly linked with certain patterns of behavioral tendencies; given the right circumstances, these are often shown “by default”. For guilt, this behavioral tendency is to repair the harm done (e.g., Frijda 1986; Frijda et al. 1989). More recently, there have also been strong theoretical arguments and empirical data documenting the positive potential of shame if measured without confounds (Allpress et al. 2014; Deonna et al. 2011; Gausel et al. 2012). We thus expected both emotions to form one more general “guilty conscience” construct, which would motivate pro-environmental behavior when individuals are confronted with climatic change.

1.4 Connectedness to nature and pro-environmental behavior

According to Mayer and Frantz (2004), individuals tend to differ with regard to the extent they feel emotionally connected to the natural world. A feeling of connectedness to nature has consequently been linked to pro-environmental constructs such as self-reported environmentalism and ecological behaviors (Gosling and Williams 2010; Mayer and Frantz 2004). In order to control for this general emotional connectedness with nature that can be considered a well-established predictor of environmental attitudes and behavior, we decided to include it as a control variable in the current study. As we also speculated that higher emotional connectedness to nature might lead to stronger reactions to being

confronted with environmental damages, we included this measure to test for moderation of our manipulation's effects.

2 The current research

2.1 Overview

We conducted a study to experimentally test the effectiveness of moral emotions in motivating pro-environmental behavioral intentions and actual behavior. Research in the area of moral emotions and environmental behavior has been primarily correlational and focused on behavioral intentions, rather than actual behavior. We thus planned an experimental design to test the assumption that confronting people with human-caused vs. seemingly natural environmental damages results in a guilty conscience motivating environmentally friendly behavioral intentions – and actions. To further clarify the roles and interrelation of guilt and shame in the context of environmental behavior, we measured both, along with other emotions (sadness, anger, pride, and emotional coldness). Finally, we also included a feeling of connectedness to nature as an important control variable.

2.2 Hypotheses

With regard to the ongoing discussion surrounding guilt and shame, a strict a priori division of the two emotions did not seem warranted. If anything, both emotions should be closely related as they both belong to the family of self-focused negative emotions. Also, when measured as “pure” emotion (Gausel and Brown 2012; Gausel and Leach 2011) without confounding any other emotions or appraisals, shame should have similarly positive effects as guilt. We therefore predicted that individuals confronted with environmental damages would react with two separate clusters of emotional reactions, a guilty conscience (guilt and shame), and other emotions (sadness, anger, pride [inversely scored], emotional coldness; Hypothesis 1a), and that the former would be more pronounced when the presented damages are human-caused (vs. seemingly natural occurrences; Hypothesis 1b).

We further predicted that emotions generally would motivate intentions to behave in a pro-environmental way (Hypothesis 2a). However, because of its “default” connection with reparative behavior tendencies, only guilty conscience should be powerful enough to translate into actual behavior. We thus predicted that a guilty conscience would mediate the effect of being confronted with human-caused environmental damages on actual pro-environmental behavior (Hypothesis 2b). In order to control for general emotionality in reaction to our manipulation, we will also include other emotions along with guilty conscience in our analyses and test these as an alternative explanation for the predicted effects.

3 Methods

3.1 Participants

The sample consisted of 114 participants ($M_{\text{age}}=25.52$ years, $SD=6.33$; 64 % male), who were approached on the campus of a medium-sized German university. Participants were informed that the study was about their “attitudes and feelings

regarding nature”, their participation was completely voluntary and they could withdraw from the study at any time without incurring any penalties. As compensation for their time, they received sweets or course credit.

3.2 Procedure

Upon arrival, participants were randomly assigned to either the experimental *human-caused* ($n=59$) or the control *naturally-occurring* condition ($n=55$). They were led individually to the laboratory where they were then seated in front of a computer and told to follow the instructions on the screen. In order to minimize interaction between experimenter and participants, the manipulation was introduced and data were recorded by computer, and the experimenter was blind to experimental condition. After assessing participants’ perceived connectedness to nature as a potential control variable, one of two sets of environmental risks was presented, depending on the experimental condition. Afterwards, participants were asked about their emotions and behavioral intentions in reaction to the presented environmental risks. Finally, demographic variables and participants’ general environmental behavior and interests were assessed.

