



## Beyond actions: Reparatory effects of regret in intergroup trust games

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## ABSTRACT

Intergroup trust is vital for cooperation and societal well-being, but is harder to establish than interpersonal trust. We investigate whether expressions of negative emotions, in particular regret, following economic decisions can shape intergroup trust. In each of three studies participants were members of a group playing a two-round trust game with another group. In the first round, they observed an outgroup member who acted fairly or unfairly towards the ingroup and then expressed positive (i.e., happiness) or negative (i.e., regret, unhappiness) emotions about this behavior. In the second round, participants played with another outgroup member. Emotions displayed by the outgroup representative following unfair behavior in round 1 influenced participants' allocations in round 2, which were higher following regret and unhappiness than following positive emotions. Thus, emotions expressed by one outgroup member affected interactions with other members who had not communicated emotions. Findings of Study 3 revealed that these effects were driven by regret increasing intergroup trust, rather than by happiness decreasing it. Moreover, participants' allocations were predicted by their perceptions of the extent to which the outgroup representative wished to change her behavior. Together, the findings reveal that regret expressions influence intergroup trust by attenuating the detrimental effects of unfair behavior.

## 1. Beyond actions: the social influence of emotions in intergroup trust games

In everyday life people get married, shop online, pay their taxes, support political parties, or buy Volkswagen cars. These seemingly disparate activities have one thing in common: They depend on trust in others, whether these others are individuals or organizations. Trust – an acceptance of vulnerability based on the expectation that others can be relied upon (Rotter, 1967) – is associated with wellbeing and a variety of positive organizational outcomes (DeNeve & Cooper, 1998; Rousseau, Sitkin, Burt, & Camerer, 1998). It operates on multiple levels and sustains relationships between individuals, groups, organizations, and countries (Hoffman, 2002; Rempel, Holmes, & Zanna, 1985). In the current research, we focus on trust between groups, and more specifically on how expressions of emotion following breaches of trust moderate the impact of such breaches.

A large body of evidence (e.g., Balliet & Van Lange, 2013) reveals that relations between groups are more competitive and less trusting than those between individuals, presumably reflecting the fact that group members are generally motivated to positively differentiate their

own group from other groups (Tajfel, 1974; see also Hornsey, 2008). This tendency is especially marked in situations involving conflicts of interest (Sherif & Sherif, 1953), and where groups are represented by individuals (Folmer, Wildschut, De Cremer, & Van Lange, 2017). Two reasons for this are negative beliefs about the outgroup, and the shield of anonymity that enables group members to pursue selfish interests without taking responsibility for their actions. As a consequence, groups are more likely than individuals to respond to cooperation by defecting (Wildschut, Pinter, Vevea, Insko, & Schopler, 2003). Once such a breach of trust occurs, it is hard to repair its effects: In the absence of a one-to-one relationship between two parties, acknowledging responsibility and harm is problematic because some members of the perpetrating group may not be involved, and not all members of the victim group may be adversely affected. Therefore, reparative acts such as apologies, which are generally effective in individual contexts (Lount, Zhong, Sibanathan, & Murnighan, 2008), are often received with skepticism and distrust in intergroup settings (e.g., Kim, Cooper, Dirks, & Ferrin, 2013; Nadler & Liviatan, 2006).

In the current research, we investigate the extent to which cooperation can be restored following a breach of trust in an intergroup

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setting. Specifically, we study whether expressions of regret can moderate the impact of transgressions on subsequent trusting behavior. Prior research shows that people's decisions to trust and act fairly are shaped by their own and others' emotions (e.g., De Melo, Carnevale, Read, & Gratch, 2014; Dunning, Fetchenhauer, & Schlösser, 2012; Van der Schalk, Kuppens, Bruder, & Manstead, 2015). Emotional expressions serve as cues to trustworthiness and cooperation (e.g., Krumhuber et al., 2007) and communicate how people feel about specific behaviors, thereby shaping observers' appraisals of the same events (Manstead & Fischer, 2001). For example, joy expressed after engaging in uncooperative behavior – such as sharing only a small proportion of monetary resources with another person – can be read as implying that selfishness is conducive to the expresser's goals. Observers are likely to infer that this person may behave similarly in the future and, as a consequence, decide not to cooperate with him or her. Regret is likely to be particularly relevant to restoring trust. This emotion arises from the appraisal that the outcome of a decision is worse than it would have been had we decided differently (Martinez, Zeelenberg, & Rijsman, 2011; Zeelenberg & Pieters, 2007). Regret is associated with feelings of personal responsibility for these decisions, and with a focus on undoing it or repairing the mistake (Zeelenberg, van Dijk, Manstead, & van der Pligt, 2000). People experiencing regret want to have the opportunity to change their behavior (Roseman, Wiest, & Swartz, 1994).

As a consequence, regret displays following unfair behavior in mixed-motive situations could convey the impression that someone is upset by the transgression and motivated to make amends – similar to other appeasement emotions such as guilt or embarrassment (Baumeister, Stillwell, & Heatherton, 1994; Feinberg, Willer, & Keltner, 2012; Lelieveld, Van Dijk, Van Beest, & Van Kleef, 2013; Semin & Manstead, 1982; Van Kleef, de Dreu, & Manstead, 2006). In other words, appeasement emotions – such as regret – should facilitate remedial efforts that serve the long-term goal of building reliable, non-exploitative exchange relationships based on mutual trust (Schniter & Sheremeta, 2014; Schniter, Sheremeta, & Shields, 2015). By contrast, expressions of positive emotions, such as happiness or pride, should signal that the transgression was conducive to the expresser's goals and is therefore likely to recur.

Consistent with these predictions, two studies (De Melo et al., 2014; Van der Schalk et al., 2015) demonstrated that people's decisions are influenced by regret and positive expressions about fair/cooperative or unfair/uncooperative behaviors. Participants in these studies observed others or interacted with them while playing an economic game. Regret following unfair or uncooperative behavior was perceived as a signal that fair or cooperative behavior was congruent with the expresser's goals, whereas positive emotions following these behaviors were perceived as signals that unfair or uncooperative behavior was congruent with the expresser's goals (De Melo et al., 2014). As a result, participants were more cooperative or more likely to make fair decisions after exposure to individuals who expressed regret, as opposed to joy, following competitive or unfair decisions in the economic game. The reverse was found for regret and joy following fair or cooperative behavior.

These results show that regret influences decisions to be fair or to cooperate in interpersonal contexts, which raises the question of whether this emotion also has the potential to repair relations between groups. The research of Van der Schalk et al. (2015, Studies 1A and 1B) is especially relevant here: While playing an ultimatum game, participants were influenced by the regret expressed by another player concerning his/her fair behavior in a previous round, as this decreased the likelihood of participants making a fair offer to another player in a subsequent round. Importantly, because the exemplar shared resources with another individual, participants' own outcomes were not affected by the exemplar's prior behavior. Thus, merely observing that the exemplar felt regret about acting fairly decreased participants' own decisions to be fair, possibly because displays of regret communicated that being fair led to undesirable outcomes. Also relevant is a study by Ten

Brinke and Adams (2015), who found that sadness displayed by company representatives during public apologies significantly predicted the effectiveness of these apologies. Expressions of sadness predicted favorable outcomes for the company, such as higher stock market returns, more positive perceptions of the company, and greater willingness to invest in it. Thus emotions expressed by a group representative in a potentially distrustful and competitive setting (Folmer et al., 2017) can influence attitudes and behaviors towards the organization as a whole.

In the current research, we build on these findings by examining whether expressions of negative emotion moderate the impact of fair or unfair intergroup behaviors on subsequent trusting behavior. Specifically, we test how regret expressed by an outgroup member in relation to his or her behavior towards an ingroup member in one round of an economic game influence participants' future interaction with an outgroup member in a second round of the game. In Study 1 we compared the effects of regret and happiness using video recordings of facial expressions. Study 2 was a conceptual replication of Study 1, in which we examined whether the effects observed in Study 1 extend to general expressions of unhappiness and happiness, rather than being specific to regret. To examine whether emotional expressions influence reactions to both positive and negative intergroup behavior, we included both fair and unfair behavior in Studies 1 and 2. In Study 3 we compared the influence of regret and happiness to a control neutral condition while also measuring regret-related appraisals. Based on previous research, we hypothesized that expressions of regret (and unhappiness) following unfair behavior would encourage greater trust than would expressions of happiness. Conversely, we expected that regret and unhappiness following fair behavior would decrease trust.

