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RESEARCH ARTICLE

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Emotion and intergroup cooperation: How verbal expressions of guilt, shame, and pride influence behavior in a social dilemma

Samuel J. Nunney  | Job van der Schalk  | Antony S. R. Manstead 

School of Psychology, Cardiff University,
Cardiff, UK

Correspondence

Antony S. R. Manstead, School of Psychology,
Cardiff University, Cardiff, UK.
Email: mansteada@cardiff.ac.uk

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Abstract

In interpersonal relations, it is known that expressing self-conscious emotions such as guilt and shame following a transgression is beneficial to reconciliation. In the current research, we examine whether this also applies to intergroup relations. Groups of three persons played an intergroup version of the “centipede game,” in which one party can cooperate with or exploit another party. In Study 1, two groups played six rounds of this game in each of two phases. Between phases, groups rated how much guilt, shame, and pride they experienced in relation to how they had performed in Phase 1; these ratings were shared with the opposing group. Groups expressing high levels of guilt and shame were associated with greater cooperation in Phase 2, whereas groups expressing high levels of pride were associated with lower cooperation in Phase 2. In Study 2, all groups played against a “group” programmed to behave in an exploitative way in Phase 1. This group then expressed shame, pride, or no emotion (control) about its performance. Cooperation in Phase 2 was significantly higher in the shame than in the pride condition, and altruistic punishment was highest in the pride condition and lowest in the shame condition. Between them, these studies show that emotional expression plays an important role in repairing intergroup relationships and in particular that expressing shame about a transgression enhances intergroup cooperation following a transgression.

KEYWORDS

centipede game, emotion, guilt, intergroup cooperation, pride, shame

1 | INTRODUCTION

Attempting to repair relationships that have been damaged by a transgression is relatively common in everyday life. In interpersonal relationships, there are several different routes that can be taken, all of which can have positive effects on relationships (e.g., Fehr et al., 2010; Riek & Mania, 2011). In the case of intergroup relationships, rebuilding the relationship after a transgression tends to be

much more difficult. It has been argued that the reason for this discrepancy between interpersonal and intergroup situations is that the latter are characterized by more competition, fear, deception, and greed (Cohen et al., 2009; Wildschut & Insko, 2007). Economic games offer a way of studying interpersonal and intergroup relations in a simplified and manipulable way. In such games, trust is operationalized as behavior that leaves one vulnerable to exploitation by another, and cooperation is operationalized as behavior that helps to maximize

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joint outcomes rather than personal gains. Findings showing decreased trust and cooperation in intergroup scenarios are common in studies using the Prisoner's Dilemma, Dictator Game, Ultimatum Game, and other economic game variants (Kugler et al., 2012). In the present research, we study intergroup cooperation in the centipede game (Rosenthal, 1981) and examine whether expressions of emotion by one group following its failure to cooperate increase subsequent cooperation between the two groups.

Most research on cooperation in economic games has explored this in an interpersonal setting and has yielded evidence that trust and cooperation can be restored following breaches. For example, it has been shown that denial of responsibility or denial of intent to be unfair are effective strategies for restoring trust (van Dijke & De Cremer, 2011), as is offering financial compensation (De Cremer, 2010), although in both cases, it was also suggested that apologizing would be the optimal strategy. There also seems to be leeway given to individuals who say that they did not fully understand the game, with studies showing that reparative acts are effective as long as the intent to be unfair was uncertain (De Cremer et al., 2010; Desmet et al., 2010). One study highlighting this was conducted by Cohen et al. (2009), who showed that task-focused communication can increase interpersonal cooperation by activating norms associated with fairness and trust. This suggests that relationship repair is possible within interpersonal economic games and also that it is possible to achieve this using communication, rather than compensation. This provides a basis for examining whether this also applies to intergroup economic games, for which research evidence is currently limited.

One way in which relationships can be repaired, or at least improved, via communication is through expressions of emotion.¹ Social appraisal theory (Manstead & Fischer, 2001) and the Emotion as Social Information (EASI) theory (van Kleef, 2009; van Kleef et al., 2010) suggest that emotion communication has the potential to influence behavior through inferential processes. The mediating process is that observers infer the emotion-specific appraisals underlying the expressed emotions and draw conclusions about how the expresser is likely to act (Hareli & Hess, 2010; van Doorn et al., 2012, 2015).

In the current research, we focus on expressions of self-conscious emotion. Self-conscious emotions entail an awareness of the self in relation to others and are typically thought to include embarrassment, guilt, shame, and pride (Tracy et al., 2007). It has been argued that self-conscious emotions evolved to help individuals to achieve social goals, such as cooperation within and between groups (Tracy & Robins, 2007). Drawing on the social appraisal perspective outline above, it is possible to see why the expression of a negative self-conscious emotion, such as guilt or shame, following a transgression should have a beneficial impact on a relationship, whether it is an interpersonal or intergroup relationship. Observers of the expression are likely to infer that the expresser appraises the transgression negatively, accepts responsibility for its negative effects, and is unlikely to repeat it. This should increase trust in the expresser. Likewise, it is possible to see why the expression of pride following a transgression

should have a detrimental impact on a relationship. Observers of the expression might be led to infer that the expresser accepts responsibility for the action, appraises it positively, and is therefore likely to repeat it. This should decrease trust in the expresser.

