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Dominance, reward, and affiliation smiles modulate the meaning of uncooperative or untrustworthy behaviour

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ABSTRACT

We investigated the effects of different types of smiles on the perception of uncooperative or untrustworthy behaviour. In five studies, participants assigned to one group played an economic game with a representative of another group. In an initial round, the representative acted uncooperatively by favouring their group and then displayed a dominance, reward, or affiliation smile. Participants rated the motives of the representative and played a second round of the game with a different member of the same outgroup. Following uncooperative or untrustworthy behaviour, affiliation smiles communicated *less positivity and superiority*, and a *greater desire to both repair the relationship* between groups and *change the uncooperative decision* than reward or dominance smiles. Perceptions of a desire to repair the relationship and to change the decision were associated with trust and cooperation in a subsequent round of the game. Together, these findings show that smiles that are subtly different in their morphology can convey different messages and highlight the importance of these expressions in influencing the perceptions of others' intentions.

Facial expressions are social signals that efficiently communicate behavioural intentions, feelings, and requests for specific responses from perceivers (e.g. Martin et al., 2017; Parkinson et al., 2012; Scarantino, 2019). They can mark the honest meaning of a particular gesture or interaction. For example, doing someone a service with an angry expression rather than a smile suggests that the help is offered out of obligation rather than kindness; and a smile that masks fear or disgust is typically viewed as "fake", suggesting that the situation should be interpreted as something other than joyful (Johnston et al., 2010). In general, people cooperate more when behaviour is associated with a real compared to fake smile (Brown & Moore, 2002). Indeed, a fundamental function of some smiles is to broadcast a willingness

to cooperate (Mehu et al., 2007). However, recent research suggests that smiles can signal multiple meanings. In addition to communicating positive feelings and serving to reward behaviour, morphologically different smile displays can also be honest signals of non-threat and of superiority (Martin et al., 2021; Niedenthal et al., 2010; Rychlowska et al., 2017). The present research examined the influence of dominance, reward, and affiliation smiles on the perception of uncooperative behaviour.

How do different smiles mark the meaning of a social interaction? The information conveyed by these signals is especially useful in determining whether another individual can be trusted in situations that involve vulnerability to exploitation, such as social dilemmas (Dawes, 1980; Hardin, 2002). In

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everyday interactions, it is common for people to trust each other and cooperate. For example, in studies using the trust game (Berg et al., 1995) individuals are willing to send and return resources to others (Johnson & Mislin, 2011), even though the "homo economicus" model predicts that nothing should be sent or received. In fact, cooperative behaviour seems to be the norm and departures from this are surprising. As a result, facial expressions of an opponent after an act of defection are particularly meaningful (e.g. Hoegen et al., 2017). For example, if an individual acts uncooperatively but then looks regretful, they are likely perceived differently than if they display a joyful smile or a smile of superiority. In the present research we examine these issues in an intergroup context, because group interactions are characterised by increased competitiveness and intergroup trust is generally harder to maintain and repair than trust between individuals (e.g. Reinders Folmer et al., 2019).

Smiles and their social functions

Although a substantial literature (e.g. Harker & Keltner, 2001; Otta et al., 1996) confirms that smiles have positive interpersonal effects, these expressions vary in their perceived genuineness (e.g. Krumhuber et al., 2007) and social function. For example, Martin et al. (2017) proposed that smiles can be divided into at least three broad categories. *Dominance* smiles signal superior status and are used to safely negotiate social hierarchies. *Reward* smiles convey positive feelings and are used to reward behaviour. *Affiliation* smiles communicate broadly prosocial motives and are used to signal non-threat. Although these displays are all called smiles and are categorised as such, note that neither dominance nor affiliation smiles are held to be signals of underlying positive emotion (Niedenthal et al., 2010).

Smiles have been typically shown to promote trust and cooperation. For example, people are more cooperative when their interaction partner smiles, compared to showing a non-expressive face (Scharlemann et al., 2001). However, not all smiles elicit trust and cooperation; perceptions of smile authenticity vary depending upon specific features of smile dynamics, and smiles perceived as inauthentic elicit less trust than those perceived as authentic (Centorrino et al., 2015; Krumhuber et al., 2007). In a recent study (Martin et al., 2021), participants played a trust game with individuals who made of dominance, reward, and affiliation smiles, as well as

expressions of anger, disgust, and sadness. Consistent with previous studies, participants trusted smiling persons more than persons displaying other expressions. However, there were also differences in participants' trust in line with the theorised function of the three smile types: reward smiles induced the highest levels of trust, whereas dominance smiles elicited the lowest levels of trust, with affiliation smiles falling in between.

The research reviewed above provides insight into the messages conveyed by different smile types, but it is worth noting that participants in both studies were shown faces of smiling individuals in the absence of any interaction. A growing literature suggests that the situation in which a facial expression occurs significantly influences how the expression is perceived (Greenaway et al., 2018; Hess & Hareli, 2017; van Kleef et al., 2016). For example, De Melo et al. (2014) found that observing a partner's smile following defection in an economic game decreased the likelihood that people would act cooperatively in a subsequent interaction, whereas observing the same smile following mutual cooperation increased cooperation. In addition, seeing someone smile after engaging in a behaviour communicated that the behaviour was conducive to this person's goals and made the observer more likely to act in a similar way. By contrast, expressions of regret communicated that the behaviour was not conducive to one's goals. Both expressions could thus increase or decrease cooperation, depending on whether they were displayed in response to competitive or cooperative behaviours. Here we investigate how dominance, reward, and affiliation smiles modulate the meaning of uncooperative or untrustworthy behaviour.

The present research

In five studies, we examine how different smiles affect social perceptions and trust after uncooperative or non-trusting behaviour. We focus on intergroup settings because, as noted earlier, trust in such contexts is more difficult to establish and maintain than interpersonal trust (e.g. Reinders Folmer et al., 2019; Sherif & Sherif, 1953). At the same time, trust is needed precisely when it is most difficult to achieve (Tam et al., 2009) and from a societal perspective it is crucial that different groups build cooperative relationships. Despite evidence that facial expressions affect trust and cooperation in dyadic settings (e.g. De Melo et al., 2014; van der Schalk et al., 2015), few

studies have investigated these effects in intergroup contexts.

We tested the hypothesis that dominance, reward, and affiliation smiles convey distinct motives when displayed following uncooperative behaviour in an intergroup economic game. In light of their social functions, dominance smiles should convey superiority and highlight one group's advantage following uncooperative behaviour, thereby signalling that this person is likely to be uncooperative in the future and decreasing intergroup trust. Reward smiles should communicate the expresser's happiness with the uncooperative act and also signal that this person is likely to repeat this behaviour in the future, thereby decreasing intergroup trust. Finally, affiliation smiles should communicate willingness to repair the relationship and increase trust. We also examined the influence of neutral and regret expressions in this context. Regret expressions signal that the expresser feels bad about a given action and wants to repair it (Rychlowska et al., 2019; Zeelenberg et al., 2000), and should therefore increase trust compared to the neutral expression.
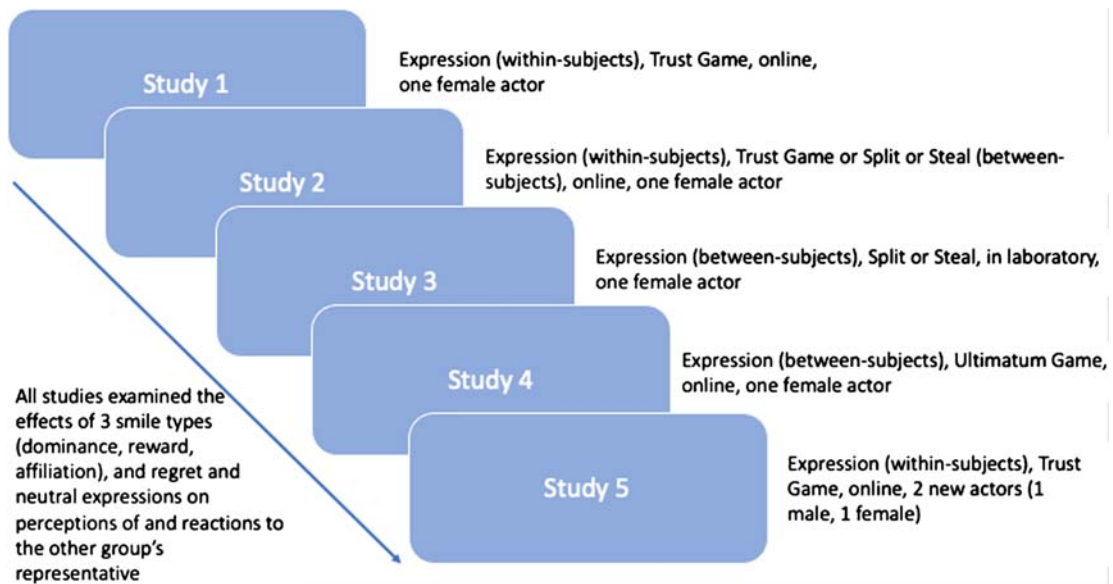
Overview of the studies