After completing the study, participants were thanked and given the opportunity of signing an actual petition regarding environmental pollution due to plastic waste and addressing the Committee on Petitions of the European Union (Expedition Med, 2013). Care was taken not to press any participant to sign the petition. It was introduced casually as “something you might want to have a look at while you’re here”, the experimenter left participants alone with the petition and, as she was blind to experimental condition, approached all participants in the same way. Finally, participants were thanked again, debriefed, and dismissed. After they had left, the experimenter recorded if the petition had been signed as behavioral outcome variable. Overall, participation took about 20 minutes. The study was approved by the relevant ethics committee and it was ensured that all the signatures and information that had been supplied by participants for the petition were passed on to the institution responsible for it.

3.3 Control measure

Connectedness to nature was measured as the first variable in order to make sure any potential effects it may have were held constant across conditions. It was assessed using an abbreviated and translated version of the Connectedness to Nature Scale (CNS, Mayer and Frantz 2004). The modified version, which was used in this study, consisted of 10 items (e.g., “I think of the natural world as a family to which I belong”) using a 6-point Likert-type scale ranging from 1=‘strongly disagree’ to 6=‘strongly agree’.

3.4 Manipulation

After completing the CNS, participants read short texts about environmental damages. The texts were identical in both conditions and differed only with regard to the three environmental damages mentioned and their respective associations with moral emotions. The selection of damages was based on a study by Böhm (2003) where participants indicated 14 specific emotions for a list of 20 environmental risks. We chose three risks with very high (air pollution from cars, consumption of fossil energy, pollution from waste dumps and incinerators) and very low (earthquakes,

volcano eruptions, forest fires) mean emotion ratings for guilt for the current study. The text read

“Nowadays media reports about serious environmental damages, some with devastating consequences for humans and nature, reach us more and more frequently: Experts agree that [air pollution from cars, consumption of fossil energy, and pollution from waste dumps and incinerators (human-caused condition) *or* earthquakes, volcano eruptions, and forest fires (naturally-occurring condition)] are some of the most important environmental problems of our time.”

After reading the texts, participants were asked to write down in a few words the thoughts they associated with the environmental damages they had read about. Then, the dependent measures were assessed.

3.5 Dependent measures

3.5.1 *Emotions*

Participants indicated how strongly they experienced each of a list of six emotions (guilt, shame, sadness, anger, pride, and emotional coldness; e.g., “I feel guilt when thinking about the environmental risks I just read about”) in response to the presented risks on 6-point rating scales, ranging from 1=‘strongly disagree’ to 6=‘strongly agree’.

3.5.2 *Behavioral intentions*

Participants then indicated how much they felt inclined to perform each of a list of 11 behaviors based on Böhm and Pfister (2000) and including different action types (e.g., “I would try to help to reduce or limit damage”, “I would participate in a demonstration so that the situation or potential damage gets prevented or corrected”).

3.5.3 *Behavioral measure*

Actual behavior was assessed by recording if participants signed the petition at the end of the session. The full set of items used can be found in the list (Online Resource 1) accompanying this article.

4 Results

4.1 Preliminary analyses

4.1.1 *Structure of emotional reactions*

In a first analytical step, we sought to investigate the underlying structure of emotional reactions to the environmental damages that participants had read about. As will be recalled, we expected guilty conscience (i.e. the moral emotions guilt and shame) and other emotions (sadness, anger, pride, emotional coldness) to form two clusters of emotional reactions. We thus conducted an exploratory factor analysis with maximum likelihood extraction and varimax rotation. As predicted in Hypothesis 1a, inspection of the scree plot indicated a two-factorial solution with guilt and shame items loading substantially ($> .35$) onto the first

factor explaining 35.62 % of variance, and all other emotion items loading onto the second factor ($> .35$) explaining an additional 22.20 % of the items' total variance (see Costello and Osborne 2005). The two items measuring anger and sadness yielded cross-loadings of medium size on both factors. These results thus essentially confirmed the predicted structure of emotional reactions. Guilty conscience was moderately correlated with the cluster of other emotions at $r(112) = .501$, $p < .001$. The full factor analysis results can be found in the supplemental materials (Online Resource 2) for this article.