The majority of research investigating the role of self-conscious emotions in economic games focuses on the *experience* of these emotions and how this influences behavior. For example, Ketelaar and Au (2003) showed that individuals who experience guilt in a repeated Prisoner's Dilemma or Ultimatum Game displayed greater cooperation or generosity in subsequent rounds (see also de Hooge et al., 2007; de Hooge et al., 2008). Research on the *expression* of self-conscious emotions has also shown that this helps to repair relationships. For example, Zeelenberg et al. (1998) showed how relationships can be repaired following expressions of regret, while Vaish et al. (2011) showed that children as young as five prefer to interact with transgressors who are remorseful. Mock jurors have also been found to be more lenient to defendants who appear remorseful (MacLin et al., 2009). Moreover, there is evidence from research using economic games that expressions of guilt, remorse, and regret following uncooperative behavior are more likely to give rise to cooperation (de Melo et al., 2009; Shore & Parkinson, 2018; van der Schalk et al., 2015). Although there is a comparative dearth of research on the effects of expressing self-conscious emotions on *intergroup* cooperation in economic games, the few studies there suggest that guilt or regret expressions can enhance cooperation in intergroup economic games (Rychlowska et al., 2019, 2021; Shore et al., 2019). Such findings suggest that the expression of negative self-conscious emotions can lead to intergroup relationship repair and future intergroup cooperation.

The current study focuses on the effects of guilt and shame as negative self-conscious emotions. These emotions were chosen because it is intuitively plausible for group members to feel guilty or ashamed following an intergroup transgression and because previous research has shown that these emotions are associated with different appraisals and actions tendencies (de Hooge et al., 2007; Schmader & Lickel, 2006). Although the differential effects of expressing guilt and shame in economic games is not something that has been widely researched, outside the context of economic games it has been shown that shame is generally perceived to be a more powerful emotion than guilt (Lickel et al., 2005; Shepherd et al., 2013) and in intergroup scenarios, the expression of shame has been shown to be more helpful and less insulting to victim groups than an expression of guilt (Giner-Sorolla et al., 2009). The current study aims to investigate whether this difference between guilt and shame is also found in an intergroup economic game.

There is less research on the way in which expressing a positive self-conscious emotion, such as pride, influences cooperation. According to Tracy (2020), pride motivates individuals to develop and maintain a self-concept consistent with social norms. One such norm is to cooperate with others, and there is indeed evidence that experiencing or anticipating the experience of pride enhances cooperation. Dorfman et al. (2014) found that inducing participants to consider pride, by writing about an event that would make them feel

proud, led to greater cooperation in a social dilemma. However, pride can also be expressed about things that are socially undesirable, such as behaving uncooperatively in a social dilemma. It seems unlikely that expressing pride under these circumstances would enhance future cooperation. Such behavior could be regarded as “hubristic pride,” a form of pride associated with a willingness to engage in antisocial behaviors and poorer interpersonal relationships (Tracy et al., 2009). The effect of expressing pride on social cooperation is therefore likely to depend on the circumstances in which pride is expressed. For example, van der Schalk et al. (2012) found that anticipated pride about acting fairly increased subsequent fairness in decision making, whereas anticipated pride about *unfair* behavior decreased subsequent fairness in decision making. Pride was therefore included in the current research with a view to exploring how the communication of this positively valenced emotion would affect the behavior of those to whom it is communicated.

1.1 | The centipede game

The centipede game (Rosenthal, 1981) involves reciprocal cooperation between players. At each step of the game, one player decides whether to stop the game and accept the monetary allocations currently on offer or to transfer the decision to the other player. Every time the decision is transferred to the other player, the total monetary allocation to the two players increases; however, if the other player chooses to stop the game, the first player ends with a lower allocation than if he or she had stopped the game earlier. There is a finite number of steps (or “nodes”), with the final node involving the highest payout to the players. Trust and cooperation are key factors involved in the playing of the game (Krockow et al., 2016a). The game was chosen for the present research because it is easily adapted to an intergroup setting and because of its sequential structure. In a multiround version of the game, if one player decides to stop the game early, resulting in a lower payout for the other player, there will be an opportunity to restore trust in a subsequent round. This structure also allows for interventions between rounds of the game, when group members can send or receive any messages to the other group and then return to play further rounds of the game. This enables the

investigation of the role that communication has in influencing motivations, strategies, and game behavior.

Prior research using the centipede game has shown that groups stop the game significantly earlier than individuals (Bornstein et al., 2004). Verbal protocol analysis has also shown that there are different motivations for cooperation depending on the temporal stage of the game, with most players who cooperate early doing so because they are experimenting with the game, while those who continue to cooperate late in the game do so for prosocial reasons (Krockow et al., 2016b).

2 | OVERVIEW OF STUDIES

The centipede game shown in Figure 1 was used in both studies. Each node in the game denotes a decision that has to be made by one of the two parties (A or B). In the current studies, the parties consisted of two 3-person groups. The group can decide to proceed (Go) or stop. If the players reach Node 5, the game is completed. Thus, a game round ends when one of the groups decides to stop or when the players reach Node 5. A group's designation as “A” or “B” switches with each new round of the game. In both studies, groups were given an opportunity to communicate with each other. Game rounds before and after this intergroup interaction are referred to as “Phase 1” and “Phase 2,” respectively. The studies were run using online software (veconlab.econ.virginia.edu).

The payout from the game consisted of lottery tickets that the groups would receive, with each payoff “point” translating into one lottery ticket for their group. Participants were informed that the lottery draw would involve all groups participating in the current study. Thus, group members believed they were playing for real stakes.