Figure 1 provides a schematic overview of the five studies. We used three economic games to test our hypotheses: the trust game (adapted from Berg et al., 1995); Split or Steal, a variant of the Prisoner's Dilemma (van den Assem et al., 2012); and the Ultimatum Game (Güth et al., 1982). Participants played each game as representatives of a team and imagined (Studies 1, 2, 5) or witnessed (Studies 3 and 4) their group being exploited by a representative of another group (henceforth "the representative").[1] Participants then saw the facial expression of the representative, supposedly showing how they and their group felt about the exploitative move. Participants next rated the feelings and motives of the representative, including perceptions of how positive and superior the representative felt, how willing they were to repair the relationship between the groups, and their desire to change the decision if they were given a chance to do so. In addition to these ratings, we collected several measures of trust in Studies 1-4. In Study 5 we examined whether the main findings regarding social motives in Studies 1–4 could be replicated using a different set of stimulus expressions. Stimuli in all studies were video sequences displaying dominance, reward, and affiliation smiles

and a regret and neutral expression (see https://osf.io/n82s9/ for all stimuli and Supplemental Materials for detailed description). The videos used in Studies 1–4 showed a female actor sitting in front of a computer with three other individuals standing behind her (see Figure 2). In the first video, the representative greeted the participant and waved her hand. The second video showed her turning to her team, ostensibly discussing the next move in the game (which, as noted earlier, was always an uncooperative or exploitative move). The remaining five clips displayed the representative's facial expressions: a reward smile, an affiliation smile, a dominance smile, an expression of regret, and a neutral face. Apart from the neutral expression, the videos depicted the evolution of the facial expression from neutral to full intensity. Study 5 used a different set of stimuli displaying the same facial expressions produced by a male and a female actor. The videos in Study 5 were validated in previous research (Martin et al., 2021; Rychlowska et al., 2017) and also depicted the evolution of the facial expression from neutral to full intensity.

Participants next rated the extent to which the representative felt positive (Studies 1, 2, 3 and 5) or happy (Study 4) about the outcome of the game (e.g. *How positive did [the representative] feel about his/her decision?*),[2] the extent to which the representative felt that their group did better than (i.e. was superior to) the participant's group (e.g. *To what extent did [the representative] show that [the other group] did better than [participant's group]?*), the extent to which the representative wanted to repair the relationship between the two groups (e.g. *To what extent did [the representative] appear to want to repair the relationship between [the other group] and [participant's group]?*), and the extent to which the representative would like to change their decision if they had the chance to do so (e.g. *To what extent do you think that [the representative] would like to change his/her decision if he/she had the chance to do so?*). As a measure of trust, participants in Studies 1–4 also rated their expectations of the other group's resource allocations in a subsequent round of the game (Studies 1-3), their trust in the other group (Study 4), and decided how to share resources with the other group (Study 3 and 4). Study 5 was a replication using a different set of stimuli; here we focused on participants' perceptions of the representative's feelings and motives and did not include measures of trust.

Figure 1. Schematic overview of the five studies, showing the experimental manipulations, the intergroup game, the study platform, and the actors used in each study.

Hypotheses

We had four hypotheses about how facial expressions displayed by the representative, following uncooperative or untrustworthy behaviour, would affect participants' perceptions and behaviours. First, given existing findings linking smiles with positive feelings (e.g. Messinger et al., 2001) and goal conduciveness (De Melo et al., 2014), we predicted (Hypothesis 1, H1) that all smiles displayed by the representative, compared to neutral and regret expressions, would communicate more positive affect and less willingness to repair the relationship or to change the uncooperative decision, thus decreasing trust. In line with the main goal of the current research, we predicted (Hypothesis 2, H2) that, following uncooperative or

Figure 2. Still frames illustrating the dynamic facial expression stimuli (Studies 1-4): The three smile types, neutral, and regret expressions displayed by the other group's representative following an uncooperative decision.

untrustworthy behaviour, the representative's affiliation smiles would convey less positive affect, less superiority, and greater willingness to repair the relationship, and to change the uncooperative decision than would reward and dominance smiles, thus improving trust. Next, we predicted (Hypothesis 3, H3) that dominance smiles displayed by the representative, because they communicate superiority in social hierarchies, would convey less positivity and more superiority than reward smiles, less willingness to repair the relationship and less desire to change the uncooperative decision, and also decrease trust. Fourth, we predicted (Hypothesis 4, H4) that, consistent with existing findings on regret in economic games (van der Schalk et al., 2015), the representative's expressions of regret, compared to neutral expressions, would convey lower levels of positive affect and superiority, more desire to repair the relationship and change the decision, and also improve trust. Finally, consistent with previous findings (De Melo et al., 2014), we expected that participants' perceptions that the representative felt positive and superior following the transgression would be negatively related to trust (Hypothesis 5, H5). We also predicted that the representative wanted to repair the intergroup relationship and change the decision would be positively correlated with trust (Hypothesis 6, H6). Below we describe the procedures for each study and report the results of the analyses for each set of dependent variables. Tests of H5 and H6 are reported in the final section, *Summary of Results across Studies*, which also provides an overview of the findings.

Study 1

Design and participants

The study had a 5-condition (facial expression: reward smile, affiliation smile, dominance smile, neutral, regret expression) within-subjects design. Participants were recruited via Pureprofile. We aimed to recruit a minimum of 31 subjects to achieve 95% statistical power ($\alpha = 0.05$) to detect a medium-sized ($f = 0.25$) main effect in a within-subjects ANOVA. Fifty-four participants (32 females, age mean $M = 32.65$ years, $SD = 2.98$) completed the study and were paid for their time.

Procedure

Participants played the trust game, in which one player (the "trustor") decides how much of a resource s/he wants to send to the other player (the "trustee"). Any resource sent to the trustee is tripled. The trustee can then return any proportion of their resource to the trustor. Sending more resources to the trustee is risky for the trustor because the trustee could return little or none of the resources. However, sending more resources offers a way to increase gains for both parties, provided the trust is reciprocated. Participants were asked to imagine a situation in which the representative acted uncooperatively towards the participant's own group by not returning any lottery tickets after the participant's group sent 7 of their 10 tickets. The facial expressions were presented in a random order. Participants then rated the feelings and motives of the representative and to predict their own and an outgroup member's behaviour in a subsequent round of the game.

Results

Data analytic strategy

We examined the effect of representative's facial expressions on participants' perceptions of the representative's feelings and motives, focusing here (for efficiency) on measures that were identical or similar across the 5 studies.[3] Descriptive statistics for the key dependent measures are reported in Table 1. We analysed each of these variables as a function of the representative's expression (five levels: dominance smile, reward smile, affiliation smile, neutral, regret expression).