4.1.2 Computation and quality of measures

Items were re-coded if necessary, so that higher values always represented higher levels of the respective construct. Then all items measuring a given construct were averaged. An overview of the main measures and their inter-correlations can be found in Table 1. As can also be seen in Table 1, the reliabilities of all measures were satisfactory.

4.2 Effects on emotional process variables

All emotion measures were significantly affected by the manipulation. However, as intended (Hypothesis 1b) when probed with an independent samples-*t*-test, the difference was more pronounced for guilty conscience ($M_{\text{human-caused}} = 3.407$, $SD = 1.056$ vs. $M_{\text{naturally-occurring}} = 2.018$, $SD = 1.151$), $t(112) = 6.718$, $p < .001$, Cohen's $d = 1.258$, than for other emotions ($M_{\text{human-caused}} = 4.818$, $SD = 0.801$ vs. $M_{\text{naturally-occurring}} = 4.250$, $SD = 0.981$), $t(112) = 3.394$, $p = .001$, Cohen's $d = 0.634$. In follow-up analyses using linear regression, there was no evidence for moderation via connectedness to nature, but connectedness to nature significantly predicted both guilty conscience ($\beta = .251$, $p = .002$) and other emotions ($\beta = .298$, $p = .001$).

After testing the manipulation's predicted effects on the emotional variables, we considered the effects on our outcome variables. In order to establish the assumed mediating role of the process variables, we used multiple regression analysis and a macro developed by (Hayes 2013; see also Baron and Kenny 1986; MacKinnon et al. 2007).

4.3 Effects on outcome variables

4.3.1 Behavioral intentions

Regarding behavioral intentions, both emotion measures had some predictive power in a linear regression, with guilty conscience being the strongest predictor in the equation, $\beta = .507$, $p < .01$ (Hypothesis 2a). Detailed results can be found in Table 2. Follow-up analyses using

Table 1 Study measures and their inter-correlations

Measure	<i>M (SD)</i>	(1)	(2)	(3)	(4)
(1) Guilty conscience	2.700 (1.106)	(.835)	.501**	.482**	.337**
(2) Other emotions	4.544 (0.933)		(.720)	.402**	.288**
(3) Behavioral intentions	2.917 (0.825)			(.846)	.232*
(4) Petition signing ^a					(-) ^b

All scales except (4) ranged from 1 to 6. Scale reliabilities (Cronbach's Alpha) on diagonal ^a coded 0=no, 1=yes

^b one-item measure

** $p \leq .01$ * $p < .05$

the Hayes (2013) macro, (Model 4, 5,000 bootstrap re-samples and bias-corrected 95 % confidence intervals; see also Preacher et al. 2007) confirmed that guilty conscience and other emotions each significantly and independently mediated the effect of our manipulation on behavioral intentions.² Guilty conscience, however, emerged as the much stronger mediator with the indirect effect estimated to be 0.447 (95 % CI=[0.237; 0.744]); the indirect effect for other emotions was 0.114 (95 % CI=[0.018; 0.284]). Interestingly, while there was no mean difference regarding behavioral intentions across conditions, results indicated a significant negative effect of our manipulation once emotions were controlled for (see Table 2).

No evidence was found for moderation via connectedness to nature, but when entered as additional predictor, it retained a strong direct link with behavioral intentions in addition to guilty conscience and other emotions, $\beta=.280$, $p=.001$.