The centipede game was renamed the “intergroup cooperation game” for the purpose of these studies. This is because the term “centipede” might have been aversive for some participants and because framing it as a cooperation game should increase the motivation to cooperate (Lieberman et al., 2004), especially given the lottery ticket incentive.

The aim of these studies was to explore the role that emotion communication plays in the context of an intergroup game based on

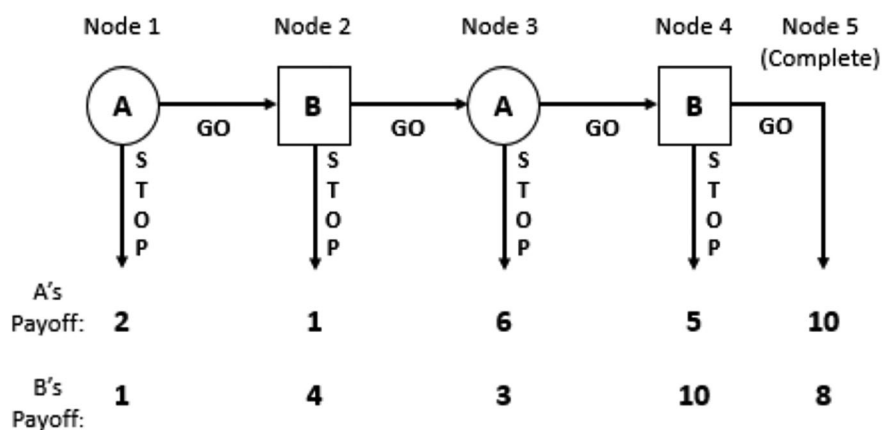


FIGURE 1 Example of structure of the intergroup cooperation (centipede) game used in the current research. Adapted from fig. 3 in Krockow et al. (2015)

cooperation or competition. Previous research suggests that it is unusual for individuals or groups to cooperate fully when playing this game (Krockow et al., 2016a). It was therefore anticipated that groups would be competitive, despite the renaming of the game. To the extent that one group behaves less cooperatively than the other group, there is a reason for members of the “victim group” to feel aggrieved and for members of the “perpetrator group” to feel some degree of guilt or shame about the failure to cooperate or alternatively some degree of pride because of the benefit for the uncooperative party. Providing the groups with an opportunity to communicate made it possible for groups to express their emotions. It was predicted that the communication of guilt, shame, and pride between the groups would have an influence on behavior in Phase 2.

It was expected that expressions of guilt and shame would occur in group expressions of emotion, reflecting a common finding in research investigating these emotions (e.g., Iyer et al., 2007; Lickel et al., 2005). It was also expected that those who received expressions of guilt and shame would exhibit greater intergroup cooperation in Phase 2. Expression of these emotions should help to restore trust between the groups, consistent with results showing the positive effects that negative self-conscious emotions can have on future cooperation (de Melo et al., 2009; van der Schalk et al., 2015). Although it was conceivable that guilt and/or shame would be expressed by groups who had cooperated in Phase 1, it seemed more likely that a failure to cooperate would trigger these emotions. By contrast, it seemed plausible that groups would express pride whether they had behaved cooperatively or uncooperatively. It was predicted that after such pride expressions, behavior in Phase 2 would be dependent on behavior in Phase 1 (van der Schalk et al., 2012). If expressions of pride are related to gaining a high number of points in Phase 1, they would be likely to be interpreted as pride about having behaved instrumentally, rather than cooperatively, and to evoke competitive reactions in Phase 2 on the part of the group receiving this expression. However, if pride expressions are unrelated (or even negatively related) to number of points won in Phase 1, they would likely be interpreted as pride about behaving cooperatively, and to elicit reciprocal cooperative behavior in Phase 2. This context-dependent prediction for pride is consistent with Verbeke et al. (2004), who argued that pride can be regarded as appropriate or excessive (“hubristic” pride) and with Wubben et al. (2012), who found that “authentic” pride elicits more prosocial behavior than does “hubristic” pride.

The studies reported here were approved by the appropriate institutional research ethics committee. Raw data for Study 1, and verbatim instructions and datasets for both studies, can be found at https://osf.io/fbz9v/?view_only=e728fbfbc9c54f029833c17c5fd583b9.

3 | STUDY 1

The purpose of Study 1 was to examine how behavior in the game would be influenced when groups were given the opportunity to communicate pride, guilt, or shame between two phases of the game.

Following a practice game against a computer, groups played six games with each other in Phase 1 and a further six games in Phase 2. The fact that there were six games in each phase meant that there was ample opportunity for groups to develop and implement a game playing strategy. Between the two phases, groups were asked to report the extent to which they felt guilt, shame, and pride about the group's performance in Phase 1, in the knowledge that their answers would be shared with the opposing group. Our main interest was in how the communication of emotions would affect behavior in Phase 2 of the game.

3.1 | Method

3.1.1 | Participants

Eighty-four participants (67 female, 17 male; mean age = 19.75 years) took part in this study. They were undergraduates who participated in exchange for partial course credit. Participants were divided into 28 three-person groups. Allocation to groups was done on a random basis, although participants were led to believe that this allocation was based on responses to a questionnaire completed online prior to the study taking place.