To test our hypotheses, we regressed participants' responses on two sets of four orthogonal contrasts, reflecting the Hypotheses 1-4.[4] Contrasts 1a and 1b test H1: compared to the other expressions, smiles after an uncooperative decision communicate more positivity and superiority (1a), but less desire to repair the relationship and change the decision and evoke less trust (1b). The second contrast (Contrasts 2a and 2b) tests H2: compared to dominance and reward smiles, affiliation smiles communicate less positivity and superiority (2a), but convey more desire to repair the relationship and to change the decision and elicit more trust (2b). Contrasts 3a and 3b test H3: compared to the reward smile, the dominance smile conveys lower levels of positivity (3a) and more superiority (3a). The dominance smile should also convey less desire to repair the relationship and to change the decision (3b) and thus evoke less trust (3b). Contrasts 4a and 4b test H4: compared to neutral, the regret expression communicates less

Table 1. Descriptive statistics for the main dependent variables.

Measure and study	Dominance smile M (SD)	Reward smile M (SD)	Affiliation smile M (SD)	Neutral M (SD)	Regret M (SD)
Positivity					
Study 1	5.80 (1.25)	6.22 (1.21)	5.46 (1.33)	3.94 (1.20)	3.78 (1.22)
Study 2	5.54 (1.33)	6.04 (1.14)	5.38 (1.10)	3.74 (1.17)	3.34 (1.35)
Study 3	5.70 (1.32)	5.89 (1.29)	5.49 (1.20)	4.33 (1.32)	3.61 (1.19)
Study 4	4.30 (1.59)	5.87 (1.21)	5.06 (1.33)	3.52 (1.38)	3.64 (1.57)
Study 5	6.10 (0.88)	6.65 (0.52)	5.93 (0.67)	3.77 (0.76)	2.51 (0.87)
Superiority					
Study 1	5.52 (1.31)	5.80 (1.52)	4.96 (1.37)	3.19 (1.51)	3.41 (1.46)
Study 2	5.52 (1.34)	5.58 (1.42)	4.46 (1.66)	3.50 (1.27)	2.78 (1.57)
Study 3	4.94 (1.29)	4.95 (1.54)	4.70 (1.37)	2.92 (1.50)	2.56 (1.30)
Study 4	4.96 (1.41)	5.21 (1.66)	4.43 (1.72)	3.04 (1.74)	3.28 (2.01)
Study 5	6.25 (0.73)	6.28 (0.80)	5.64 (0.90)	3.06 (1.24)	3.30 (1.33)
Desire to repair relationship					
Study 1	2.69 (1.65)	2.50 (1.75)	3.11 (1.57)	3.13 (1.54)	4.48 (1.49)
Study 2	2.88 (1.38)	2.96 (1.74)	3.36 (1.59)	3.34 (1.19)	4.68 (1.79)
Study 3	2.14 (1.27)	2.16 (1.29)	2.72 (1.44)	2.44 (1.20)	3.31 (1.61)
Study 4	2.93 (1.41)	2.65 (1.47)	2.89 (1.51)	2.71 (1.42)	3.05 (1.33)
Study 5	1.87 (0.79)	2.28 (1.22)	2.62 (0.98)	3.47 (0.79)	5.27 (0.99)
Desire to change decision					
Study 1	2.33 (1.54)	2.28 (1.55)	2.91 (1.52)	3.26 (1.71)	4.26 (1.53)
Study 2	2.28 (1.32)	2.24 (1.45)	3.04 (1.54)	3.66 (1.14)	5.02 (1.50)
Study 3	1.94 (1.38)	2.05 (1.78)	2.06 (1.44)	2.35 (1.54)	3.00 (1.81)
Study 4	2.80 (1.62)	2.27 (1.54)	2.95 (1.68)	3.10 (1.78)	3.31 (1.77)
Study 5	1.78 (0.84)	1.99 (1.03)	2.34 (0.90)	3.59 (0.79)	5.27 (1.16)
Trust					
Study 1	1.74 (3.07)	1.36 (2.60)	2.32 (3.21)	3.11 (3.97)	5.51 (4.49)
Study 2 (Trust game)	3.52 (4.17)	3.24 (4.28)	4.56 (4.85)	4.14 (4.25)	5.84 (5.12)
Study 2 (Split or Steal)	2.50 (0.93)	2.38 (1.17)	2.96 (1.12)	2.92 (0.72)	3.67 (0.92)
Study 3	2.16 (1.03)	2.27 (0.10)	2.30 (1.07)	2.23 (1.08)	2.23 (0.98)
Study 4	2.69 (1.07)	2.34 (0.96)	2.50 (0.86)	2.43 (0.96)	2.26 (0.84)
Study 3 (Behavioural)	14.3%	25.0%	18.8%	16.7%	25.8%
Study 4 (Behavioural)	17.96 (7.71)	17.79 (6.39)	17.42 (6.48)	18.83 (7.77)	17.85 (7.72)

Note: Columns correspond to different facial expressions displayed by the representative. For ease of comparison among studies in the present table, measures of positivity, superiority, desire to repair the relationship and to change the decision in Study 4 were converted to 7-point scales. Descriptives for behavioural measures of trust display the percentage of "Split" decisions (Study 3) and the number of tokens sent to the other team (Study 4).

positivity and superiority (4a), but conveys more desire to repair the relationship and to change the decision, thereby increasing trust (4b).

Dependent measures

Positivity. Ratings of the representative's positivity about the number of tickets her own group gained varied significantly as a function of expression, $F(4, 212) = 63.62$, $p < .001$, $\eta_p^2 = .55$ (see Table 1 for means and Table S3 in Supplemental Materials for an overview of omnibus tests across the 5 studies). As predicted in H1, dominance, reward, and affiliation smiles were rated as more positive than neutral and regret expressions, $F(1, 53) = 171.90$, $p < .001$, $\eta_p^2 = .76$ (Contrast 1a). In line with H2, the affiliation smile was rated as lower in positivity than the dominance and the reward smile, $F(1, 53) = 12.72$, $p = .001$, $\eta_p^2 = .19$ (Contrast 2a). Also as expected, the reward smiles were rated as more positive than the

dominance smiles, $F(1, 53) = 6.90$, $p = .01$, $\eta_p^2 = .11$ (H3; Contrast 3a), indicating that the dominance smile communicated lower levels of the representative's positivity about the number of tickets her group gained. Finally, contrary to H4, the regret expression was perceived as similar in positivity to the neutral expression, $F(1, 53) = 0.63$, $p = .43$, $\eta_p^2 = .01$ (Contrast 4a).

Superiority. Participants' ratings of the extent to which the representative demonstrated that her group did better than the participant's group were significantly affected by expression, $F(4, 212) = 50.46$, $p < .001$, $\eta_p^2 = .49$ (see Table 1). In line with H1, dominance, reward, and affiliation smiles were rated as higher in superiority than the neutral and the regret expressions, $F(1, 53) = 146.06$, $p < .001$, $\eta_p^2 = .73$ (Contrast 1a). Consistent with H2, the affiliation smile was rated as lower in superiority than the dominance and the reward smile, $F(1, 53) = 16.20$, $p < .001$, η_p^2

= .23 (Contrast 2a). Contrary to H3 there was no significant difference between the reward and the dominance smile, $F(1, 53) = 1.66$, $p = .20$, $\eta_p^2 = .03$ (Contrast 3a). Finally, also inconsistent with H4, the regret expression was perceived as similar in superiority to the neutral expression, $F(1, 53) = 0.70$, $p = .41$, $\eta_p^2 = .01$ (Contrast 4a).

Desire to Repair Relationship. Participants' ratings of the extent to which the representative wanted to repair the relationship between the two groups were significantly affected by expression, $F(4, 212) = 17.16$, $p < .001$, $\eta_p^2 = .24$ (see Table 1). In line with H1, the representative's dominance, reward, and affiliation smiles communicated lower desire to repair the relationship than the neutral and regret expressions, $F(1, 53) = 30.46$, $p < .001$, $\eta_p^2 = .36$ (Contrast 1b). As predicted in H2, the affiliation smile elicited higher ratings of a desire to repair the relationship than the reward and the dominance smiles, $F(1, 53) = 5.22$, $p = .03$, $\eta_p^2 = .09$ (Contrast 2b). However, there was no difference in ratings of the desire to repair the relationship between the reward and dominance smiles, $(F(1, 53) = 0.52$, $p = .48$, $\eta_p^2 = .01)$ (H3; Contrast 3b). In line with H4, regret conveyed a greater desire to repair the relationship between groups than the neutral expression, $F(1, 53) = 30.35$, $p < .001$, $\eta_p^2 = .36$ (Contrast 4b).