4.3.2 Actual behavior

Willingness to engage in actual behavior was generally high: Overall, 91 participants (79.8 %) signed the petition. Closer inspection of the distribution of those participants signing the petition revealed that, as predicted in Hypothesis 2b, the proportion of participants in the human-caused condition was significantly higher than in the naturally-occurring condition, 88.1 % vs. 70.9 %, respectively, χ^2 (df=1, $N=114$)=5.245, $p=.019$.

To test the predicted role of guilty conscience as mediator of the manipulation's effect on behavior (Hypothesis 2b), we used binary logistic regression. In a first step, condition (coded 0=naturally-occurring, 1=human-caused condition) significantly predicted petition signing (coded 0=no, 1=yes), Wald χ^2 (df=1, $N=114$)=4.963, $p=.026$, effectively reproducing the above analysis. However, the effect of condition dropped to non-significance when guilty conscience and other emotions were entered into the model. Crucially, as predicted in Hypothesis 2b, guilty conscience was the only significant predictor (see Table 3). This mediation was reliable when probed with Hayes (2013) macro: The manipulation's indirect effect via guilty conscience was significant (IE=.882, 95 % CI=[0.154; 1.832]) while the indirect effect via other emotions was not (IE=.238, 95 % CI=[-0.104; 0.755]).

Interestingly, when testing for potential moderation in a third step, we found a significant condition by connectedness to nature-interaction ($B=2.193$, $SE=0.888$, $p=.014$) indicating that the manipulation was particularly effective for those participants also reporting a high connectedness to nature.³

5 Discussion

The current study investigated the role of moral emotions in motivating environmental behavior intentions and actual behavior. We were able to empirically demonstrate that the confrontation with human-caused environmental damages led to a guilty conscience which, in turn, predicted environmentally friendly behavior intentions and, more importantly, actual

² A mediating (or intervening) variable can help explain the underlying process of an observed relationship. Statistically, this relationship between the independent and dependent variable is usually significantly weaker or even insignificant after including the mediator in the model (see Baron and Kenny 1986).

³ With regard to the discussion on guilt and shame mentioned in the introductory part of the paper, we conducted follow-up analyses treating each as a separate emotion. It seems noteworthy that while their predictive power was either significant or approaching significance with regard to behavioral intentions ($\beta_{\text{guilt}}=.333$, $p=.01$, and $\beta_{\text{shame}}=.217$, $p=.067$), the reported effect of guilty conscience on actual behavior was exclusively driven by shame ($B_{\text{shame}}=0.708$, $SE=0.351$, $p=.044$, whereas $B_{\text{guilt}}=0.001$, $SE=0.289$, $p=.998$).

Table 2 Results of linear regression predicting behavioral intentions

Predictor	B (SE)	Standardized coefficients
Constant	1.344 (0.325)	
Condition ^a	−0.428 (0.154)	−.260**
Guilty conscience	0.322 (0.065)	.507**
Other emotions	0.201 (0.081)	.227*

^a Condition was coded 0=naturally-occurring condition, 1=human-caused condition. Statistics for the full model are: adjusted $R^2 = .296$, $F(3,110)=16.843$, $p<.001$

** $p<.01$ * $p<.05$

behavior. This is one of few studies we know of to take an experimental approach to the issue of confrontation with environmental damages, and to advance the respective literature beyond correlational designs investigating only behavioral intentions.

5.1 Moral emotions and environmental behavior

As expected, confrontation with human-caused environmental damages evoked strong emotional reactions compared to seemingly natural damages. These findings are in line with the emotional reactions toward different environmental damages found in previous, correlational studies (Böhm 2003; Harth et al. 2013; Mallett 2012). At the same time, the current study contributes to the fields of environmental behavior as well as emotion research in a number of ways.