All studies were approved by the ethics committee of Cardiff University's School of Psychology (EC.14.10.14.3866). The three experiments used a version of the trust game (adapted from Berg, Dickhaut, & McCabe, 1995), a classic measure of behavioral trust. In this paradigm, two players receive the same amount of a resource. One player (hereafter 'trustor') is then asked to decide how much of the resource s/he wants to send to the other player (hereafter 'trustee'). Any resource sent to the trustee is tripled. The trustee then has the opportunity to return any proportion of his/her resources to the trustor. Sending more resources is risky for the trustor because the trustee could choose to return little or none of the resources. However, sending more resources offers a way to increase resources for both parties, provided the trust is reciprocated.

## 2. Study 1

We used an immersive paradigm in which participants belonged to a group (the ingroup team) that ostensibly played two rounds of the trust game with an outgroup team to gain lottery tickets. The outcome of the two rounds contributed to each group's pooled resources. In each session, a confederate posing as fellow ingroup member was chosen – apparently randomly – to represent the participant's group in the first round of the game. She played with an outgroup representative, seemingly also selected at random, and always made a trusting move at the beginning of the round. The first round of the game included the experimental manipulations. The behavior of the outgroup representative was 'fair,' such that parity of resources between the groups was restored, or 'unfair,' such that the outgroup had more resources than the ingroup. We also manipulated the emotions expressed by the outgroup member, by varying the facial expressions she displayed following the behavior: She either smiled or showed a negative expression intended to convey regret (see Fig. 1 and Supplemental Materials, S1). In the second round, participants played with an anonymous outgroup member. The number of tickets they sent to this person, together with their expectations of what members of the other team would share, served as the primary dependent measures.



Fig. 1. Stimuli used in Study 1: regret and happiness of the outgroup representative were presented in video recordings.

## 2.1. Method

### 2.1.1. Design and participants

Below we report all measures, manipulations, and exclusions. The study had a 2 (Behavior: fair vs. unfair)  $\times$  2 (Emotion: happiness vs. regret) between-subjects design. We recruited as many participants as we could during a 2-week period, aiming for 30 usable data points in each condition. Participants were undergraduate psychology students ( $N = 147$ , 131 females;  $M_{\text{age}} = 18.58$  years,  $SD = 1.44$ ) compensated with course credit and recruited in groups of two or three persons, for a total of 53 experimental sessions. We discarded data from 18 subjects (15 females) from further analyses: twelve who did not answer three screening questions correctly, three who recognized one of the individuals in the video, and three who during debriefing showed that they were aware of the purpose of the study. The final sample comprised 129 participants and 52 groups (13 groups per condition, with between 30 and 35 participants in each condition; see Supplemental Materials, Table S2). With this number of participants, we achieved 80% statistical power ( $\alpha = 0.05$ ) to detect a medium-sized interaction effect ( $f = 0.25$ ) in a between-subjects ANOVA.

### 2.1.2. Procedure

Each group included a female confederate who posed as a fellow-student enrolled in the study and who was blind to the experimental condition. The same confederate served for all groups. Groups therefore consisted of three or four members, including the confederate. We randomly allocated each team to one of the four experimental conditions (fully crossing fair vs. unfair behavior with happiness vs. regret). First, subjects were informed that they were participating with another group of students recruited for the same study, who would be working in another room in the same building. The two groups had ostensibly been formed on the basis of scores on a prior mass survey that had been completed by all students at the start of the academic year. The experimenter explained that it was necessary for the two groups to start the different steps of the experiment at exactly the same time, and appeared to communicate by telephone with a colleague supervising the other group before each step.

After providing written consent, participants were given 10 min to agree on a name for their group. This task was intended to create group cohesion. Next, the experimenter explained that the two groups would be playing a computer game to gain lottery tickets, and that all study participants would play on behalf of their respective teams. The goal was to maximize the group's tickets and thereby its chances of winning the lottery prize of £100. In reality, all groups had an equal chance of winning. In order to learn the rules of the game, participants first played a 'demonstration round.' They gathered around a PC computer (screen size: 14", display resolution: 1280  $\times$  800), equipped with a webcam and were informed that the two groups would be able to see and hear each other at certain points during the demonstration. Then,

the experimenter ostensibly tested the video connection between the two rooms by opening videoconferencing software (join.me 2015, LogMeIn, Inc.) such that participants could briefly see themselves on screen. An automated voice message announced 'the conference will begin when the next party joins,' followed by a beep supposedly signaling that the other team started the video connection. The experimenter then launched the game program, implemented in MediaLab (version 2012.4.133, Empirisoft Corporation) and using the trust game adapted from Berg et al. (1995). First, the computer asked for the name of the team and its members and selected (apparently at random) the confederate to play this first round. She was asked to sit in front of the computer and to make sure that the other group members were able to read the screen, after which the experimenter left the room.

The program then revealed the name of the other team and its representative, delivered the instructions for the trust game, and played a full-screen video ostensibly showing the outgroup greeting the participants. In reality, the video was previously recorded with a webcam (Microsoft Lifecam HD-3000; size: 1920  $\times$  1080, frame rate: 29 frames/s). It showed a female student sitting in front of a computer with three other persons standing behind her, in a setting closely resembling the one in which groups of participants were located.

Instructions explained that the confederate's task was to send to the other group a proportion of the 10-lottery-ticket endowment that each group had received at the start of the round. When asked to decide how many tickets she would like to pass to the other team, the confederate always sent 7 tickets, announcing her decision without explicitly consulting other ingroup members. Next, subjects were informed that the outgroup representative would discuss her decision with other members of her team. They saw a full-screen video of the representative turning towards her group, and then learned that the other group had decided to return either 14 tickets (for a final outcome of 17–17; fair condition) or no tickets (3–31; unfair condition). The information about the outgroup response was followed by the emotion manipulation. Participants viewed a full-screen video recording of the outgroup representative displaying a facial expression of regret or happiness. The former involved lip pressing and downward head movements, as in expressions of embarrassment or shame (Keltner, 1995). These recordings were validated in a pilot study (see Supplemental Materials, S1 for a detailed description and [https://osf.io/h7av3/?view\\_only=64a45a1b7def4d95b1231e35df6a2c78](https://osf.io/h7av3/?view_only=64a45a1b7def4d95b1231e35df6a2c78) for the video files). Fig. 1 shows still images from the two videos.

Group members then moved to another room to play the second round with an anonymous outgroup member.<sup>1</sup> Each person sat at a

<sup>1</sup> In Studies 1 and 2 this outgroup member could, in theory, have been the outgroup representative who played the first round of the game. However, this possibility was ruled out in Study 3, where participants were specifically informed that the round 2 game partner was *not* the representative from round 1.



separate computer station. The program apparently ‘matched’ them with a member of the other team, referred to as the ‘game partner.’ Instructions explained that, as in the demonstration round, each player started the game with a 10-lottery-ticket endowment. After a brief reminder of the rules of the trust game, participants were asked to decide how many of their 10 tickets they wanted to pass to their game partner and to report the number of tickets they thought a typical outgroup member would share if he or she was the trustor. The next two items asked how much participants thought they had in common with ingroup and outgroup members. As manipulation checks, they also rated the fairness of the outgroup's behavior in round 1, and how positive, happy, and regretful the outgroup representative had felt about it. Participants responded to these items using 5-point scales with endpoints labeled: *very negative* and *very positive*, *not at all* and *extremely*, and *none at all* and *a great deal*, respectively. Finally, three screening questions tested participants' understanding of the trust game (see [https://osf.io/h7av3/?view\\_only=64a45a1b7def4d95b1231e35df6a2c78](https://osf.io/h7av3/?view_only=64a45a1b7def4d95b1231e35df6a2c78) for the full questionnaire). The outcome of round 2 was then revealed: The game partner always returned twice the amount sent by the participant, such that the two players ended the game with the same number of tickets.