Given that this was not an experimental study and there was no prior literature on which to base estimates of effect size, the number of participants recruited was determined primarily by the available number of participants in the participant pool within the time period allocated for running the study. The minimum effect size to which the study would be sufficiently sensitive was determined by sensitivity analysis (G*Power 3; Faul et al., 2007). This showed that, using the sample size available, there would be a 95% chance of detecting a large effect size ($r = .373$; $d = 0.805$).

3.1.2 | Measures

Emotions

Groups were asked to complete three rating scales in response to the question “How are you now feeling, as a group, about your performance in Phase 1?” The three scales were labeled proud, guilty, and ashamed. Responses to these items were made on a 6-point rating scale where 1 was labeled *strongly disagree* and 6 was labeled *strongly agree* (with intermediate points labeled *disagree*, *slightly disagree*, *slightly agree*, and *agree*). It had previously been explained that their responses would be shared with the opposing group before commencing Phase 2 (and that they would see the opposing group's responses). Our focus was on how the emotions expressed one group influenced the behavior of the group observing these expressions.

Game behaviors

We recorded the following variables: the number of tickets won; the average node at which a group exited (hereafter “average node exit”); the number of “steals” from the other group (defined as the total

number of times the group chose to exit a game); and the percentage of cooperative moves (defined as the percentage of moves that were cooperative, as opposed to the number of steals). These variables were recorded for both Phase 1 and Phase 2.

3.1.3 | Procedure

On signing up to the study, participants completed a questionnaire under the impression that their answers would help to determine allocation to groups that would participate in the study. This was intended to increase identification with the group to which they were allocated. On arrival at the lab, they were asked to remain in a waiting room until all six participants had arrived. Here, they received an information sheet describing the game and reminding them of the lottery ticket prize. They were then divided into two groups of three and led to one of two rooms in which computers had been set up ready to play the "Intergroup Cooperation Game." Groups first read the instructions and participated in one practice game, playing against a scripted computer program in which it played one cooperative move and one steal. Participants' understanding of how the game worked was checked before the groups played against each other in Phase 1. One group was randomly chosen to be "Player A" for the first of the six games in this phase, with the other group taking the role of "Player B," after which the groups switched roles such that each group was A for three games and B for the other three. At the end of Phase 1, there was an interval during which participants completed the emotion measures. Responses were shared with the opposing group. Then, Phase 2 took place, following the same structure as Phase 1. At the end of Phase 2, there was a debrief for all participants in which the purpose of the study was explained. For ethical reasons, participants received an equal number of lottery tickets.

3.2 | Results

All analyses in this study were conducted at the "group" level (i.e., using group as the unit of analysis). Although this limits statistical power, it is an appropriate reflection of the fact that group members were asked to arrive at collective, rather than individual, decisions.

3.2.1 | Game variables in Phase 1 and Phase 2

There were no significant correlations between Phase 1 and Phase 2 scores for any of the game variables, suggesting that no consistent strategy was used across the two phases, presumably reflecting the impact of the emotions expressed between the two phases. To examine differences between phases, game variable difference scores were calculated by subtracting variables in Phase 1 from those in Phase 2. In what follows, the relations between emotion measures and game variables, both within and between phases, will be reported using correlation and regression analyses.

3.2.2 | Expressing pride

Pride ratings following Phase 1 were significantly associated with number of tickets won ($r = .55, p = .002$) and with average node exit ($r = .42, p = .028$) but not with number of steals ($r = .06, p = .746$) or percentage of cooperative moves ($r = .166, p = .399$). Thus, pride expressions were related to performance in the game, rather than with competitive or cooperative behavior specifically.

A high score for pride (5 or 6, where 6 was the maximum) was expressed by at least one group in 50% of the games (Sessions 3, 4, 6, 8, 10, 11, and 12; see Appendix S1). Games in Phase 2 of these sessions tended to be less cooperative. Generally, groups to whom pride was expressed after Phase 1 tended to steal more in Phase 2 than they did in Phase 1. Although these groups remained cooperative at the start of Phase 2, the combination of the other group's pride expression and being stolen from again appears to have encouraged them to steal at the end of Phase 2.

These observations are confirmed by correlation analyses. The expression of pride by the other group was significantly associated with all measures of change in the receiving group's game behavior between Phase 1 and Phase 2: total tickets ($r = -.49, p = .008$), average node exit ($r = -.54, p = .003$), number of steals ($r = .62, p < .001$), and percentage of cooperative moves made ($r = -.63, p < .001$). Thus, the more that one group expressed pride, the greater the competitiveness of the other group in Phase 2, relative to Phase 1, as highlighted by the increase in the number of steals made by one group following high expression of pride by the other group.

3.2.3 | Expressing guilt and shame

As anticipated, there was a strong positive correlation between the expression of guilt and the expression of shame ($r = .88, p < .001$). Both guilt and shame ratings were significantly associated with game behaviors during Phase 1. Specifically, they were correlated with number of steals ($r_{\text{guilt}} = .40, p = .033$; $r_{\text{shame}} = .38, p = .047$) and (negatively) with percentage of cooperative moves ($r_{\text{guilt}} = -.40, p = .036$; $r_{\text{shame}} = -.39, p = .038$) but not with tickets won ($r_{\text{guilt}} = -.15, p = .462$; $r_{\text{shame}} = -.22, p = .255$) or average node exit ($r_{\text{guilt}} = -.28, p = .033$; $r_{\text{shame}} = -.35, p = .065$). Thus, guilt and shame expressions were associated with competitive behavior, but not with game performance.