While theoretical frameworks and meta-analyses have stressed the importance of moral emotions in the realm of environmental behavior (see Bamberg and Möser 2007; Schwartz 1977), empirical investigations of their role have been surprisingly scarce so far. This study takes an important step forward in, first, introducing an experimental design and, second, measuring actual environmental behavior. It should be acknowledged that there are other studies linking moral emotions (mostly guilt) with pro-environmental behavioral intentions (e.g., Rees and Bamberg 2014) or support for a pro-environmental group (Mallett et al. 2013). However, few studies have gone beyond this correlational approach (e.g., Harth et al. 2013), and as far as we know, only (Mallett 2012, Study 2) has investigated actual behavior in an experimental setting. Meeting this “gold standard” to drawing causal conclusions is essential if behavioral research is to inform public policy makers or practitioners developing behavior change interventions.

On theoretical grounds, the current study was not (and could not be) designed to fully resolve the ongoing discussion on the differential effects of guilt and shame (Allpress et al. 2014; Gausel and Leach 2011). As we expected guilt and shame to have similar correlates, in

Table 3 Results of logistic regression predicting petition signing

Predictor	Step 1		Step 2	
	B (SE)	Odds ratio [CI]	B (SE)	Odds ratio [CI]
Constant	0.891 (0.297)		−1.976 (1.194)	
Condition	1.140* (0.500)	3.048 [1.143; 8.124]	−0.061 (0.637)	1.063 [0.305; 3.706]
Guilty conscience			0.635* (0.301)	1.887 [1.046; 3.405]
Other emotions			0.418 (0.297)	1.519 [0.849; 2.718]

Statistics for the full model are: Nagelkerke's $R^2 = .213$, Model χ^2 (df=3) = 16.521, $p=.001$

* $p<.05$

the current study, we decided to collapse both into one “guilty conscience” construct and this decision was supported by the factorial structure of the data. However, we show that shame, as in the context of intergroup conflicts, holds positive potential in the context of environmental behavior as well. Whereas previous research has focused on guilt as motivating pro-environmental behavioral intentions (Ferguson and Branscombe 2010; Harth et al. 2013; Mallett 2012), the current study converges with recent studies documenting the positive correlates of shame (de Hooge et al. 2008; Gausel et al. 2012; Rees et al. 2013; Rees and Bamberg 2014). Crucially, while both guilt and shame predicted positive behavioral intentions, follow-up analyses showed that it was shame, and not guilt, driving the manipulation’s effect on actual behavior. While future studies are needed to substantiate this finding, it also converges with research from other areas. Allpress et al. (2010), for example, in the lead-up to the first official government apology to Aboriginal Australians, found Australians’ group-based moral emotions to be generally linked with supportive attitudes. However, only shame, not guilt, predicted whether participants signed a petition in support of the apology or not. In line with this previous research and theorizing, we argue that guilt and shame are both important drivers of reparative and retributive behavior (but see Mallett 2012). At the same time, however, the results of the current study should not be over-simplified. It is crucial to keep in mind that inducing a guilty conscience in individuals may lead to avoidance or denial of the problem when feelings of inferiority are also induced (Gausel et al. 2012; Tangney et al. 1996). Similarly, “moralizing” the issue of climate change may have detrimental consequences under certain circumstances, e.g. when the message is attributed to an identifiable outgroup (Täuber and Van Zomeren 2013) or when perceived efficacy to solve the problem is low (Täuber et al., this issue).

The current study provides first evidence that, given the right circumstances, moral emotions can motivate pro-environmental behavior but more empirical research in this area is needed. Future studies replicating and extending our results should include guilt, shame, and other emotions in order to understand the complex interplay of emotional reactions to the climate crisis and their links with attitudes and behavior.

5.2 Limitations of the current study and future directions

There are a number of limitations of the current study that warrant discussion. First, for practical reasons, we focused our attention on moral emotions individuals experience in reaction to being confronted with natural damages. We consequently left out other key factors relevant to environmental behavior that have been identified elsewhere. For example, perceived behavioral control (PBC) is a well-established predictor of behavior (Ajzen 1991) that has been linked with environmental behavior (e.g., use of public transportation; Heath and Gifford 2002; Kaiser and Gutscher 2003). It could be argued that our manipulation confounded human-caused vs. naturally-occurring problems with problems within vs. beyond human control, i.e. PBC. However, in a recent cross-sectional study, both PBC and guilty conscience independently predicted individuals’ intention to participate in a neighborhood-based climate protection initiative (Rees and Bamberg 2014). In future studies including cognitive (such as PBC) and emotional variables (such as guilt and shame), we would expect both to have independent effects on environmental behavior (see also the work on self determination-theory for another influential theory of human motivation that has been linked with environmental behavior; Laverne et al. 2010; Ryan and Deci 2000).