After completing the procedure, participants were thanked and asked not to share the details of the study with others. They received a debriefing e-mail at the end of data collection and we randomly selected one winning team to share the lottery prize of £100 between its members.

## 2.2. Results

### 2.2.1. Manipulation checks

Participants felt they had more in common with ingroup members ( $M = 3.26$ ,  $SD = 0.87$ ) than with outgroup members ( $M = 2.67$ ,  $SD = 0.88$ ),  $t(128) = 6.32$ ,  $p < .001$ ,  $d = 0.66$  (see Supplemental Materials, S2, for all descriptive statistics). Consistent with the findings of a pilot study (see Supplemental Materials, S1), the outgroup's decision to return 0 tickets was rated as less fair ( $M = 1.77$ ,  $SD = 1.06$ ) than its decision to return 14 tickets ( $M = 4.72$ ,  $SD = 0.52$ ),  $F(1, 125) = 411.12$ ,  $p < .001$ ,  $\eta_p^2 = 0.77$ .<sup>2</sup>

Participants in the regret condition perceived the group representative as more regretful ( $M = 2.41$ ,  $SD = 0.80$  vs.  $M = 1.78$ ,  $SD = 0.81$ ,  $F(1, 125) = 19.30$ ,  $p < .001$ ,  $\eta_p^2 = 0.13$ ), less happy ( $M = 3.11$ ,  $SD = 0.95$  vs.  $M = 3.94$ ,  $SD = 0.84$ ,  $F(1, 125) = 26.95$ ,  $p < .001$ ,  $\eta_p^2 = 0.18$ ), and less positive ( $M = 2.84$ ,  $SD = 0.91$  vs.  $M = 4.13$ ,  $SD = 0.71$ ,  $F(1, 125) = 81.29$ ,  $p < .001$ ,  $\eta_p^2 = 0.39$ ) than did participants in the happy condition.<sup>3</sup>

### 2.2.2. Allocations

In round 2 of the game, participants indicated how many of their 10 lottery tickets they wished to send to an anonymous member of the other team. These allocations (see Fig. 2) were entered into an ANOVA where the factors were outgroup Behavior (fair vs. unfair) and outgroup



Fig. 2. Allocations in round 2 of the trust game as a function of the experimental condition. Error bars represent 95% confidence intervals. The asterisk indicates significance at  $p < .05$  (Study 1).

Emotion (happiness vs. regret). There was a main effect of Behavior: Participants sent more tickets to fair ( $M = 6.16$ ,  $SD = 1.62$ ) than to unfair outgroups ( $M = 3.29$ ,  $SD = 2.04$ ),  $F(1, 125) = 77.36$ ,  $p < .001$ ,  $\eta_p^2 = 0.38$ . The main effect of outgroup Emotion was not significant,  $F(1, 125) = 2.20$ ,  $p = .14$ ,  $\eta_p^2 = 0.02$ . A marginally significant interaction,  $F(1, 125) = 3.39$ ,  $p = .07$ ,  $\eta_p^2 = 0.03$ , revealed that in the unfair condition expressions of regret led to higher allocations ( $M = 3.87$ ,  $SD = 2.10$ ) than did smiles ( $M = 2.80$ ,  $SD = 1.88$ ),  $F(1, 125) = 5.56$ ,  $p = .02$ ,  $\eta_p^2 = 0.04$ , 95% CI [0.17, 1.96]. The corresponding difference within the fair condition was not significant,  $F(1, 125) = 0.06$ ,  $p = .80$ ,  $\eta_p^2 < 0.01$ , 95% CI [-0.78, 1.01].

### 2.2.3. Expected outgroup allocations

Participants' trust in the other team was also indexed by their expectations of the number of tickets (0–10) that a typical outgroup member would send. This measure of trust was influenced by outgroup Behavior,  $F(1, 125) = 88.27$ ,  $p < .001$ ,  $\eta_p^2 = 0.41$ : Participants expected that typical members of fair outgroups would send more tickets ( $M = 5.77$ ,  $SD = 1.85$ ) than typical members of unfair outgroups ( $M = 2.60$ ,  $SD = 1.95$ ). The main effect of Emotion was not significant,  $F(1, 125) = 0.58$ ,  $p = .45$ ,  $\eta_p^2 < 0.01$ . However, the interaction was marginally significant,  $F(1, 125) = 3.39$ ,  $p = .07$ ,  $\eta_p^2 = 0.03$ : Participants tended to expect fewer tickets from the outgroup when unfair decisions had been accompanied by happiness ( $M = 2.20$ ,  $SD = 1.91$ ) rather than regret ( $M = 3.07$ ,  $SD = 1.93$ ),  $F(1, 125) = 3.41$ ,  $p = .07$ ,  $\eta_p^2 = 0.03$ , 95% CI [-1.80, 0.06]. Participants' expectations did not differ as a function of emotion within the fair condition,  $F(1, 125) = 0.58$ ,  $p = .45$ ,  $\eta_p^2 < 0.01$ , 95% CI [-0.57, 1.29].

Insight into the process underlying the effect of outgroup emotion on participants' allocations and their expectations of the outgroup behavior within the unfair behavior condition can be gained by examining the correlations between the key dependent variables, which are shown in Table 1 (below the diagonal).<sup>4</sup> It can be seen that there was a strong

<sup>2</sup> Ratings of fairness were not affected by emotion of the outgroup representative,  $F(1, 125) = 0.12$ ,  $p = .73$ ,  $\eta_p^2 < 0.01$ , but Emotion interacted with Behavior,  $F(1, 125) = 6.91$ ,  $p = .01$ ,  $\eta_p^2 = 0.05$ , such that, following unfair behavior, regret elicited higher ratings of fairness ( $M = 2.00$ ,  $SD = 1.14$ ) than did the happy facial expression ( $M = 1.57$ ,  $SD = 0.95$ ),  $F(1, 125) = 4.42$ ,  $p = .04$ ,  $\eta_p^2 = 0.03$ , 95% CI [0.02, 0.83]. The difference between emotions displayed following fair behavior was not significant,  $F(1, 125) = 2.60$ ,  $p = .11$ ,  $\eta_p^2 = 0.02$ , 95% CI [-0.07, 0.74].

<sup>3</sup> The main effects of Behavior and the interactions between Emotion and Behavior were all non-significant,  $F(1, 125) = 0.01$ ,  $p = .92$ ,  $\eta_p^2 < 0.001$  and  $F(1, 125) = 0.24$ ,  $p = .62$ ,  $\eta_p^2 < 0.01$  (happy),  $F(1, 125) < 0.01$ ,  $p = .99$ ,  $\eta_p^2 < 0.001$  and  $F(1, 125) = 1.94$ ,  $p = .17$ ,  $\eta_p^2 = 0.01$  (positive),  $F(1, 125) = 0.31$ ,  $p = .58$ ,  $\eta_p^2 < 0.01$  and  $F(1, 125) < 0.01$ ,  $p = .97$ ,  $\eta_p^2 < 0.001$  (regretful).

<sup>4</sup> Additional analyses conducted on participants' allocations in the unfair condition revealed that the effects of emotion on allocations were mediated by participants' ratings of happiness and regret of the outgroup representative. Specifically, ratings of the representative's happiness were a significant predictor of allocations in a joint regression model controlling for emotion condition,  $B = -0.70$ ,  $F(2, 62) = 8.08$ ,  $p = .01$ , 95% CI [-1.18, -0.21] (with a significant indirect effect estimated with 5000 bootstrap resamples,  $B = 0.63$ , 95% CI [0.28, 1.13]). The same was true for ratings of the representative's

**Table 1**

Correlations between allocations, expectations of outgroup behavior, identification, and emotion ratings (Study 1). Cells above the diagonal represent the fair conditions and cells below the diagonal represent the unfair conditions.