Desire to Change Decision. Participants' ratings of the extent to which the representative would like to change her decision were significantly affected by expression, $F(4, 212) = 21.98$, $p < .001$, $\eta_p^2 = .29$ (Table 1). As predicted, dominance, reward, and affiliation smiles of the representative communicated a lower desire to change the decision than the neutral and regret expressions $F(1, 53) = 43.99$, $p < .001$, $\eta_p^2 = .45$ (H1; Contrast 1b). Moreover, as predicted in H2, the affiliation smile elicited higher ratings of a desire to change the decision than the reward and the dominance smiles, $F(1, 53) = 8.62$, $p < .01$, $\eta_p^2 = .14$ (Contrast 2b). Inconsistent with H3, there was no difference between the reward and dominance smiles in perceived desire to change the decision, $F(1, 53) = 0.10$, $p = .76$, $\eta_p^2 < .01$ (Contrast 3b). Finally, as predicted, regret conveyed a higher desire to change the decision than the neutral expression, $F(1, 53) = 15.22$, $p < .001$, $\eta_p^2 = .22$ (H4; Contrast 4b).

Trust: Expectations of Outgroup Behaviour. Participants' expectations of how many tickets (out of 25) the representative would return indexed trust and varied significantly as a function of expression, $F(4, 208) = 16.61$, $p < .001$, $\eta_p^2 = .24$ (see Table 1).

Consistent with H1, participants expected lower allocations (i.e. were less trusting) after being exposed to the representative's dominance, reward, and affiliation smiles than after seeing the neutral and regret expressions $F(1, 52) = 25.69$, $p < .001$, $\eta_p^2 = .33$ (Contrast 1b). Moreover, the affiliation smile elicited higher trust than the reward and the dominance smiles, $F(1, 52) = 4.23$, $p = .04$, $\eta_p^2 = .07$ (H2; Contrast 2b). Inconsistent with H3, ratings of trust evoked by reward and dominance smiles were similar, $F(1, 52) = 0.84$, $p = .36$, $\eta_p^2 = .02$ (Contrast 3b). Finally, as predicted, regret elicited higher levels of trust than the neutral expression, $F(1, 52) = 15.75$, $p < .001$, $\eta_p^2 = .23$ (H4; Contrast 4b).

Summary of Results for Different Smile Types. As predicted, relative to reward and dominance smiles, affiliation smiles communicated less positivity, less superiority, greater desire to repair the relationship, and greater desire to change the decision; and elicited more positive expectations of outgroup behaviour (H2). Dominance smiles communicated less positivity relative to reward smiles but did not communicate greater superiority or less desire to repair the relationship or to change the decision, and did not affect trust (H3; see also *Summary of Results across Studies* and Table 2, below). In Study 2 we examined whether these findings would generalise to a different economic game.

Study 2
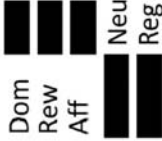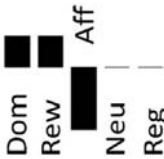
Design and participants

The study had a 2 (game: trust game vs. Split or Steal) × 5 (facial expression: reward smile, affiliation smile, dominance smile, neutral, regret expression) mixed factorial design, with the game as a between-subject variable and expression as a within-subject variable.[5] We analysed data from 50 participants (38 females, age mean $M = 31.10$ years, $SD = 2.71$).[6]

Procedure

Study 2 was a conceptual replication of Study 1. We used the same video stimuli but now participants played one of two economic games, either the trust game or Split or Steal (van den Assem et al., 2012). In the Split or Steal game, players make a choice about whether or not to "split" or "steal" a pool of resources. If both players choose "split", they share the resources equally. However, if one player

Table 2. Summary of the findings.

Measure and Study	Contrast 1a, 1b Hypothesis 1 η_p^2	Contrast 2a, 2b Hypothesis 2 η_p^2	Contrast 3a, 3b Hypothesis 3 η_p^2	Contrast 4a, 4b Hypothesis 4 η_p^2
Positivity				
Study 1	.76***	.19**	.11*(-)	.01
Study 2	.69***	.10*	.14**(-)	.06†
Study 3	.31***	<.01	<.01	.03***
Study 4	.29***	.02**	.02**(-)	<.01
Study 5	.94***	.29***	.35***(-)	.56***
Superiority				
Study 1	.73***	.23***	.03	.01
Study 2	.62***	.32***	<.01	.15**
Study 3	.35***	<.01	<.01	<.01
Study 4	.19***	.02**	<.01	<.01
Study 5	.88***	.33***	<.01	.02
Desire to repair relationship				
Study 1	.36***(-)	.09*(-)	.01	.36***(-)
Study 2	.23***(-)	.08†(-)	<.01	.34***(-)
Study 3	.03**(-)	.02**(-)	<.01	.04***(-)
Study 4	<.01	<.01	.01	<.01
Study 5	.77***(-)	.30***(-)	.11*(-)	.70***(-)
Desire to change decision				
Study 1	.45***(-)	.14**(-)	<.01	.22***(-)
Study 2	.60***(-)	.17**(-)	<.01	.49***(-)
Study 3	.04***(-)	<.01	<.01	.02*(-)
Study 4	.02**(-)	.01†(-)	.01*	<.01
Study 5	.84***(-)	.25***(-)	.04	.62***(-)
Trust				
Study 1	.33***(-)	.07*(-)	.02	.23***(-)
Study 2 (Trust game)	.17*(-)	.08	.01	.18*(-)
Study 2 (Split or Steal)	.36**(-)	.25*(-)	.01	.28**(-)
Study 3	<.01	<.01	<.01	<.01
Study 4	<.01†	<.01	.01*	<.01
Study 4 (Behavioural)	<.01	<.01	<.01	<.01

Note:. Hypotheses and analysed contrasts are depicted in the headings. The table shows effect sizes (partial eta squared). Asterisks denote significance, †$p < .10$, *$p < .05$, **$p < .01$, and ***$p < .001$. Darker green shading denotes significant contrasts in line with our predictions, lighter green shading denotes marginal contrasts in line with our predictions. Darker blue shading denotes significant contrasts opposite to our predictions, lighter blue shading denotes marginal contrasts opposite to our predictions. Minus signs denote the inverse of the patterns shown in the column headings.[‡]

[‡]Meta-analytic findings (see main text):

Contrast 1

Positivity: $M_d = 3.46$, $t(4) = 2.79$, $p = .049$; superiority: $M_d = 2.79$, $t(4) = 3.50$, $p = .025$; desire to repair the relationship: $M_d = 1.36$, $t(4) = 2.10$, $p = .104$; desire to change decision: $M_d = 1.95$, $t(4) = 2.43$, $p = .072$; trust measures: $M_d = 0.61$, $t(4) = 1.78$, $p = .149$.

Contrast 2

Positivity: $M_d = 0.73$, $t(4) = 2.43$, $p = .027$; superiority: $M_d = 0.87$, $t(4) = 3.15$, $p = .035$; desire to repair the relationship: $M_d = 0.59$, $t(4) = 2.73$, $p = .055$; desire to change decision: $M_d = 0.64$, $t(4) = 2.96$, $p = .041$; trust measures: $M_d = 0.46$, $t(4) = 2.19$, $p = .093$.

Contrast 3

Positivity: $M_d = 0.59$, $t(1, 4) = 2.38$, $p = .076$; superiority: $M_d = 0.13$, $t(4) = 2.21$, $p = .092$; desire to repair the relationship: $M_d = 0.09$, $t(4) = 0.54$, $p = .614$; desire to change decision: $M_d = -0.02$, $t(4) = -0.18$, $p = .863$; trust measures: $M_d = 0.11$, $t(4) = 1.34$, $p = .251$.