Second, even more importantly, any conclusions drawn from the current study need to be considered with caution: Participants in our study (German university students) may be more aware of and concerned with environmental issues than the general public. This might be a problem especially as our manipulation seemed to be more effective for those reporting higher connectedness to nature, an attribute that might be lower in the general public. While this

criticism is true for most psychological research, studies replicating our results in other cultural contexts and preferably using more general samples of participants would certainly be desirable.

Third, the manipulation used in the current study is obviously only one way of manipulating guilty conscience in individuals. Future research might conceptually replicate our findings using manipulations teasing apart physical distance or knowledge and cause of environmental damages as three facets that may have been confounded in our current manipulation.

Fourth and finally, our behavioral measure, although an improvement on behavioral intentions measures of previous studies, is still at the “easy” end of the behavioral difficulty continuum. However, our manipulation still produced a significant difference by condition and the mediation via guilty conscience was significant. We are thus optimistic that the current manipulation should indeed be an effective way of motivating environmentally friendly behavior. Future studies might want to explore how effective the current manipulation can be in motivating more difficult environmental behavior such as longer lasting engagement in climate protection initiatives.

5.3 Toward theory-based interventions

As demonstrated in the current study, one simple, theory-based, and effective strategy in motivating environmentally friendly attitudes and behaviors can be to confront people with human-caused environmental damages – to evoke a guilty conscience. The aim of the current study was to offer an example of how theoretical basis and empirical verification can be combined into an effective behavior change-strategy. We focused on moral emotions in this study because these have been identified as core variables in the literature on environmental behavior (Bamberg and Möser 2007; Kaiser 2006) and a substantial theoretical basis was available from research on emotions in intergroup relations (Giner-Sorolla 2013; Iyer and Leach 2008). Fortunately, there is an ever-growing number of campaigns and interventions developing strategies and policies to effectively cope with the problem of climate change. However, only few of them are based on sound theories, even fewer have been evaluated empirically, and their effectiveness is often based on ‘gut-feeling’. Before prematurely implementing such campaigns and interventions, with the present work we hope to encourage a combination of theoretical and empirical grounding. Social sciences have developed a wealth of theories in the realm of climate change – it is time to put them into practice.

Acknowledgments The research presented in this paper was facilitated by the North Rhine-Westphalian Ministry for Innovation, Science, and Research. The authors would like to thank Gerd Bohner, Marco Grasso, Megan Hurst, Ezra Markowitz, Susanne Täuber, and three anonymous reviewers for their helpful comments on earlier versions of this manuscript.

References

- Abrahamse W, Steg L, Vlek C, Rothengatter T (2005) A review of intervention studies aimed at household energy conservation. *J Environ Psychol* 25:273–291
- Ajzen I (1991) The theory of planned behavior. *Organ Behav Hum Decis Process* 50:179–211
- Allpress JA, Barlow FK, Brown R, Louis WR (2010) Atoning for colonial injustices: group-based shame and guilt motivate support for reparation. *Int J Confl Violence* 4:75–88
- Allpress JA, Brown R, Giner-Sorolla R, Deonna JA, Teroni F (2014) Two faces of group-based shame: moral shame and image shame differentially predict positive and negative orientations to in group wrongdoing. *Pers Soc Psychol Bull* 40(10):1270–1284
- Bamberg S, Möser G (2007) Twenty years after Hines, Hungerford, and tomera: a new meta-analysis of psycho-social determinants of pro-environmental behaviour. *J Environ Psychol* 27:14–25