	1	2	3	4	5	6	7	8
1. Allocations	–	<b>0.55**</b>	<b>0.30*</b>	<b>0.29*</b>	0.07	–0.10	–0.21	–0.09
2. Expectations of outgroup behavior	<b>0.55***</b>	–	0.08	0.13	0.03	0.09	–0.22	0.10
3. Identification with ingroup	–0.01	–0.01	–	<b>0.40**</b>	0.04	–0.06	0.02	–0.04
4. Identification with outgroup	0.12	<b>0.26*</b>	<b>0.25*</b>	–	0.04	0.13	–0.07	< 0.001
5. Fairness	0.16	<b>0.27*</b>	–0.13	<b>0.35**</b>	–	0.23	–0.11	0.22
6. Happiness	– <b>0.41**</b>	–0.15	0.01	–0.20	–0.05	–	– <b>0.67***</b>	<b>0.73***</b>
7. Regret	<b>0.35**</b>	<b>0.49***</b>	–0.04	0.08	–0.04	– <b>0.54***</b>	–	– <b>0.64***</b>
8. Positivity	– <b>0.32**</b>	– <b>0.38**</b>	0.03	– <b>0.26*</b>	–0.09	<b>0.70***</b>	– <b>0.65***</b>	–

Note. Correlations in bold are significant, with \* denoting  $p < .05$ , \*\* denoting  $p < .01$ , and \*\*\* denoting  $p < .001$ .

positive association between allocations and expectations of outgroup behavior, and also that both trust measures were positively associated with ratings of the outgroup representative's regret, but negatively associated with ratings of her positivity and happiness. The corresponding correlations were non-significant in the fair condition (shown in Table 1 above the diagonal).

### 2.3. Discussion

In Study 1 we investigated whether facial expressions of regret displayed by an outgroup representative affected participants' trust in subsequent interactions with other members of the same group. This was indeed the case: Participants' allocations and expectations of outgroup behavior were both affected by the emotions expressed by the group representative. Specifically, regret following unfair behavior significantly enhanced intergroup trust, compared to expressions of happiness by the outgroup representative following such behavior. Not only were participants willing to send more tickets to outgroup members in the regret condition; they also expected the outgroup to invest more lottery tickets. Although regret affected trust following unfair outgroup behavior, it did not do so when the other team acted fairly. In Study 2, we examined the boundary conditions of the effects of regret and happiness observed in Study 1 by investigating whether they would also be found when more general positive and negative feelings are expressed. We used a modified procedure, in which outgroup reactions to unfairness were communicated by written responses to emotion scales, ostensibly completed by the other team, conveying either positive or negative affect about the group-serving decision.

## 3. Study 2

The procedure for this study was similar to the one used in Study 1: Groups of participants including a confederate ostensibly played a trust game with another team. This time, however, participants did not see this other team or the facial expressions of the outgroup representative. Instead, positive and negative emotions were communicated via questionnaires ostensibly completed by the other team, showing that they felt happy or unhappy about their decision. As in Study 1, we measured participants' allocations and expectations of outgroup behavior during the second round of the trust game, when they played with an anonymous member of the other team. Based on the findings of Study 1, we

predicted that – relative to the positive condition – negative emotion communicated by the other team following unfair behavior would improve intergroup trust, which would lead participants to send more tickets and expect higher outgroup returns in the second round.

### 3.1. Method

#### 3.1.1. Design and participants

This study had a 2 (outgroup Behavior: fair vs. unfair)  $\times$  2 (outgroup Emotion: positive vs. negative) between-subjects design. We recruited as many participants as possible during a 3-week period, again aiming for 30 data points per condition. Participants ( $N = 172$ , 152 females,  $M_{\text{age}} = 20.05$  years,  $SD = 2.73$ ) were recruited in groups of two or three and were compensated with course credit. Due to a technical problem, the responses of four female subjects were not recorded by the experimental software. We also discarded data from 11 participants (all female) from further analyses: ten who did not answer the three screening questions correctly and one whose responses to debriefing questions showed that she was aware of the purpose of the study. The final sample comprised 157 participants (with between 37 and 41 participants in each condition; see Supplemental Materials, Table S3) and 60 teams (15 per condition). With this number of participants, we achieved 80% statistical power ( $\alpha = 0.05$ ) to detect a medium-sized interaction effect ( $f = 0.22$ ) in a between-subjects ANOVA.

#### 3.1.2. Procedure

As in Study 1, the teams included a confederate blind to experimental condition. Subjects observed her playing the demonstration round with the representative of the other team, and then played a second round of the trust game with an anonymous outgroup member. However, because videos were not used in Study 2, there was no need for the experimenter to appear to test the video connection, or for conferencing software to be used. Instead, participants were introduced to the other team and informed about their decisions via the trust game program. As in Study 1, the confederate always sent 7 tickets out of 10, and participants then learned about the fair or unfair behavior of the other team. The confederate was then presented with two questions from the 9-point portrait version of the Self-Assessment Manikin (SAM) scale (Bradley & Lang, 1994; The PXLab Self-Assessment Manikin Scales, 2008) which asked her to rate how happy vs. unhappy and how calm vs. aroused the team members felt about their decision. Participants and the confederate were then informed that their group had been selected by the computer to see how the other team had responded to these questions. They were also told that the outgroup would not see ingroup members' responses or know that the ingroup was able to see the outgroup's responses. Subjects then viewed screenshots of the SAM scale ostensibly completed by the other team. In the positive condition, the 'happiest' pictogram on a 9-point portrait version of the SAM scale was selected; in the negative condition the 'unhappiest' pictogram was selected. The same arousal ratings (6 on a 9-point scale) were shown in both conditions.

(footnote continued)

regret,  $B = 0.64$ ,  $F(2,62) = 5.52$ ,  $p = .02$ , 95% CI [0.09, 1.18] (indirect effect:  $B = 0.40$ , 95% CI [0.10, 0.91]). In both cases emotion condition was no longer a significant predictor of allocation, ( $B = 0.44$ ,  $F(2,62) = 0.71$ ,  $p = .40$ , 95% CI [–0.59, 1.47], happy, and  $B = 0.67$ ,  $F(2,62) = 1.75$ ,  $p = .19$ , 95% CI [–0.34, 1.68], regret), consistent with complete mediation. Ratings of positivity did not significantly affect allocations in round 2 when controlling for emotion condition,  $F(2,62) = 2.61$ ,  $p = .11$ , 95% CI [–1.10, 0.12] (indirect effect:  $B = 0.73$ , 95% CI [–0.08, 1.66]).

Measures collected in round 2 were similar to those included in Study 1. This time, we asked about participants' expectations concerning the number of tickets they thought their game partner (and not, as in Study 1, a typical outgroup member) would share as the trustor in the game (see [https://osf.io/h7av3/?view\\_only=64a45a1b7def4d95b1231e35df6a2c78](https://osf.io/h7av3/?view_only=64a45a1b7def4d95b1231e35df6a2c78) for the full questionnaire).<sup>5</sup>

### 3.2. Results

#### 3.2.1. Manipulation checks

Participants reported having more in common with ingroup members ( $M = 3.42$ ,  $SD = 0.82$ ) than with outgroup members ( $M = 2.79$ ,  $SD = 0.82$ ),  $t(156) = 8.38$ ,  $p < .001$ ,  $d = 0.76$ . They also rated the behavior of the other team as less fair when the outgroup returned 0 tickets ( $M = 1.70$ ,  $SD = 0.97$ ) compared to 14 tickets ( $M = 4.61$ ,  $SD = 0.54$ ),  $F(1, 153) = 552.07$ ,  $p < .001$ ,  $\eta_p^2 = 0.78$  (see Supplemental Materials, S3, for all descriptive statistics).<sup>6</sup>