Contrast 4

Positivity: $M_d = 0.83$, $t(4) = 2.08$, $p = .106$; superiority: $M_d = 0.32$, $t(4) = 2.32$, $p = .081$; desire to repair the relationship: $M_d = 1.34$, $t(4) = 2.56$, $p = .063$; desire to change decision: $M_d = 1.21$, $t(4) = 2.48$, $p = .068$; trust measures: $M_d = 0.55$, $t(4) = 2.16$, $p = .097$.

chooses "split" and the other chooses "steal", the player who steals takes all resources and the other gets nothing. If they both choose "steal", both players end the round without any resources. Similar to the trust game, the cooperative/trusting decision to "split" is risky, because it makes the player vulnerable to exploitation if the other person chooses to "steal". Here, the resource was a pool of 40 lottery tickets. Participants were asked to imagine that they played on behalf of a team with another group. They then observed a "demonstration round" of the game played between the ostensibly randomly selected representatives of both groups. The representative of the other group made a "Steal" decision, while the member of the participant's group selected the "Split" option. As a result, the other group took all 40 tickets available in the round and the participant's own group finished the round without any tickets. Participants in the trust game condition played the same game and followed the same procedure as in Study 1. All participants then viewed the video stimuli in a within-subjects design. Afterward, they rated the feelings and motives of the representative and predicted their own and an outgroup member's behaviour in a subsequent round of the game.

Results

Positivity
Ratings of how positive the representative felt about the number of tickets she or her group had gained were significantly influenced by expression, $F(4, 192) = 51.82$, $p < .001$, $\eta_p^2 = .52$ (see Table 1).[7] As predicted in H1, dominance, reward, and affiliation smiles were rated as more positive than neutral and regret expressions, $F(1, 48) = 108.08$, $p < .001$, $\eta_p^2 = .69$ (Contrast 1a). Supporting H2, the affiliation smile was rated as lower in positivity than the dominance and the reward smile, $F(1, 48) = 5.55$, $p = .02$, $\eta_p^2 = .10$ (Contrast 2a). Also as expected, the reward smiles were rated as more positive than the dominance smiles, $F(1, 48) = 8.11$, $p = .006$, $\eta_p^2 = .14$ (H3; Contrast 3a). Finally, consistent with H4, the regret expression tended to be perceived as lower in positivity than the neutral expression, $F(1, 48) = 3.28$, $p = .08$, $\eta_p^2 = .06$ (Contrast 4a).

Superiority
Participants' ratings of the extent to which the representative demonstrated that her group did better than the participant's group were significantly affected by expression, $F(4, 192) = 39.50$, $p < .001$, $\eta_p^2 = .45$ (see Table 1).[8] In line with H1, dominance, reward, and affiliation smiles were rated as higher in superiority than the neutral and the regret expressions, $F(1, 48) = 78.72$, $p < .001$, $\eta_p^2 = .62$ (Contrast 1a). Consistent with H2, the affiliation smile was rated as lower in superiority than the dominance and the reward smile, $F(1, 48) = 22.92$, $p < .001$, $\eta_p^2 = .32$ (Contrast 2a). Contrary to H3 there was no significant difference between the reward and the dominance smile, $F(1, 48) = 0.70$, $p = .79$, $\eta_p^2 < .01$ (Contrast 3a). Consistent with H4, the regret expression was perceived as lower in superiority than the neutral expression, $F(1, 48) = 8.76$, $p = .005$, $\eta_p^2 = .15$ (Contrast 4a).

Desire to repair relationship
Participants' ratings of the extent to which the representative wanted to repair the relationship between groups were significantly affected by expression, $F(4, 192) = 12.12$, $p < .001$, $\eta_p^2 = .20$ (see Table 1).[9] In line with H1, the representative's dominance, reward, and affiliation smiles communicated lower desire to repair the relationship than the neutral and regret expressions, $F(1, 48) = 14.12$, $p < .001$, $\eta_p^2 = .23$ (Contrast 1b). As predicted in H2, the affiliation smile tended to elicit higher ratings of a desire to repair the relationship than the reward and the dominance smiles, $F(1, 48) = 4.02$, $p = .05$, $\eta_p^2 = .08$ (Contrast 2b). However, there was no difference in ratings of the desire to repair the relationship between the reward and dominance smiles, $F(1, 48) = 0.11$, $p = .74$, $\eta_p^2 < .01$ (H3; Contrast 3b). In line with H4, regret conveyed a greater desire to repair the relationship between groups than the neutral expression, $F(1, 48) = 24.40$, $p < .001$, $\eta_p^2 = .34$ (Contrast 4b).

Desire to change decision
Participants' ratings of the extent to which the representative would like to change her decision were significantly affected by expression, $F(4, 192) = 37.41$, $p < .001$, $\eta_p^2 = .44$ (see Table 1).[10] As predicted, dominance, reward, and affiliation smiles of the representative communicated a lower desire to change the decision than the neutral and regret expressions, $F(1, 48) = 71.95$, $p < .001$, $\eta_p^2 = .60$ (H1; Contrast 1b). Moreover, as predicted in H2, the affiliation smile elicited higher ratings of desire to change the decision than the reward and dominance smiles, $F(1, 48) = 9.83$, $p = .003$, $\eta_p^2 = .17$ (Contrast 2b). However, there was no difference between the reward and

dominance smiles in perceived desire to change the decision, $F(1, 48) = 0.03$, $p = .86$, $\eta_p^2 < .01$ (H3; Contrast 3b). Finally, as predicted in H4, regret conveyed a greater desire to change the decision than did the neutral expression, $F(1, 48) = 46.47$, $p < .001$, $\eta_p^2 = .49$ (Contrast 4b).

Trust: expectations of outgroup behaviour, trust game

Participants' expectations of how many tickets (out of 25) the new game partner would return in the second round of the game were significantly affected by expression, $F(4, 96) = 3.49$, $p = .01$, $\eta_p^2 = .13$ (see Table 1). Consistent with H1, participants expected lower allocations (i.e. were less trusting) after being shown the representative's dominance, reward, and affiliation smiles than after seeing the neutral and regret expressions, $F(1, 24) = 4.98$, $p = .03$, $\eta_p^2 = .17$ (Contrast 1b). Contrasts 2b and 3b (H2 and H3) were not significant, $F(1, 24) = 2.13$, $p = .16$, $\eta_p^2 = .08$ and $F(1, 24) = 0.29$, $p = .60$, $\eta_p^2 = .01$, respectively. Finally, as predicted in H4, regret elicited higher levels of trust than the neutral expression, $F(1, 24) = 5.30$, $p = .03$, $\eta_p^2 = .18$ (Contrast 4b).

Trust: expectations of outgroup behaviour, split or steal game

Participants' ratings of the likelihood of the new game partner splitting the ticket pool were also significantly affected by expression, $F(4, 92) = 8.21$, $p < .001$, $\eta_p^2 = .26$ (see Table 1). Consistent with H1, participants rated the game partner as less likely to "split" after being shown dominance, reward, and affiliation smiles than after seeing the neutral and regret expressions, $F(1, 23) = 13.00$, $p = .001$, $\eta_p^2 = .36$ (Contrast 1b). Consistent with H2, participants expected more cooperation after seeing the affiliation smile compared to the dominance and the reward smile, $F(1, 23) = 7.78$, $p = .01$, $\eta_p^2 = .25$ (Contrast 2b). Contrast 3b (H3) was not significant, $F(1, 23) = 0.28$, $p = .60$, $\eta_p^2 = .01$. Finally, consistent with H4, participants expected more cooperation after seeing the expression of regret rather than the neutral expression, $F(1, 23) = 9.00$, $p = .006$, $\eta_p^2 = .28$ (Contrast 4b).

Summary of results for different smile types

As predicted, relative to reward and dominance smiles, affiliation smiles communicated less positivity, less superiority, a somewhat greater desire to repair the relationship, and greater desire to change the

decision; they also elicited more positive expectations of outgroup behaviour in the Split and Steal game (H1). Relative to reward smiles, dominance smiles communicated less positivity but did not communicate greater superiority, less desire to repair the relationship or to change the decision, and did not affect the indices of trust (H3). Thus Study 2 largely replicated and extended the findings of Study 1 (see also Table 2, below). Moreover, compared to other smiles, affiliation smiles improved trust in the Split or Steal game, yielding support for H2, but not in the trust game. In Study 3 we examined whether these findings would generalise to a between-subjects design in which participants were only exposed to one type of expression.