- Baron RM, Kenny DA (1986) The moderator-mediator variable distinction in social psychological research: conceptual, strategic and statistical considerations. *J Pers Soc Psychol* 51:1173–1182
- Böhm G (2003) Emotional reactions to environmental risks: consequentialist versus ethical evaluation. *J Environ Psychol* 23:199–212
- Böhm G, Pfister HR (2000) Action tendencies and characteristics of environmental risks. *Acta Psychol* 104:317–337
- Brown R, Čehajić S (2008) Dealing with the past and facing the future: mediators of the effects of collective guilt and shame in Bosnia and Herzegovina. *Eur J Soc Psychol* 38:669–684
- Brown R, González R, Zagefka H, Manzi J, Čehajić S (2008) Nuestra culpa: collective guilt and shame as predictors of reparation for historical wrongdoing. *J Pers Soc Psychol* 94:75–90
- Costello AB, Osborne JW (2005) Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis. *Pract Assess Res Eval* 10:1–9
- de Hooij IE, Breugelmans SM, Zeelenberg M (2008) Not so ugly after all: when shame acts as a commitment device. *J Pers Soc Psychol* 95:933–943
- Deonna JA, Rodogno R, Teroni F (2011) In defense of shame: The faces of an emotion. Oxford University Press, New York
- Doosje B, Branscombe NR, Spears R, Manstead ASR (1998) Guilty by association: when one's group has a negative history. *J Pers Soc Psychol* 75:872–886
- Expedition Med (2013) Stop plastic in the sea [Available online <http://www.expeditionmed.eu/fr/en/>]
- Ferguson MA, Branscombe NR (2010) Collective guilt mediates the effect of beliefs about global warming on willingness to engage in mitigation behavior. *J Environ Psychol* 30:135–142
- Frijda NH (1986) The emotions. University Press, Cambridge
- Frijda NH, Kuipers P, ter Schure E (1989) Relations among emotion, appraisal, and emotional action readiness. *J Pers Soc Psychol* 57:212–228
- Gausel N (2012) Facing in-group immorality: differentiating expressed shame from expressed guilt. *Rev Eur Stud* 4
- Gausel N, Brown R (2012) Shame and guilt: do they really differ in their focus of evaluation? wanting to change the self and behavior in response to ingroup immorality. *J Soc Psychol* 152:547–567
- Gausel N, Leach CW (2011) Concern for self-image and social-image in the management of moral failure: rethinking shame. *Eur J Soc Psychol* 41:468–478
- Gausel N, Leach CW, Vignoles VL, Brown R (2012) Defend or repair? explaining responses to in-group moral failure by disentangling feelings of shame, rejection, and inferiority. *J Pers Soc Psychol* 102:941–960
- Giner-Sorolla R (2013) Judging passions: Moral emotions in persons and groups. Psychology Press, Hove
- Gosling E, Williams KJ (2010) Connectedness to nature, place attachment and conservation behaviour: testing connectedness theory among farmers. *J Environ Psychol* 30:298–304
- Harrison PR, Mallett RK (2013) Mortality salience motivates the defense of environmental values and increases collective ecoguilt. *Ecopsychology* 5:36–43
- Harth NS, Kessler T, Leach CW (2008) Advantaged group's emotional reactions to intergroup inequality: the dynamics of pride, guilt, and sympathy. *Personal Soc Psychol Bull* 34:115–129
- Harth NS, Leach CW, Kessler T (2013) Are we responsible? guilt, anger, and pride about environmental damage and protection. *J Environ Psychol* 34:18–26
- Hayes AF (2013) Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. Guilford Press, New York
- Heath Y, Gifford R (2002) Extending the theory of planned behavior: predicting the use of public transportation. *J Appl Soc Psychol* 32:2154–2189
- Iyer A, Leach CW (2008) Emotion in inter-group relations. *Eur Rev Soc Psychol* 19:86–125
- Iyer A, Schmader T, Lickel B (2007) Why individuals protest the perceived transgressions of their country: the role of anger, shame and guilt. *Personal Soc Psychol Bull* 33:572–587
- Johns M, Schmader T, Lickel B (2005) Ashamed to be an American? the role of identification in predicting vicarious shame for anti-arab prejudice after 9–11. *Self Identity* 4:331–348
- Kaiser FG (2006) A moral extension of the theory of planned behavior: norms and anticipated feelings of regret in conservationism. *Pers Individ Differ* 41:71–81
- Kaiser FG, Gutscher H (2003) The proposition of a general version of the theory of planned behavior: predicting ecological behavior. *J Appl Soc Psychol* 33:586–603
- Lavergne KJ, Sharp EC, Pelletier LG, Holtby A (2010) The role of perceived government style in the facilitation of self-determined and non self-determined motivation for pro-environmental behavior. *J Environ Psychol* 30:169–177
- Lewis HB (1971) Shame and guilt in neurosis. International Universities Press, New York
- MacKinnon DP, Fairchild AJ, Fritz MS (2007) Mediation analysis. *Annu Rev Psychol* 58:593–614
- Mallett RK (2012) Eco-guilt motivates eco-friendly behavior. *Ecopsychology* 4:223–231
- Mallett RK, Melchiori KJ, Strickroth T (2013) Self-confrontation via a carbon footprint calculator increases guilt and support for a proenvironmental group. *Ecopsychology* 5:9–16