High scores for both guilt and shame were observed in around 30% of the games. The expression of these emotions had a positive effect on cooperation during Phase 2, with these groups tending to be more cooperative in Phase 2 than they had been in Phase 1. However, expression of these emotions did not necessarily lead to stable intergroup cooperation: Despite the cooperation evident in the earlier games of Phase 2, some groups began stealing again in the final rounds this phase.

Turning to the correlations between the expression of guilt or shame and the difference in Phase 1 and Phase 2 game behavior, there were significant associations for all game measures: total tickets

(guilt: $r = .52, p = .005$; shame: $r = .55, p = .002$), average node exit (guilt: $r = .59, p = .001$; shame: $r = .64, p < .001$), and percentage of cooperative moves (guilt: $r = .52, p = .005$; shame: $r = .71, p < .001$). The other group's expression of shame was also significantly negatively associated with the difference in number of steals ($r = -.59, p = .001$), while the corresponding correlation with the other group's expression of guilt was marginally significant ($r = -.36, p = .058$). Overall, this pattern of correlations shows that expression of guilt or shame by one group was associated with more cooperative behavior by the other group in Phase 2 (relative to Phase 1).

3.2.4 | Predictive effects of pride, guilt, and shame

Four multiple linear regressions were computed to predict the differences in game behavior between Phase 1 and Phase 2 using the emotion measures as predictors. Due to the high correlation between the expressions of guilt and shame, it was decided that only one of these two emotions would be entered into the regression model, along with pride. Expressed shame, rather than guilt, was chosen as the negative emotion predictor, because of its stronger correlations with all of the game variables, including a significantly negative association with number of steals. We regressed variables indexing the difference in game behavior between Phase 1 and Phase 2 on the other group's expressions of shame and pride between the two phases. The regression models were significant for all game variables (difference in total tickets, $F(2,25) = 10.94, p < .001, R^2_{adj.} = .42$; difference in node exit, $F(2,25) = 22.14, p < .001, R^2_{adj.} = .61$; difference in number of steals, $F(2,25) = 13.96, p < .001, R^2_{adj.} = .49$; difference in cooperative moves, $F(2,25) = 18.27, p < .001, R^2_{adj.} = .56$). Table 1 presents a summary of the findings. Expressed shame significantly predicted game behavior for all game variables, such that it predicted more cooperative behavior by the other group in Phase 2 than in Phase 1. In contrast, pride predicted less cooperative game behavior by the other group in Phase 2 than in Phase 1, although this was not significant for the number of tickets won.

3.3 | Discussion

The aim in Study 1 was to allow groups of participants to play the centipede game without any experimental manipulation and to

examine whether the communication of the extent to which groups reported feeling proud, guilty, or ashamed was associated with game behavior in Phase 2. Several features of the results show that this was the case. The fact that behavior in Phase 1 was not significantly related to behavior in Phase 2 suggests that the communication of emotion between the two phases had an impact. The fact that there were many significant associations between the difference scores between a group's Phase 1 and Phase 2 game behaviors and the emotions expressed by the other group is consistent with the argument that expressing these emotions had an impact on how the game was played. It was predicted that the expression of pride following competitive behavior would be associated with less intergroup cooperation in Phase 2 and that the expression of guilt and shame would be associated with greater intergroup cooperation in Phase 2. There was strong support for the second of these predictions. Support for the first prediction is complicated by the fact that pride expressions were associated with doing well in Phase 1, in the sense of winning more tickets, but not with indices of competitive behavior such as number of steals or (negatively) with percentage of cooperative moves. Nevertheless, pride expressions were significantly associated with less intergroup cooperation in Phase 2.

The most striking finding of this study in relation to intergroup reconciliation is that the expression of both guilt and shame was associated with more cooperative behavior from the other group in Phase 2 in comparison to Phase 1. These emotions were expressed when there had been uncooperative behavior by one group in Phase 1 and their expression after Phase 1 was associated with a more cooperative Phase 2 behavior by the group that received these expressions. This is consistent with de Melo et al. (2009) and van der Schalk et al. (2015), who showed that the expression of a negative self-conscious emotion following a transgression increases cooperation in economic games. There was also some evidence, albeit limited, that the expression of shame was the stronger of the two negative self-conscious emotions in predicting future cooperation: The amount of shame expressed by a group after Phase 1 had a significant negative association with the number of Phase 2 steals by the group that received these expressions, which was not the case for guilt. This is consistent with the findings of Giner-Sorolla et al. (2009), who showed that the expression of shame can be more helpful and less insulting than the expression of guilt in intergroup scenarios. This suggests that shame might be a more effective emotion to express than guilt in repairing intergroup relationships.

Measure	(Constant)		Shame			Pride		
	B	SE B	B	SE B	β	B	SE B	β
Tickets	-7.49	8.62	5.51	1.47	.57**	-2.92	1.80	-.25
Node exit	-0.52	0.58	0.51	0.10	.65**	-0.31	0.12	-.32*
Steals	-0.86	0.75	-0.37	0.13	-.42**	0.53	0.16	.49**
Coop moves	0.03	0.14	0.09	0.02	.53**	-0.09	0.03	-.43**

TABLE 1 Summary results of regressing differences between Phase 1 and Phase 2 game measures on the other group's expression of shame and pride

Note: Table entries are unstandardized (B) and standardized (β) regression coefficients (Study 1).