Study 3

Design and participants

The study had a 5-condition (expression: reward smile, affiliation smile, dominance smile, neutral, regret expression) between-subjects design. Participants were undergraduate psychology students at a large mid-Western university in the U.S.A. ($N = 385$, 228 females; $M_{age} = 18.97$ years, $SD = 1.76$) compensated with course credit and recruited in groups of three or four persons, for a total of 103 experimental sessions. We recruited as many participants as we could during a 3-month period, aiming to test a minimum of 305 subjects to achieve 95% statistical power to detect a medium-sized main effect in a between-subjects ANOVA. We discarded data from 54 subjects: 48 who did not correctly answer four attention checks and 6 because of a software malfunction. The final sample comprised 331 participants (191 females; age mean $M = 18.95$ years, $SD = 1.75$), with between 62 and 70 participants in each condition.

Procedure

Study 3 was a laboratory experiment. Subjects participated in groups of 3 or 4 persons and played the Split or Steal game with another group. The procedure was similar to Study 2, but this time participants were led to believe that they were interacting with an actual other group in a different room, via video-conferencing software. Again, participants observed a "demonstration round" of the game played between ostensibly randomly selected representatives of both groups and again the representative of the other

group made a "Steal" decision, while the member of the participant's group selected the "Split" option. Participants then saw a video displaying the facial expression of the other group's representative. After seeing the expression, participants rated the representative's feelings and motives and played a second round of the game with another outgroup member. Participants' ratings and expectations of outgroup decisions were used as dependent measures in the analyses testing Hypotheses 1-4.

Results

Positivity

Ratings of how positive the representative felt about her decision to "steal" were significantly influenced by expression, $F(4, 326) = 39.09$, $p < .001$, $\eta_p^2 = .32$ (see Table 1). As predicted in H1, dominance, reward, and affiliation smiles were rated as more positive than neutral and regret expressions, $F(1, 326) = 145.21$, $p < .001$, $\eta_p^2 = .31$ (Contrast 1a). However, inconsistent with H2, the affiliation smile conveyed similar levels of positivity to the dominance and reward smiles, $F(1, 326) = 2.60$, $p = .11$, $\eta_p^2 < .01$ (Contrast 2a). Moreover, the dominance smile was perceived as similar in positivity to the reward smile, $F(1, 326) = 0.76$, $p = .38$, $\eta_p^2 < .01$ (H3; Contrast 3a). Finally, in line with H4, the regret expression tended to be perceived as lower in positivity than the neutral expression, $F(1, 326) = 10.37$, $p = .001$, $\eta_p^2 = .03$ (Contrast 4a).

Superiority

Participants' ratings of the extent to which the representative showed that her group did better than the participant's team were affected by expression, $F(4, 326) = 45.27$, $p < .001$, $\eta_p^2 = .36$ (see Table 1). In line with H1, dominance, reward, and affiliation smiles were rated as higher in superiority than the neutral and the regret expressions, $F(1, 326) = 178.55$, $p < .001$, $\eta_p^2 = .35$ (Contrast 1a). However, contrary to H2, the affiliation smile was not rated as lower in superiority than the dominance and reward smiles, $F(1, 326) = 1.47$, $p = .23$, $\eta_p^2 < .01$ (Contrast 2a). Also, contrary to H3, there was no significant difference between the reward and the dominance smile, $F(1, 326) < 0.01$, $p = .97$, $\eta_p^2 < .01$ (Contrast 3a). The same was true for Contrast 4a, $F(1, 326) = 2.10$, $p = .15$, $\eta_p^2 < .01$, indicating a lack of support for H4 as the regret expression was perceived as similar in superiority to the neutral expression.

Desire to repair relationship

Participants' ratings of the extent to which the representative wanted to repair the relationship were significantly affected by expression, $F(4, 326) = 8.00$, $p < .001$, $\eta_p^2 = .09$ (see Table 1). In line with H1, the representative's dominance, reward, and affiliation smiles communicated lower desire to repair the relationship than the neutral and regret expressions, $F(1, 326) = 11.84$, $p = .001$, $\eta_p^2 = .03$ (Contrast 1b). As predicted in H2, the affiliation smile conveyed more desire to repair the relationship than did dominance and reward smiles, $F(1, 326) = 8.04$, $p = .005$, $\eta_p^2 = .02$ (Contrast 2b). However, inconsistent with H3, there was no difference in ratings of the desire to repair the relationship between the reward and dominance smiles, $F(1, 326) < 0.01$, $p = .95$, $\eta_p^2 < .01$ (Contrast 3b). In line with H4, regret conveyed a greater desire to repair the relationship between groups than did the neutral expression, $F(1, 326) = 12.84$, $p < .001$, $\eta_p^2 = .04$ (Contrast 4b).

Desire to change decision

Participants' ratings of the extent to which the representative would like to change her decision were significantly affected by expression, $F(4, 326) = 4.65$, $p = .001$, $\eta_p^2 = .05$ (see Table 1). As predicted in H1, dominance, reward, and affiliation smiles of the representative communicated less desire to change the decision than did the neutral and regret expressions, $F(1, 326) = 13.39$, $p < .001$, $\eta_p^2 = .04$ (Contrast 1a). However, the affiliation smile did not evoke higher ratings of desire to change the decision than did dominance and reward smiles, $F(1, 326) = 0.07$, $p = .79$, $\eta_p^2 < .01$ (H2; Contrast 2b). Contrast 3b, reflecting the difference between the reward and dominance smiles (H3), was also not significant, $F(1, 326) = 0.14$, $p = .71$, $\eta_p^2 < .01$. Finally, and in line with H4, regret conveyed a higher desire to change the decision than the neutral expression, $F(1, 326) = 5.35$, $p = .02$, $\eta_p^2 = .02$ (Contrast 4b).

Trust: expectations of outgroup behaviour

Participants' ratings of the likelihood of the round 2 game partner splitting the tickets with them were not affected by the round 1 representative's expression, $F(4, 326) = 0.19$, $p = .94$, $\eta_p^2 < .01$. None of the four contrasts of interest were significant (Contrast 1b: $F(1, 326) = 0.18$, $p = .89$, $\eta_p^2 < .001$, Contrast 2b: $F(1, 326) = 0.37$, $p = .54$, $\eta_p^2 < .01$, Contrast 3b: $F(1$,

326) = 0.37, $p = .54$, $\eta_p^2 < .01$, Contrast 4b: $F(1, 326) < 0.01$, $p = .99$, $\eta_p^2 < .001$).

Trust: decisions to "split" or "steal"

The effect of the representative's expression on participants' decisions in the Split or Steal game was analysed with a logistic regression. The model explained 2% (Nagelkerke R^2) of the variance and was not statistically significant, $\chi^2(4) = 4.19$, $p = .38$, suggesting that participants' decisions were not affected by the representative's facial expressions.

Summary of results for different smile types

Relative to reward and dominance smiles, affiliation smiles did not communicate less positivity or less superiority, or a greater desire to change the decision (as observed in Studies 1 and 2) but did communicate greater desire to repair the relationship. Unlike Study 1 and the Split or Steal condition in Study 2, affiliation smiles also did not elicit more positive expectations of outgroup behaviour and did not affect participants' decisions in the Split or Steal game (H2, see also Table 2). Relative to reward smiles, dominance smiles did not communicate less positivity (contrary to the results of Studies 1 and 2), greater superiority or less desire to repair the relationship or to change the decision (H3).

It is evident that differences between smile types had less impact in a between-subjects design where they could not be directly compared with each other. Nevertheless, participants still inferred that affiliation smiles communicated a greater desire to repair the relationship than other smile types. In Study 4 we retained a between-subjects design, and participants were again led to believe that they interacted with an actual other group via video-conferencing software. We also investigated whether group identification would moderate the effects of dominance, reward, and affiliation smiles displayed by the representative. We used a variation of the Ultimatum Game (Güth et al., 1982) to further investigate whether the findings from Studies 1–3 could be replicated in another game.