As expected, participants in the negative emotion condition thought that the trustee and her team felt more unhappy ( $M = 3.06$ ,  $SD = 1.22$  vs.  $M = 1.92$ ,  $SD = 0.97$ ,  $F(1, 153) = 43.09$ ,  $p < .001$ ,  $\eta_p^2 = 0.22$ ), less happy ( $M = 2.26$ ,  $SD = 1.14$  vs.  $M = 4.30$ ,  $SD = 0.81$ ,  $F(1, 153) = 180.90$ ,  $p < .001$ ,  $\eta_p^2 = 0.54$ ), and less positive ( $M = 2.39$ ,  $SD = 0.91$  vs.  $M = 4.17$ ,  $SD = 0.85$ ,  $F(1, 153) = 181.55$ ,  $p < .001$ ,  $\eta_p^2 = 0.54$ ) than did participants in the positive emotion condition.<sup>7</sup>

#### 3.2.2. Allocations

The number of tickets that participants sent to the game partners in round 2 was affected by outgroup Behavior (see Fig. 3): Participants sent more tickets to the fair ( $M = 5.95$ ,  $SD = 1.99$ ) than to the unfair outgroup ( $M = 3.95$ ,  $SD = 2.10$ ),  $F(1, 153) = 37.72$ ,  $p < .001$ ,  $\eta_p^2 = 0.20$ . Neither the main effect of Emotion nor the interaction between Emotion and Behavior were significant,  $F(1, 153) = 1.48$ ,  $p = .22$ ,  $\eta_p^2 = 0.01$  and  $F(1, 153) = 1.46$ ,  $p = .23$ ,  $\eta_p^2 = 0.01$ , respectively. However, a comparison between the happiness and unhappiness emotion conditions within unfair behavior revealed a marginally significant difference, such that participants tended to allocate more tickets when the outgroup reported feeling unhappiness ( $M = 4.34$ ,  $SD = 1.97$ ) rather than happiness ( $M = 3.55$ ,  $SD = 2.17$ ),  $F(1, 153) = 3.05$ ,  $p = .08$ ,  $\eta_p^2 = 0.02$ , 95% CI  $[-1.69, 0.10]$ . The difference between the two fair conditions was not significant,  $F(1, 153) < 0.001$ ,  $p = .99$ ,  $\eta_p^2 < 0.001$ , 95% CI  $[-0.93, 0.92]$ .<sup>8</sup>

<sup>5</sup> Participants also completed the 'slider' measure of Social Value Orientation (Murphy, Ackermann, & Handgraaf, 2011). This measure was included for exploratory purposes and will not be discussed further.

<sup>6</sup> Ratings of fairness were also affected by the emotion of the outgroup representative,  $F(1, 153) = 8.79$ ,  $p = .004$ ,  $\eta_p^2 = 0.05$ , and were lower when the representative expressed negative ( $M = 2.94$ ,  $SD = 1.62$ ) than positive emotion, ( $M = 3.29$ ,  $SD = 1.68$ ). Emotion did not interact with Behavior,  $F(1, 153) = 0.33$ ,  $p = .57$ ,  $\eta_p^2 < 0.01$ .

<sup>7</sup> All three ratings were also affected by outgroup Behavior, with higher ratings of happiness and positivity, and lower ratings of unhappiness in the unfair conditions,  $F(1, 153) = 15.12$ ,  $p < .001$ ,  $\eta_p^2 = 0.09$ ,  $F(1, 153) = 16.57$ ,  $p < .001$ ,  $\eta_p^2 = 0.10$ , and  $F(1, 153) = 7.26$ ,  $p < .01$ ,  $\eta_p^2 = 0.04$ , respectively. Ratings of positivity were qualified by a marginally significant interaction between Behavior and Emotion,  $F(1, 153) = 4.04$ ,  $p = .05$ ,  $\eta_p^2 = 0.03$ , such that the difference between the positive and negative emotion condition was larger following fair, compared to unfair, behavior,  $F(1, 153) = 116.16$ ,  $p < .001$ ,  $\eta_p^2 = 0.43$  vs.  $F(1, 153) = 67.88$ ,  $p < .001$ ,  $\eta_p^2 = 0.31$ , respectively. Neither of the other two interaction effects was significant,  $F(1, 153) = 2.16$ ,  $p = .14$ ,  $\eta_p^2 = 0.01$  (happiness) and  $F(1, 153) = 0.40$ ,  $p = .53$ ,  $\eta_p^2 < 0.01$  (unhappiness).

<sup>8</sup> The nested nature of the data in Study 1 and 2, where participants were nested within groups, suggests that multilevel models would be a more appropriate statistical technique. We did not perform this analysis given the small number of level-2 units (groups) combined with a small number of level-1 observations per group, which is lower than the minimum recommended for

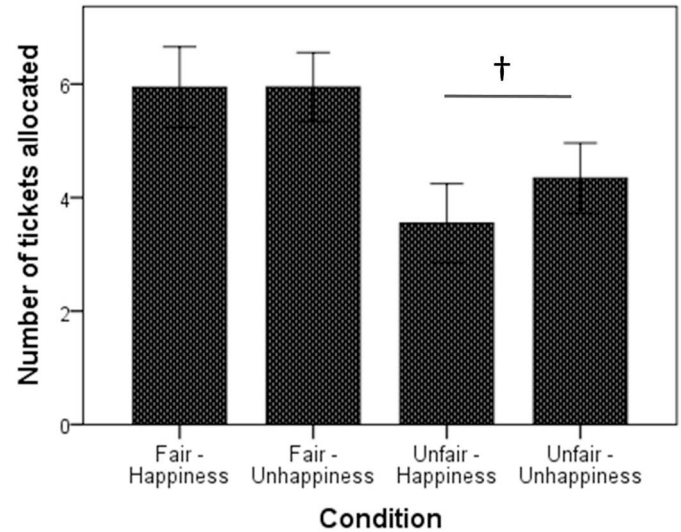


Fig. 3. Allocations in the second round of the trust game as a function of the experimental condition. Error bars represent 95% confidence intervals. † =  $p < .10$  (Study 2).

#### 3.2.3. Expected outgroup allocations

Expectations of outgroup allocations were influenced by outgroup Behavior: Participants thought that members of fair teams would send more tickets ( $M = 5.63$ ,  $SD = 1.35$ ) than members of unfair teams ( $M = 2.91$ ,  $SD = 1.95$ ),  $F(1, 153) = 102.12$ ,  $p < .001$ ,  $\eta_p^2 = 0.40$ . However, neither the main effect of Emotion nor the Behavior by Emotion interaction were significant,  $F(1, 153) < 0.01$ ,  $p = .95$ ,  $\eta_p^2 < 0.01$ ,  $F(1, 153) = 2.64$ ,  $p = .11$ ,  $\eta_p^2 = 0.02$ , and a planned comparison within the unfair condition revealed no significant effect of emotion,  $F(1, 153) = 1.26$ ,  $p = .26$ ,  $\eta_p^2 < 0.01$ , 95% CI  $[-1.16, 0.32]$ .

Correlations between the key dependent variables the fair and unfair Behavior conditions are shown in Table 2. As well as the strong and significant relation between allocations and expectations of outgroup behavior, it is worth noting that, as in Study 1, allocations in the unfair condition were negatively correlated with ratings of the outgroup representative's happiness and positivity.