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

A counterproductive emotion to express, from the perspective of intergroup relationship repair, is pride. The expression of pride between the two phases was associated with significantly less cooperation in Phase 2: When one group expressed pride, the group that received that expression tended to steal more in the subsequent rounds. It seems likely that the competitive behavior towards groups that expressed pride after Phase 1 was due to pride-expressing groups being regarded as having acted instrumentally, in their own interests, rather than in the collective interest of both groups. Here, it is noteworthy that pride ratings were significantly correlated with number of tickets won by the group during Phase 1. As a result, pride-expressing groups may have been seen as untrustworthy. One way to react to such behavior would be to respond in kind, which would of course result in decreased cooperation in Phase 2. Another response would be to punish the pride-expressing group for boasting, or expressing hubristic pride, as noted by Verbeke et al. (2004) and Wubben et al. (2012), if the opportunity to do so arises. This is a possibility that will be examined in Study 2.

A limitation of this study is the relatively small sample size. It was considered appropriate to analyze behavior at the group level, rather than the individual data, but this necessarily limits statistical power. A further limitation of this study is that emotion expressions could have been made in relation to different behaviors. Because groups were free to make their own decisions during both phases of the game, the emotions they expressed between the two phases were made against a backdrop of variable game behavior. There was a marked tendency for groups expressing high levels of guilt and/or shame to have behaved competitively during Phase 1, and for groups expressing high levels of pride to have behaved instrumentally during Phase 1, although these patterns were not observed in every group. This presumably made it more difficult for observers to make inferences about the motives underlying the emotion expressions. Both limitations are addressed in Study 2.

4 | STUDY 2

Although Study 1 established that intergroup repair is possible following group-serving behavior in the centipede game, it did this in a general way, with a variety of strategies possibly being used. In Study 2, the number of strategies was constrained. Controlling the behavior of one group through computer simulation of the group's decisions and communications made it possible to have the group perform in a uniformly uncooperative way and then express exactly the same degree of either a positively or negatively valenced self-conscious emotion. This way, we could more reliably test the effect of expressed emotions following a transgression on subsequent behavior.

The results of Study 1 suggested that shame expressions are somewhat more strongly associated with the subsequent behavior of the receiving group. Shame and guilt ratings were also highly correlated. Therefore, expressions of guilt were dropped from Study 2, and a no-emotion control condition was included in its place in order to

explore how the receiving group would behave in the absence of any expression of self-conscious emotion.

Because the results of Study 1 suggested that there was a tendency for groups to steal from groups that expressed pride, a measure of altruistic punishment was also included at the end of the game, the purpose being to gain better insight into the motivations of groups who reacted to pride expressions by cooperating less. Previous research has shown that altruistic punishment is related to levels of anger and other negative emotions (Fehr & Gächter, 2002; Nelissen & Zeelenberg, 2009). After the other group's instrumental behavior in the Phase 1 and its subsequent expression of pride, the participant's group might simply mistrust the other group, which should be reflected in uncooperative game behavior but little tendency to engage in altruistic punishment; alternatively, the participant's group might be angry about the other group's behavior and therefore be willing to give up some of its own tickets in order to punish the other group. This also enabled us to explore whether the specific effects of pride and shame exacerbate or alleviate these feelings, relative to the control group. Although this measure of altruistic punishment could be construed as measuring "spite," spite is generally conceptualized as involving an intention to hurt others (Pillutla & Murnighan, 1996). This does not necessarily involve self-sacrifice, which is the key component of any index of altruistic punishment. It is therefore reasonable to regard the measure used in the current study as a measure of altruistic punishment: punishment of another or others that is costly to one's own group (Fehr & Gächter, 2002).

It was again predicted that an expression of shame by the other group following its noncooperation in Phase 1 would lead to greater cooperation on the part of the participant's group in Phase 2 than would the expression of pride by the other group or a no-emotion control condition. It was also predicted that the expression of pride by the other group following its noncooperation in Phase 1 would lead to less cooperation on the part of the participant's group in Phase 2 than would the expression of shame by the other group or a no-emotion control condition. Finally, it was expected that the expression of pride by the other group following its noncooperation in Phase 1 would give rise to greater altruistic punishment by members of the participant's group after Phase 2 than would be observed in either the shame or control conditions.

4.1 | Method

4.1.1 | Participants and design

One hundred and sixty-eight participants (141 female, 27 male; mean age = 19.58) took part in this study. They were undergraduates who participated in exchange for partial course credit. The study had a fully between-subjects design, with groups randomly allocated to one of three conditions. The materials used were the same as Study 1, except for the communicative interaction phase, where the expressed emotions were predetermined. The minimum number of groups required to reveal a significant difference between pride and shame

expressions was determined by power analysis (G*Power 3; Faul et al., 2007). The average value of the correlation coefficients for the associations of pride and shame with each game variable difference score in Study 1 was $r = .595$. This corresponds to a large effect size of .74. To detect an effect of this size with 95% confidence and with a significance level of .05, at least 35 groups would be needed, so the 56 groups used in Study 2 provided ample power.

4.1.2 | Manipulation

Emotion expression

In the interactive communication stage, the participant groups received an expression of pride or an expression of shame or were in a control condition in which they were told that emotion ratings would not be shared between groups. Those in the pride condition received ratings reflecting a high score for pride (5 on a 1–6 scale) and a low score for shame (2 on a 1–6 scale). These ratings were reversed for groups in the shame condition (i.e., scores of 2 for pride and 5 for shame).