Study 4

Design and participants

The study had a 2 (identification: high vs low)[11] × 5 (expression: reward smile, affiliation smile, dominance smile, neutral, regret expression) between-subject design. We recruited participants via Prolific Academic and aimed for a minimum of 500 subjects. Five hundred and thirteen participants (348 females, age mean $M = 36.80$, $SD = 11.30$) completed the study and were paid for their time. We excluded data from 82 participants: 68 who reported not being able to see the video stimuli and 14 who expressed suspicions that the other team did not actually exist. The final sample involved 431 participants (297 females, age mean $M = 36.65$, $SD = 11.35$), with between 38 and 48 participants in each condition, and was sufficient to reach 99% statistical power to detect a medium-sized main effect in a between-subjects ANOVA.

Procedure

The experiment was administered online. At the start of the study participants were informed that they would be matched with 5 other individuals. Specifically, they had been ostensibly matched with two other online participants to form a three-person group (the "remote" group) that would play with another team of three people, consisting of participants who were meeting face-to-face in the researchers' laboratory (the "local" group). Participants were also told that members of their "remote" group would see the "local" group at various moments during the study.

In all conditions, the two teams played a group version of the Ultimatum Bargaining Game (Güth et al., 1982), in which one player (the "allocator") decides how to divide a pool of resources between their own group and another group by making an offer to the other group's representative (the "receiver"). The latter can either accept the offer, in which case both groups receive the division that was proposed, or reject it, in which case neither group receives anything.

Participants were informed that there would be two rounds of the game and that in each round, the teams would share a pool of 50 tokens. The allocator would make an offer and the computer, ostensibly randomly, would determine whether or not the receiver had the choice to reject this offer. The tokens gained by both players were to be passed to their teams and equally shared between all players. Participants also learned that at the end of the study the researchers would randomly select one "local" and one "remote" team. These teams would then have

their tokens converted to cash, resulting in a payoff of up to £50 per participant.

As in Studies 2 and 3, participants saw another member of their team play the first round of the game with a member of the other group. The programme then, ostensibly randomly, assigned the other team's representative to be the allocator and the participants' group representative to be the receiver. The allocator then made an offer, whereby the other team would receive 35 tokens and the participant's group would receive 15 tokens. The programme then, seemingly randomly, determined that the offer had to be accepted. The ostensibly live video stream of the other group then started. The representative displayed one of the five facial expressions (dominance smile, reward smile, affiliation smile, neutral, regret). The videos were identical to those used in the previous studies. After seeing the video, participants provided their ratings.

Results

Happiness
Participants' ratings of how happy the representative felt about the outcome of the first round were affected by expression, $F(4, 426) = 47.18$, $p < .001$, $\eta_p^2 = .31$ (see Table 1). As predicted in H1, dominance, reward, and affiliation smiles were rated as conveying more happiness than neutral and regret expressions, $F(1, 426) = 171.33$, $p < .001$, $\eta_p^2 = .29$ (Contrast 1a). In line with H2, the affiliation smile was rated as conveying less happiness than the dominance and the reward smile, $F(1, 426) = 7.84$, $p = .005$, $\eta_p^2 = .02$ (Contrast 2a). Consistent with H3, the reward smile communicated greater happiness about the number of tokens her group gained than did the dominance smile, $F(1, 426) = 7.13$, $p = .008$, $\eta_p^2 = .02$ (Contrast 3a). Finally, the regret and neutral expressions were rated as similarly happy, $F(1, 426) = 0.33$, $p = .57$, $\eta_p^2 < .01$ (H4; Contrast 4a).

Superiority
Participants' ratings of the extent to which the representative demonstrated that her group did better than the participant's group were significantly affected by expression, $F(4, 426) = 27.86$, $p < .001$, $\eta_p^2 = .21$ (see Table 1). In line with H1, dominance, reward, and affiliation smiles were rated as higher in superiority than the neutral and the regret expressions, $F(1, 426) = 101.20$, $p < .001$, $\eta_p^2 = .19$ (Contrast 1a). Consistent with H2, affiliation smiles were

rated as lower in superiority than dominance and reward smiles, $F(1, 426) = 8.23$, $p = .004$, $\eta_p^2 = .02$ (Contrast 2a). However, Contrast 3a, coding the difference between the reward and the dominance smile (H3), was not significant, $F(1, 426) = 1.00$, $p = .32$, $\eta_p^2 < .01$, and the same was true for Contrast 4a, $F(1, 426) = 0.76$, $p = .38$, $\eta_p^2 < .01$, indicating that the regret expression was perceived as similar to the neutral expression (H4).

Desire to repair relationship
The main effect of representative's expression on participants' ratings of the extent to which she wanted to repair the relationship was not significant, $F(4, 426) = 1.23$, $p = .30$, $\eta_p^2 = .01$ (see Table 1). None of the contrasts were significant, Contrast 1b, H1: $F(1, 426) = 0.19$, $p = .66$, $\eta_p^2 < .01$; Contrast 2b, H2: $F(1, 426) = 0.24$, $p = .62$, $\eta_p^2 < .01$; Contrast 3b, H3: $F(1, 426) = 2.60$, $p = .11$, $\eta_p^2 = .01$; and Contrast 4b, H4: $F(1, 426) = 1.72$, $p = .19$, $\eta_p^2 < .01$.

Desire to change decision
Participants' ratings of the extent to which the representative would like to change her decision were significantly affected by expression, $F(4, 426) = 4.91$, $p = .001$, $\eta_p^2 = .04$ (see Table 1). Consistent with H1, dominance, reward, and affiliation smiles of the representative communicated less desire to change the decision than did the neutral and regret expressions, $F(1, 426) = 10.15$, $p = .002$, $\eta_p^2 = .02$ (Contrast 1b). Although the affiliation smile tended to elicited higher ratings than the reward and dominance smiles, Contrast 2b (H2) did not reach conventional significance levels, $F(1, 426) = 3.52$, $p = .06$, $\eta_p^2 = .01$. Unexpectedly, and contrary to H3, dominance smiles were rated as conveying *higher* desire to change the decision than the reward smile, $F(1, 426) = 4.46$, $p = .03$, $\eta_p^2 = .01$ (Contrast 3b). Contrast 4b (H4) was not significant, suggesting that the regret and neutral expressions conveyed similar levels of desire to change the decision, $F(1, 426) = 0.65$, $p = .42$, $\eta_p^2 < .01$.

Self-reported trust
Participants' ratings of the extent to which they could trust an average member of the other team were significantly affected by the representative's expression, $F(4, 426) = 2.57$, $p = .04$, $\eta_p^2 = .02$ (see Table 1). Dominance, reward, and affiliation smiles did not elicit greater trust than neutral and regret expressions, $F(1, 426) = 3.15$, $p = .08$, $\eta_p^2 < .01$ (H1; Contrast 1b), and

the affiliation smile was rated similarly to other smiles, $F(1, 426) = 0.01$, $p = .91$, $\eta_p^2 < .01$ (H2; Contrast 2b). Unexpectedly, participants reported lower levels of trust after seeing the reward smile than after seeing the dominance smile, $F(1, 426) = 5.87$, $p = .02$, $\eta_p^2 = .01$ (H3; Contrast 3b). The regret expression did not significantly improve trust compared to the neutral expression, $F(4, 126) = 1.25$, $p = .26$, $\eta_p^2 < .01$ (H4; Contrast 4b).

Behavioural trust

Facial expressions displayed by the representative did not affect participants' allocations, $F(4, 426) = 0.42$, $p = .79$, $\eta_p^2 < .01$ (see Table 1). None of the four contrasts were significant (H1; Contrast 1b: $F(1, 426) = 0.73$, $p = .39$, $\eta_p^2 < .01$, H2; Contrast 2b: $F(1, 426) = 0.23$, $p = .63$, $\eta_p^2 < .01$, H3; Contrast 3b: $F(1, 426) = 0.25$, $p = .87$, $\eta_p^2 < .01$, H4; Contrast 4b: $F(1, 426) = 0.78$, $p = .38$, $\eta_p^2 < .01$).