### 3.3. Discussion

In a conceptual replication of Study 1, we tested whether expressed emotions moderated the effects of unfair behavior on intergroup trust. An important difference with Study 1 was the way in which outgroup emotions were operationalized; here they were conveyed by the pictograms of the Self-Assessment Manikin scales, rather than by recordings of dynamic facial expressions. The results showed that negative emotions tended to influence allocations in a manner consistent with the findings of Study 1: Unhappiness following unfair behavior tended to increase allocations, when compared to happiness. Both experiments reveal that, in the context of an intergroup trust game, breaches of trust can be mitigated by expressions of negative non-confrontational

(footnote continued)

multilevel analysis (Bell, Morgan, Kromrey, & Ferron, 2010; Maas & Hox, 2005). Instead, we conducted an additional analysis combining the data from Studies 1 and 2, and using groups (rather than individual observations) as the unit of analysis. This analysis is now reported in the Supplemental Materials, S5. The results are consistent with the conclusions drawn from the separate analyses of Studies 1 and 2, with a marginally significant interaction between Emotion and Behavior,  $F(1, 108) = 3.26$ ,  $p = .07$ ,  $\eta_p^2 = 0.03$ , and a significant difference between allocations made in the regret/unhappiness condition ( $M = 4.18$ ,  $SD = 1.48$ ) and those made in the happiness condition ( $M = 3.23$ ,  $SD = 1.67$ ),  $F(1, 108) = 6.60$ ,  $p = .01$ ,  $\eta_p^2 = 0.06$ , 95% CI  $[0.22, 1.69]$ .



**Table 2**

Correlations between allocations, expectations of outgroup behavior, identification, and emotion ratings (Study 2). Cells above the diagonal represent the fair conditions and cells below the diagonal represent the unfair conditions.

	1	2	3	4	5	6	7	8
1. Allocations	–	<b>0.51***</b>	–0.17	0.19	–0.04	–0.01	–0.04	0.05
2. Expectations of outgroup behavior	<b>0.65***</b>	–	0.06	0.06	–0.13	0.14	–0.06	0.21
3. Identification with ingroup	< 0.01	0.13	–	0.15	0.19	0.15	–0.09	0.09
4. Identification with outgroup	0.06	0.04	<b>0.45***</b>	–	–0.01	0.12	0.08	0.08
5. Fairness	–0.12	–0.09	–0.14	0.03	–	<b>0.23*</b>	–0.36**	<b>0.29*</b>
6. Happiness	<b>–0.26*</b>	–0.18	–0.08	<b>–0.23*</b>	0.04	–	<b>–0.48***</b>	<b>0.85***</b>
7. Unhappiness	0.20	–0.05	0.02	–0.01	0.01	<b>–0.54***</b>	–	<b>–0.45***</b>
8. Positivity	<b>–0.22*</b>	–0.17	–0.21	–0.12	0.16	<b>0.75***</b>	<b>–0.53***</b>	–

Note. Correlations in bold are significant, with \* denoting  $p < .05$ , \*\* denoting  $p < .01$ , and \*\*\* denoting  $p < .001$ .

emotions. They also suggest that the influence of emotion observed in one-to-one interactions (De Melo et al., 2014) extends to intergroup settings, such that emotions expressed by one member of an outgroup influence future interactions with other outgroup members.

However, the effect of emotions in Study 2 was limited to the measure of behavioral trust, and was weaker than the one observed in Study 1. This difference is also reflected in the relation between trust and ratings of emotions of the outgroup representative: The correlations between allocations and emotion ratings were weaker in Study 2 than in Study 1. Such discrepancies between the two studies suggest that the expression of regret in Study 1 conveyed appeasement and readiness to change the group's behavior more effectively than did the unhappy pictograms used in Study 2, which communicated general negative valence. This highlights the difference between regret and general negative affect, which can convey different messages, including dependency and need for help (van Kleef et al., 2006). As a result, participants may have varied in their interpretations of this expression of diffuse negativity, leading to more 'noisy' responses. It is also worth noting that in Study 2, subjects were told that the outgroup would not know that the ingroup was able to see the outgroup's responses to the SAM scales. As a result, the completed questionnaires could have been interpreted as a less direct signal to the ingroup than the facial expressions used in Study 1, adding to the uncertainty about the communicated motives and emotions.

Similarly, the fact that stronger effects of emotion expressions were observed in Study 1 suggests that dynamic facial displays of discrete emotions have a bigger impact on participants' trust than do static images of Self-Assessment Manikin scales. Our findings also lend support to arguments that bipolar affect scale instruments, such as the Self-Assessment Manikin, may be insufficient to capture the more complex emotional states experienced by people in social dilemmas (Schniter et al., 2015). Finally, it is worth noting that the emotion manipulation in Study 2 tended to affect allocations, but not expectations of outgroup behavior. This suggests that, despite being highly correlated, these two constructs are not identical and that participants' decisions to share resources in the trust game may be more subject to affective influences than are their estimates of how members of the other group would behave (Fetchenhauer & Dunning, 2012).

One limitation of Studies 1 and 2 is that in the absence of a neutral control condition we are unable to conclude whether the observed effects of emotion following breaches of trust are due to displays of regret (or negative emotion) enhancing intergroup trust or to displays of happiness (or positive emotion) reducing intergroup trust. Moreover, we lack strong evidence for the interpretation that the increase in trust following the facial expressions of regret was due to the regret-related expectation that the outgroup was likely to change its behavior in the future. Another potential limitation relates to the measurement of allocations to the outgroup. In round 2, participants were told that they would play with an anonymous outgroup member, leaving open the theoretical possibility that this could be the same outgroup representative who had been observed in the first round. It is therefore

possible that the findings of Studies 1 and 2 partly reflect the influence of emotion at the interpersonal, rather than intergroup, level. We aimed to address these limitations in Study 3, where emotions were (as in Study 1) manipulated by means of dynamic video recordings of an outgroup representative's facial expressions.

Given that regret did not affect participants' trust in the fair behavior conditions of Studies 1 and 2, Study 3 focused on the effects of regret following unfairness. To distinguish the effects of regret from those of happiness, we included a neutral expression condition. Moreover, in round 2 we asked participants to share resources with an outgroup member who was explicitly said to be someone other than the outgroup representative observed in the first round. Finally, to shed more light on the presumed mechanism underlying the findings of Studies 1 and 2, we specifically assessed the extent to which the facial expressions of the outgroup representative conveyed her willingness to change the allocation decision if she had the chance. This appraisal has been linked with regret (e.g., Martinez et al., 2011) and provides information about the expresser's likely future behaviors.

#### 4. Study 3

Like Study 1, Study 3 used video recordings of facial expressions, this time portrayed by an experienced female actor. In a within-subjects design, participants saw the outgroup representative's happy, regretful, and neutral facial expressions, ostensibly showing how she and her group felt about the outcome of the round. After seeing each expression, subjects were asked to imagine that they were to play a second round of the same game with another member of the outgroup team. They then indicated the number of lottery tickets that they would send to this other person, and their expectations of how many tickets the person would return. Consistent with the findings of Studies 1 and 2, we hypothesized that participants would send more lottery tickets to the other outgroup member and would expect this person to return more when the outgroup representative was regretful, rather than happy or neutral, about her unfair decision. We also predicted that participants' perceptions of the outgroup representative's willingness to change her decision would be higher following expressions of regret than following happy or neutral expressions.

##### 4.1. Method

##### 4.1.1. Design and participants

This study had a 3-condition (Emotion: happiness, neutral, regret) within-subjects design.<sup>9</sup> Participants were recruited via Pureprofile, an

<sup>9</sup> Participants also rated two other facial expressions, but because these expressions were not the focus of the present research, this will not be discussed further. A further group of participants completed exactly the same task in an interpersonal, rather than intergroup, setting. The interpersonal condition yielded a similar pattern of results to the one found in the intergroup condition, but again this was not the focus of the present research and will not be

external survey organization, and we aimed to recruit a minimum of 40 subjects. Forty-two participants (23 females,  $M_{\text{age}} = 30.43$  years,  $SD = 3.63$ ) completed the study and were paid for their participation. With this number of participants, we achieved 80% statistical power ( $\alpha = 0.05$ ) to detect a medium-sized interaction effect ( $f = 0.25$ ) in a within-subjects ANOVA.

#### 4.1.2. Procedure

This was an on-line experiment using Qualtrics (version 1.869s, Provo, UT) to display the stimuli and collect responses. After providing consent, participants were asked to adopt the role of being a member of a 3-person group, and to imagine that they would be playing a game with another person who was a member of a different 3-person team. The two teams would be playing to gain lottery tickets. Next, participants read the instructions of the trust game, identical to the instructions used in Studies 1 and 2.