4.1.3 | Measures

Game behaviors

The same game variables were recorded as in Study 1: total tickets won, average node exit, number of steals, and percentage of cooperative moves made. These variables were recorded for the games in Phase 2. No variables were recorded in Phase 1 because all groups were exposed to the same pattern of play from the preprogrammed opponent group.

Prosocial behavior

A composite variable was created using the average z score for average node exit, the inverse of number of steals, and the percentage of cooperative moves made. Higher scores reflect more prosocial behavior.

Altruistic punishment

Following Phase 2, group members were asked to respond individually to the question “If you could give up any number of your group’s tickets to remove double that amount of your opponents’ tickets, how many tickets would you give up?” Responses were made by writing down the number of tickets participants were prepared to give up. This variable was operationalized as a percentage score of the total tickets attained by the group.

4.1.4 | Procedure

On signing up to the study, participants were asked to complete a questionnaire under the impression that their responses would

determine their group membership, which was in fact allocated randomly. On arriving at the lab, they were left in a waiting room until all six participants had arrived. They were then divided into two groups of three, given the impression that the two groups would play against each other, and led into two separate rooms with computers that were ready to play the “Intergroup Cooperation Game.” Groups read the instructions for the game and played one practice game against a computer program in which they saw the computer make both one cooperative move and one steal. Group members were then asked to ensure that they understood how the game worked before participating in the first game with the “other group.” After two games in which the programmed opponent group ended the game at the earliest opportunity, there was an interval during which groups completed the felt emotion measures. The experimental groups then received what appeared to be the opponents’ emotion ratings. Next, Phase 2 commenced, in which all groups completed two further games, but now, the opponent group was programmed to cooperate at every move. This was followed by the altruistic punishment measure, before the two groups came together again to be debriefed.

4.2 | Results

A Shapiro–Wilk test of normality showed that all dependent variables were nonnormally distributed (all p s < .001). Nonparametric statistical tests were therefore used to analyze the data.

4.2.1 | Effect of emotion expression on game variables and prosocial behavior

The means and standard deviations for all group-level dependent variables are shown in Table 2. Kruskal–Wallis tests showed that emotion condition had significant effects on all game variables. Regarding overall tickets won, $H(2) = 15.52$, $p < .001$, Dunn–Bonferroni post hoc tests showed that the shame condition differed significantly from both the pride condition ($p < .001$, $d = 1.47$) and the control condition ($p = .043$, $d = 0.97$). Although the difference between the pride and control conditions is not statistically significant ($p = .079$, $d = 0.55$), it does suggest that pride had a tendency to decrease cooperation, relative to the control condition. Groups in the shame condition gained significantly more tickets ($M = 17.79$) than did those in the pride ($M = 11.68$) or control ($M = 14.11$) conditions. Similar patterns of means were observed for average node exit, $H(2) = 15.86$, $p < .001$; number of steals, $H(2) = 8.68$, $p = .013$; percentage of moves that were cooperative, $H(2) = 15.76$, $p < .001$; and the composite prosocial behavior measure, $H(2) = 15.41$, $p < .001$. Dunn–Bonferroni post hoc adjustments showed that the only significant pairwise differences for these variables were those between the shame and pride conditions, with the control condition not differing from either of the other two. In all cases, groups in the shame condition behaved in a significantly more cooperative way than did those in the pride condition.

TABLE 2 Means (and standard deviations) of dependent measures by condition (Study 2)

Measure	Condition		
	Control	Pride	Shame
Tickets gained	14.11 _a (4.09)	11.68 _a (4.73)	17.79 _b (3.46)
Average node exit	3.00 _{ab} (1.14)	2.32 _a (1.10)	3.92 _b (.99)
Number of steals	1.50 _{ab} (0.71)	1.84 _a (0.50)	1.21 _b (0.79)
Percent cooperative moves	45.78 _{ab} (33.06)	23.16 _a (29.70)	67.53 _b (27.67)
Prosocial behavior	-0.01 _{ab} (0.92)	-0.57 _a (0.77)	0.58 _b (0.84)
Composite average z score	7.56 _a (11.34)	14.66 _b (15.95)	2.89 _c (7.25)
Altruistic punishment			
Mean % tickets used to punish			

Note: Means within rows not sharing a common subscript differ significantly from each other ($p < .05$).

4.2.2 | Effect of emotion expression on altruistic punishment

The means and standard deviations for this dependent variable are also shown in Table 2. A Kruskal–Wallis test showed that emotion condition had a significant effect on the percentage of tickets participants were willing to use to punish the opponent group, $H(2) = 26.18$, $p < .001$. Dunn–Bonferroni post hoc tests showed that all three conditions differed significantly from each other. Those in the shame condition ($M = 2.89$) punished the uncooperative group significantly less than those in the pride condition ($M = 14.66$, $p < .001$, $d = 0.95$) and those in the control condition ($M = 7.56$, $p = .037$, $d = 0.49$). Those in the pride condition punished the other group more than those in the control condition ($p = .033$, $d = 0.51$).

4.3 | Discussion

The aim of Study 2 was to explore the impact of shame and pride expressions following uncooperative behavior in the centipede game. It was predicted that the expression of shame would lead to more cooperation following a transgression and that the expression of pride would lead to less cooperation. There was good support for these predictions.