- Mayer FS, Frantz CM (2004) The connectedness to nature scale: a measure of individuals' feeling in community with nature. *J Environ Psychol* 24:503–515
- Möser G, Bamberg S (2008) The effectiveness of soft transport policy measures: a critical assessment and meta-analysis of empirical evidence. *J Environ Psychol* 28:10–26
- Onwezen MC, Antonides G, Bartels J (2013) The norm activation model: an exploration of the functions of anticipated pride and guilt in pro-environmental behaviour. *J Econ Psychol* 39:141–153
- Preacher KJ, Rucker DD, Hayes AF (2007) Addressing moderated mediation hypotheses: theory, methods, and prescriptions. *Multivar Behav Res* 42:185–227
- Rees JH, Bamberg S (2014) Climate protection needs societal change: determinants of intention to participate in collective climate action. *Eur J Soc Psychol* 44:466–473
- Rees JH, Allpress JA, Brown R (2013) Nie wieder: group-based emotions for in-group wrongdoing affect attitudes toward unrelated minorities. *Polit Psychol* 34:387–407
- Ryan RM, Deci EL (2000) Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am Psychol* 55:68–78
- Schwartz SH (1977) Normative influence on altruism. In: Berkowitz L (ed) *Advances in experimental social psychology*, Vol 10. Academic, New York, pp 221–279
- Smith ER (1993) Social identity and social emotions: Toward new conceptualizations of prejudice. In: Mackie DM, Hamilton DL (eds) *Affect, cognition, and stereotyping: Interactive processes in group perception*. Academic, San Diego, pp 297–315
- Smith ER, Seger CR, Mackie DM (2007) Can emotions be truly group level? evidence regarding four conceptual criteria. *J Pers Soc Psychol* 93:431–446
- Sustrans – The Sustainable Transport Charity (2009) *Travelsmart Project Review*. Sustrans, Bristol
- Tam K-P, Lee S-L, Chao MM (2013) Saving Mr. Nature: anthropomorphism enhances connectedness to and protectiveness toward nature. *J Exp Soc Psychol* 49:514–521
- Tangney JP, Dearing RL (2002) *Shame and guilt*. The Guilford Press, New York
- Tangney JP, Miller RS, Flicker L, Barlow DH (1996) Are shame, guilt, and embarrassment distinct emotions? *J Pers Soc Psychol* 70:1256–1269
- Täuber S, Van Zomeren M (2013) Outrage towards whom? threats to moral group status impede striving to improve via out-group-directed outrage. *Eur J Soc Psychol* 43:149–159
- The National Academies of Science (2008) Understanding and responding to climate change. Retrieved December 27, 2013 from: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1048006.pdf