The other team was displayed in a series of video sequences (size:  $480 \times 853$ ) embedded in the online survey and recorded with a webcam (Microsoft Lifecam HD-3000; frame rate: 29 frames/s). As in Study 1, the sequences represented a female actor, sitting in front of a computer with three other persons standing behind her. After watching the first video sequence, in which the outgroup representative greeted the participant, subjects answered three screening questions testing their understanding of the possible outcomes. The rest of the questionnaire was only presented to participants who correctly answered all three questions.<sup>10</sup> Subjects were asked to imagine a situation in which they had sent 7 of their 10 tickets to the other team. They then saw the second video sequence in which the outgroup representative turned to consult with her team. Next, they were told that the other group had decided not to return any tickets, resulting in the participant's group finishing the round with 3 tickets, compared with the other group's 31 tickets. Participants then saw, in random order, the video sequences showing regretful, happy, and neutral expressions of the outgroup representative, and were asked to imagine that each video depicted how the representative and her team felt about the decision they had made. The sequences were similar to those used in Study 1 and were validated in a pilot study (see Supplemental Materials, S4 for a detailed description and [https://osf.io/h7av3/?view\\_only=64a45a1b7def4d95b1231e35df6a2c78](https://osf.io/h7av3/?view_only=64a45a1b7def4d95b1231e35df6a2c78) for the video files). Fig. 4 shows still images from the three emotion videos.

After each video, participants were asked to imagine a situation in which they played the same game with another member of the same outgroup and were asked to decide how many lottery tickets (out of 10) they wished to send to this person. We also asked about subjects' expectations of the number of tickets that this person would return after receiving 5 tickets (and therefore having 25 tickets to share after this allocation was tripled). Finally, participants used 7-point scales to rate how positive the outgroup representative had felt about the number of tickets her team gained and how much she would like to change her decision, if she had the chance to do so (see [https://osf.io/h7av3/?view\\_only=64a45a1b7def4d95b1231e35df6a2c78](https://osf.io/h7av3/?view_only=64a45a1b7def4d95b1231e35df6a2c78) for the full questionnaire). After seeing the videos and answering the corresponding questions, participants were thanked and paid for completing the study.

## 4.2. Results

### 4.2.1. Manipulation check

The ratings of how positive the representative felt about the number of tickets her team sent varied significantly as a function of Emotion,  $F(2, 82) = 102.43$ ,  $p < .001$ ,  $\eta_p^2 = 0.71$ . Pairwise comparisons revealed that the outgroup representative was perceived as significantly more

positive when she smiled ( $M = 6.38$ ,  $SD = 0.88$ ) than when she adopted the neutral facial expression ( $M = 3.55$ ,  $SD = 1.15$ ,  $p < .001$ , 95% CI [2.55, 3.50]). The difference between the regret ( $M = 3.36$ ,  $SD = 1.30$ ) and neutral conditions was not significant,  $p = .47$ , 95% CI [−0.72, 0.33].

### 4.2.2. Willingness to change decision

Responses to the question about the extent to which the outgroup representative would like to change her decision were also affected by the facial expression she displayed,  $F(2, 82) = 18.88$ ,  $p < .001$ ,  $\eta_p^2 = 0.31$ . Specifically, the regret expression elicited higher scores on this measure ( $M = 4.69$ ,  $SD = 1.69$ ) than did the neutral facial expression ( $M = 3.62$ ,  $SD = 1.39$ ,  $p = .003$ , 95% CI [0.40, 1.75]). The difference between the smile ( $M = 2.48$ ,  $SD = 1.71$ ) and the neutral expression was also significant,  $p = .005$ , 95% CI [0.37, 1.91]. In sum, while facial expressions of happiness elicited high ratings of positivity, the expression of regret was associated with increased willingness to change one's behavior.

### 4.2.3. Allocations

Participants' hypothetical allocations were significantly influenced by Emotion,  $F(2, 82) = 5.52$ ,  $p = .006$ ,  $\eta_p^2 = 0.12$  (see Fig. 5). Pairwise comparisons revealed that participants were willing to send more tickets after seeing the regret expression ( $M = 3.19$ ,  $SD = 2.72$ ) than after seeing the neutral facial expression ( $M = 2.31$ ,  $SD = 2.50$ ),  $p = .04$ , 95% CI [0.04, 1.72]. The difference between the neutral and smile expressions ( $M = 1.93$ ,  $SD = 2.15$ ) was not significant,  $p = .28$ , 95% CI [−0.32, 1.09].

### 4.2.4. Expected outgroup allocations

Participants' expectations of how much the outgroup game partner would return also varied significantly as a function of Emotion,  $F(2, 82) = 10.80$ ,  $p < .001$ ,  $\eta_p^2 = 0.21$ . Outgroup game partners were expected to send more tickets when the representative had expressed regret ( $M = 7.05$ ,  $SD = 5.55$ ), compared to the neutral facial expression ( $M = 4.43$ ,  $SD = 4.65$ ),  $p = .005$ , 95% CI [0.82, 4.42]. The difference between the smile ( $M = 3.17$ ,  $SD = 4.14$ ) and the neutral facial expression was only marginally significant,  $p = .07$ , 95% CI [−0.10, 2.62].

Table 3 displays correlations between the key measures in the three emotion conditions. As in Studies 1 and 2, there was a significant correlation between participants' allocations and expectations of outgroup behavior. Importantly, allocations were also significantly and positively associated with participants' ratings of the representative's willingness to change her behavior. This association was significant in the smile and regret conditions, but not in the neutral condition.

## 4.3. Discussion

As in Study 1, regret and happiness were conveyed by dynamic videos of facial expressions, but this time we compared the effects of the two emotion displays with a neutral, baseline condition. This allows us to conclude that the observed effects following a breach of trust are due to regret enhancing intergroup trust, rather than smiles weakening intergroup trust. Participants were also explicitly told that they were playing the second round of the game with an outgroup member who was *not* the outgroup representative seen in round 1. The fact that the facial expressions of the group representative affected how participants anticipated behaving towards a *different* group member confirms that the effects of one outgroup member's emotional expressions generalize to behavior towards other outgroup members.

A potential limitation of Study 3 is the use of a hypothetical, rather than real, setting in a within-subjects study, with participants providing their responses individually, rather than in small groups. It is possible that these changes – which were motivated by feasibility constraints – reduced the immersive character of the experiment, as well as the

(footnote continued)  
discussed further.

<sup>10</sup> All participants had been informed about the presence of screening questions in the survey before providing consent.





Fig. 4. Emotion stimuli used in Study 3: expressions of regret, neutrality, and happiness displayed by the outgroup representative following an unfair decision.



Fig. 5. Study 3: participants' allocations in the trust game as a function of the Emotion displayed by the outgroup representative after unfair behavior. Error bars represent 95% confidence intervals. The asterisk indicates significance at

salience of the perceived intergroup context. On the other hand, this conceptual replication of the findings of Studies 1 and 2 in a sample derived from general population rather than undergraduate students provides additional support for the prediction that emotional displays of one individual affect trust towards the group to which this person belongs.

The findings extend the results of Studies 1 and 2 to a new set of stimuli: Once again, facial expressions of regret elicited higher levels of trust than did smiling facial expressions, in terms of both allocations and expectations of outgroup behavior. The findings also reveal that the expression of regret conveys information about how likely the unfair behavior is to recur in the future. Finally, the findings again suggest that facial expressions of regret influence participants' economic decisions more strongly than pictograms communicating generally negative affect.

## 5. General discussion

In three experiments, we examined how expressions of regret affect intergroup trust following unfair outgroup behavior. Findings revealed greater trust towards an outgroup member when an unfair representative of the outgroup had expressed regret or unhappiness rather than happiness about their behavior, with regret expressions exerting a more marked influence than expressions of general unhappiness. Comparing regret and happiness with a neutral expression in Study 3 revealed that the effects of emotion were driven by expressions of regret increasing trust, rather than expressions of happiness

decreasing trust. As revealed in Study 3, expressions of regret communicated not only the representative's negative feelings about the decision, but also a willingness to change behavior – an appraisal that significantly predicted participants' own allocation decisions.