The results of Study 2 show that the expression of shame led to greater cooperation. Groups in the shame condition finished with more tickets than did groups in both the pride and the control conditions. This shows that expressing shame is not only more effective in repairing the relationship between groups than is expressing pride but also more effective than not expressing any emotion. Although the differences between the shame and control conditions were not consistently significant, as was also the case for the differences between

the pride and control conditions, the observed pattern of means was highly consistent across measures and also consistent with our predictions.

The results of Study 2 shed further light on why groups in the pride condition reacted by being less cooperative. Members of groups in the pride condition were more willing to engage in costly punishment of the opposing group than were groups in the shame or control conditions. This is consistent with the view that expressing pride following uncooperative behavior was seen as antisocial and therefore increased the tendency to engage in altruistic punishment, presumably in an effort to persuade the offending group to abide by social norms.

5 | GENERAL DISCUSSION

The aim of this research was to investigate whether emotion expression in an intergroup economic game can lead to relationship repair after one group has failed to cooperate and thereby to shed light on how emotion expression can help to enhance intergroup cooperation in everyday settings where one group has acted uncooperatively. The centipede game was used because it is a sequential, multiround game, in which levels of trust could fluctuate. It also provided an opportunity to implement an interactive communication stage, which helped in establishing whether emotional communication influences motivations and behavior in an intergroup setting. In both Studies 1 and 2, there was support for the notion that emotion expressions have an impact on intergroup cooperation.

Both Studies 1 and 2 show that relationship repair via emotion expression is possible. In Study 1, it was found that expressions of both guilt and shame were associated with more cooperative actions when the centipede game was played in an unconstrained setting. In Study 2, it was found that receiving an expression of shame following a transgression led to more cooperation than did receiving an expression of pride. These findings show that improving intergroup relationships through emotional expression is possible.

Considering guilt and shame specifically, previous research has suggested that they are distinct emotions, serving different functions (Schmader & Lickel, 2006; Tracy & Robins, 2006). However, both are negative self-conscious emotions and were associated with greater intergroup cooperation in Study 1. Previous research had shown that the experience of guilt, but not shame, leads to improved relationships in economic games (de Hooge et al., 2007; Ketelaar & Au, 2003). Study 1 shows that the expression of shame was somewhat more strongly associated with cooperative behavior (in particular, the reduction of stealing moves) than was the expression of guilt, and Study 2 shows that the expression of shame is effective in enhancing intergroup cooperation. Although both studies point to the positive effect that shame can have, it should be noted that these are intergroup settings and that shame expressions may have different effects in interpersonal scenarios.

The expression of pride had consistent effects in Studies 1 and 2. In Study 1, the expression of pride was associated with less cooperation and a higher chance of being stolen from. In Study 2, pride

expressions led to something beyond less cooperation; there was also a larger chance of being punished after expressing pride. This suggests that the expression of pride not only hinders relationship repair but also motivates those who receive it to engage in altruistic punishment. It seems likely that seeing pride being expressed by a group that had behaved instrumentally in order to enhance its own gains leads to anger, which would explain both being less cooperative in response and being motivated to punish the pride-expressing group.

Between them, the two studies show that a group's past behavior is not the only factor that shapes subsequent intergroup behavior. This is especially evident in Study 2, where the other group's Phase 1 game behavior was constant across conditions, with only the expressed emotions varying between conditions. The findings show that the emotions expressed by the group have a significant impact on intergroup cooperation, consistent with what would be expected on the basis of theoretical models such as social appraisal (Manstead & Fischer, 2001) and EASI (van Kleef, 2009; van Kleef et al., 2010). Members of one group do not act towards another group solely on the basis of the latter group's past failure to cooperate; they also make inferences about the appraisals and intentions of the other group and are readier to cooperate with the other group if it appears to be ashamed of its actions than if it expresses pride or in the absence of any emotional communication. Admittedly, we did not take measures of such appraisals in the current research, and this is a limitation that should be addressed in future work.

To conclude, these studies show that emotion expressions influence behavior in the centipede game. They demonstrate the positive impact of expressing negative self-conscious emotions such as guilt and shame, as well as the negative impact of expressing the positive self-conscious emotion of pride. At the outset, we noted that repairing relationships is a common occurrence in everyday life, but that previous research suggests that relationship repair is more difficult to achieve in intergroup settings. The present studies show that emotional expression can play an important role in repairing intergroup relationships and in particular that expressing shame about a failure to cooperate can improve future intergroup cooperation.

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ORCID

Samuel J. Nunney  <https://orcid.org/0000-0002-3722-9832>

Job van der Schalk  <https://orcid.org/0000-0001-7968-4721>

Antony S. R. Manstead  <https://orcid.org/0000-0001-7540-2096>

ENDNOTE

¹ We use the term “expressions of emotion” here and elsewhere in this paper in the broadest sense, to include facially and verbally expressed emotion.

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Antony S. R. Manstead is Emeritus Professor of Psychology at Cardiff University. He previously held positions at the Universities of Sussex, Manchester, Amsterdam, and Cambridge. He has been Chief Editor of the *British Journal of Social Psychology* and the *European Review of Social Psychology*. His research interests are emotion, attitudes, and social identity.

AUTHOR BIOGRAPHIES

Samuel J. Nunney gained his PhD in Psychology at Cardiff University, after graduating with first class honors in Psychology from the University of Birmingham. His research interests are in intergroup apology, reconciliation, and emotion. He is currently managing environmental research for the Church of England.

Job van der Schalk was a Lecturer in Psychology at Cardiff University. His research interests are in emotion, facial expression, mimicry, decision making, and intergroup relations.

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