Our results extend the findings of Van der Schalk et al. (2015), who used two interpersonal games to show that observing how another person feels about fair and unfair behavior affects the observer's own economic decisions. However, unlike Van der Schalk et al. (2015), we focused on trust. This was motivated by the relevance of this construct for cooperation, forgiveness, and successful intergroup exchanges (e.g., Serva, Fuller, & Mayer, 2005). In the present research, we used a variation of the trust game to simulate a competitive intergroup setting in which two groups communicate via representatives (Folmer et al., 2017), and where one group behaves unfairly during an initial exchange, creating a breach of trust (Lount et al., 2008). The damaging effect of such a breach was reflected in a substantial main effect of outgroup behavior on subsequent trust in Studies 1 and 2. However, our results show that facial expressions of regret, even when unaccompanied by any verbal messages, are sufficiently powerful to enhance trust during subsequent interactions with other members of the transgressing group. To our knowledge, this is the first time that such an effect has been reported, although the finding dovetails well with previous results documenting the effects of emotions accompanying real-world apologies (Ten Brinke & Adams, 2015).

In line with previous work, our studies support theoretical positions arguing that expressions of regret, like other appeasement emotions such as guilt or embarrassment, can serve as nonverbal apologies, signaling a willingness to repair the relationship (Baumeister et al., 1994; Feinberg et al., 2012; Schniter et al., 2015; Semin & Manstead, 1982). Our studies are also in line with work that illustrates the relationship-repairing potential of appeasement emotions in intergroup settings. For example, by investigating the effects of emotions conveyed by the outgroup, our experiments complement the findings of a recent study by Shore, Rychlowska, Van der Schalk, Parkinson, and Manstead (2018) exploring the effects of emotion expressions of the ingroup. In this study, guilt – an appeasement emotion conceptually close to regret (Baumeister et al., 1994) – expressed by an ingroup member who failed to reciprocate a trusting move by the outgroup increased participants' own feelings of guilt and their allocations in a subsequent round of a trust game. Similarly, a recent study by Solak, Reifen Tagar, Cohen-Chen, Saguy, and Halperin (2016) suggests that the influence of appeasement emotions extends to the real-world settings of the 2014 war in Gaza and racial tensions in the US. Given that feelings of regret, guilt, or empathy do not typically occur spontaneously in a perpetrator group, an important avenue for future research will be to investigate the extent to which such emotions are elicited by other elements of the context (Levy, van Zomeren, Saguy, & Halperin, 2017).

Interestingly, in the present research, emotions influenced participants' decisions in the unfair (competitive), but not in the fair (cooperative) behavior conditions. This may be due to the norm of fairness established by the confederate's initial trusting move (sending 7 tickets out of 10) in the first round, and to the fact that the outgroup decision

**Table 3**

Correlations between allocations, expectation of outgroup behavior, and emotion ratings in the regret, neutral, and happiness condition (Study 3).

	Regret			Neutral			Happiness		
	1	2	3	1	2	3	1	2	3
1. Allocations									
2. Expectations of outgroup behavior	<b>0.59***</b>			<b>0.52***</b>			<b>0.48**</b>		
3. Positivity about the outcome	<b>−0.27*</b>	<b>−0.36**</b>		0.20	−0.09		<b>−0.38*</b>	−0.04	
4. Willingness to change decision	<b>0.46**</b>	<b>0.39**</b>	<b>−0.50**</b>	0.17	<b>0.56***</b>	−0.17	<b>0.42**</b>	0.07	<b>−0.69***</b>

Note. Correlations in bold are significant, with \* denoting  $p < .05$ , \*\* denoting  $p < .01$ , and \*\*\* denoting  $p < .001$ .

not to return any tickets was an extreme breach of trust. Such a violation of the fairness norm might have induced a state of increased vigilance and uncertainty in participants (Mendes, Blascovich, Hunter, Lickel, & Jost, 2007), in which emotion information became particularly relevant (Niedenthal, Mermillod, Maringer, & Hess, 2010). Consistent with this line of reasoning, results of a recent study (Hoegen, Stratou, & Gratch, 2017) showed that emotion expressions are not informative during mutual cooperation but become especially relevant for predicting people's decisions when players behave unfairly. While the effects of appeasement displays are likely moderated by the extent to which these expressions are spontaneous vs. strategic (Shore & Parkinson, 2017), our research reveals that the reparatory effects of regret extend to competitive contexts.

Our results also complement the findings of Van Kleef et al. (2006). These researchers showed that seeing a negotiation opponent expressing appeasement emotions – such as regret or guilt – increased participants' expectations that the other would make concessions and as a result increased the toughness of their own demands. Conversely, participants who were exposed to emotions communicating dependency and need for help, such as disappointment or worry, made greater concessions. These opposing effects of different types of negative emotions shed additional light on the small effect sizes observed in Study 2, in which we manipulated unhappiness – a non-specific negative emotion, potentially conveying elements of both appeasement and need for help.

It should be acknowledged that the interaction between outgroup behavior and outgroup emotion was not significant in Study 2, and that the planned comparison between the two fair conditions was only marginally significant. While the pattern of results in Study 2 echoed the one observed in the two other studies, we interpret the weaker effects of emotion on participants' allocations in Study 2 as reflecting the lack of specificity of the emotion manipulation: Whereas in Studies 1 and 3 the outgroup team used facial expressions to convey regret and readiness to change one's behavior, in Study 2 the outgroup team expressed general negative affect which presumably conveyed less information about how they appraised their past decision and about their future intentions. We therefore argue that the lack of statistical significance of the results in Study 2 shows that our findings are specific to expressions of regret, rather than general negative affect. This interpretation is supported by the significant positive correlation, observed in Study 3, between participants' allocations and their judgments of the outgroup representative's willingness to change her decision observed in the emotion conditions of Study 3. It is also possible that the videos in which participants could see the facial expressions of the outgroup representative were more compelling than the text-and-pictogram descriptions used in Study 2. People are known to be more sensitive to changes in faces than to changes in other objects, given the unique biological significance of faces (Ro, Russell, & Lavie, 2001), which would also help to account for the more powerful effects observed in the two studies using video stimuli.

Another potential limitation of the current research is that the effects for the comparisons of interest between regret (or unhappiness) and happiness following unfair outgroup behavior were relatively small in size ( $d = 0.33$ , Study 1;  $d = 0.24$ , Study 2, and  $d = 0.51$ , Study 3),

such that on average participants sent approximately one additional ticket more to members of an outgroup that had expressed regret than to members of an outgroup that had expressed happiness. At first glance, this may not seem impressive, especially compared with the substantial effect of outgroup behavior ( $d = 1.56$ , Study 1;  $d = 0.98$ , Study 2), where the difference in allocations to the fair versus unfair teams was around two (Study 2) or nearly three (Study 1) tickets. However, it is worth keeping in mind the fact that the trust violation occurred in an intergroup setting with a representative – where trust restoration is challenging (Folmer et al., 2017) – and was serious in nature: After the ingroup's initial trusting move, the outgroup failed to return any tickets and thereby showed itself to be untrustworthy. The fact that expressions of emotion are powerful enough to enhance trust after such a serious transgression demonstrates their potential for improving intergroup relations. In real-world contexts, where emotions are likely to have a similar influence (Ten Brinke & Adams, 2015), even small improvements in intergroup trust may translate into savings of millions of dollars, tons of carbon dioxide, or many thousands of lives.

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### Open practices

Experimental stimuli and datasets from the three studies are available at [https://osf.io/h7av3/?view\\_only=64a45a1b7def4d95b1231e35df6a2c78](https://osf.io/h7av3/?view_only=64a45a1b7def4d95b1231e35df6a2c78).

### Appendix A. Supplementary materials

Supplementary materials to this article can be found online at <https://doi.org/10.1016/j.jesp.2019.01.006>.

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