Summary of results for different smile types

In line with the findings of Studies 1 and 2, there was some support for H2, such that, relative to reward and dominance smiles, affiliation smiles communicated less positivity and less superiority, and a somewhat greater desire to change the decision. This suggests that smile types influence social judgments even when they cannot be directly compared with each other. However, affiliation smiles did not communicate a greater desire to repair the relationship or influence expectations of outgroup behaviour or participants' allocations. In line with H3, and consistent with Studies 1 and 2, dominance smiles communicated less positivity than reward smiles. However, and similar to other studies, dominance smiles did not communicate greater superiority or desire to repair the relationship, and did not affect participants' allocations compared to reward smiles. Unexpectedly, and contrary to Studies 1-3, dominance smiles communicated greater desire to change the decision and made the outgroup appear more trustworthy.

As in Study 3, participants' allocations were not affected by the expression manipulation and the effects of the different smile types were less marked in a between-subjects design. However, the observed differences were largely in line with the findings of Studies 1-3, suggesting that perceptions of social motives are affected by subtle differences among different smile types, even when observers cannot make a direct comparison between these smiles. The overall consistency of the findings with those of

previous results speaks to the robustness of the observed patterns of findings (see also Table 2). In Study 5, we tested whether the effects of dominance, reward, and affiliation smiles would be observed for a different set of stimuli depicting a male and a female representative (see https://osf.io/n82s9/ and Supplemental Materials for details).

Study 5

Design and participants

The study had a 2 (gender of the model: male vs. female) × 5 (facial expression: reward smile, affiliation smile, dominance smile, neutral, regret expression) within-subjects design. We aimed for at least 54 usable data points, the sample size in Study 1, sufficient to achieve 95% statistical power ($\alpha = 0.05$) to detect a medium-sized ($f = 0.25$) main effect in a within-subjects ANOVA. Participants ($N = 128$, 106 females; $M_{age} = 18.67$ years, $SD = 0.58$) were undergraduate psychology students at a large British university and were compensated with course credit. Data from 68 participants: 10 who did not finish the survey and 58 who did not correctly answer three attention checks were discarded from the analyses for a final sample of 60 (53 females; age mean $M = 19.48$ years, $SD = 1.07$).

Procedure

The trust game instructions and the video stimuli were embedded in a Qualtrics questionnaire. Instructions of the trust game were identical to the ones used in Studies 1 and 2. After reading these, subjects answered three screening questions testing their understanding of the possible outcomes. They were then asked to imagine that they had sent 7 of their 10-lottery-ticket endowments to the other team. After discussing their next move, the other team 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. This information was followed by the facial expression manipulation. Participants saw, in random order, ten video sequences (5 facial expressions × 2 models) and were asked to imagine that each video represented how members of the other team felt about the decision they made. After each video, participants rated the feelings and motives communicated by each person.

Results

Positivity about outcome

Ratings of how positive the representatives felt about the number of tickets the participant's group gained varied significantly as a function of expression, $F(4, 236) = 385.06$, $p < .001$, $\eta_p^2 = .87$ (see Table 1).[12] Consistent with H1, ratings of positivity were higher for dominance, reward, and affiliation smiles than for the neutral and the regret expressions, $F(1, 59) = 966.06$, $p < .001$, $\eta_p^2 = .94$ (Contrast 1a). In line with H2, affiliation smiles communicated lower levels of positivity than the reward and dominance smiles, $F(1, 59) = 24.68$, $p < .001$, $\eta_p^2 = .29$ (Contrast 2a). Consistent with H3, reward smiles conveyed more positivity than dominance smiles, $F(1, 59) = 31.49$, $p < .001$, $\eta_p^2 = .35$ (Contrast 3a). Finally, as predicted by H4, regret expressions were rated as lower in positivity than neutral expressions, $F(1, 59) = 76.01$, $p < .001$, $\eta_p^2 = .56$ (Contrast 4a).

Superiority

Participants' ratings of the extent to which the representatives demonstrated that their group did better than the participant's group were significantly affected by expression, $F(4, 236) = 157.34$, $p < .001$, $\eta_p^2 = .73$ (see Table 1).[13] In line with Hypothesis 1, dominance, reward, and affiliation smiles were rated as higher in superiority than the neutral and the regret expression, $F(1, 59) = 422.37$, $p < .001$, $\eta_p^2 = .88$, (Contrast 1a). As predicted in Hypothesis 2, affiliation smiles were rated as lower in superiority than the dominance and the reward smiles, $F(1, 59) = 29.62$, $p < .001$, $\eta_p^2 = .33$ (Contrast 2a). Contrast 3a (H3), coding the difference in superiority between the reward and the dominance smiles, was not significant, $F(1, 59) = 0.07$, $p = .79$, $\eta_p^2 = .001$. Finally, regret expressions were perceived as similar in superiority to the neutral expressions $F(1, 59) = 1.16$, $p = .29$, $\eta_p^2 = .02$ (H4; Contrast 4a).

Desire to repair relationship

Participants' ratings of the extent to which the representatives wanted to repair the relationship between the two groups were significantly affected by expression, $F(4, 236) = 123.98$, $p < .001$, $\eta_p^2 = .68$ (see Table 1).[14] In line with H1, dominance, reward, and affiliation smiles communicated lower desire to repair the relationship than did neutral and regret expressions, $F(1, 59) = 201.70$, $p < .001$, $\eta_p^2 = .77$ (Contrast 1b). As predicted in H2, affiliation smiles elicited higher ratings than did dominance and reward smiles, $F(1, 59) = 24.86$, $p < .001$, $\eta_p^2 = .30$ (Contrast 2b). Consistent with H3, reward smiles communicated more desire to repair the relationship than did dominance smiles, $F(1, 59) = 6.98$, $p = .01$, $\eta_p^2 = .11$ (Contrast 3b). Finally, in line with H4, regret conveyed a greater desire to repair the relationship than did neutral expressions, $F(1, 59) = 138.33$, $p < .001$, $\eta_p^2 = .70$ (Contrast 4b).

Desire to change decision

Participants' ratings of the extent to which the outgroup representatives would like to change their decision were significantly affected by expression, $F(4, 236) = 157.41$, $p < .001$, $\eta_p^2 = .73$ (see Table 1).[15] In line with H1, dominance, reward, and affiliation smiles communicated lower desire to change decision than did neutral and regret expressions, $F(1, 59) = 305.64$, $p < .001$, $\eta_p^2 = .84$ (Contrast 1b). As predicted in H2, affiliation smiles elicited higher ratings than did dominance and reward smiles, $F(1, 59) = 19.57$, $p < .001$, $\eta_p^2 = .25$ (Contrast 2b). Dominance and reward smiles did not evoke different ratings, $F(1, 59) = 2.22$, $p = .14$, $\eta_p^2 = .04$ (H3; Contrast 3b). In line with H4, regret expressions conveyed a higher desire to change the decision than did neutral expressions, $F(1, 59) = 98.42$, $p < .001$, $\eta_p^2 = .62$ (Contrast 4b).

Summary of results for different smile types

As predicted, relative to reward and dominance smiles, affiliation smiles communicated less positivity, less superiority, a greater desire to repair the relationship, and greater desire to change the decision (H2). Relative to reward smiles, dominance smiles communicated less positivity and less desire to repair the relationship, but did not communicate greater superiority, or less desire to change the decision (H3). Overall, Study 5 replicated and extended the findings of the previous studies (see also Table 2), revealing that observed patterns of results are not dependent on the specific stimulus set used in the previous studies. This speaks to the generalizability of the findings.

Summary of results across studies

Contrast Analyses

The results of the contrast analyses are summarised in Table 2, which reports the partial eta squared (η_p^2)

values associated with each contrast for each study, together with the significance of the contrast and whether it is consistent (green shading) or inconsistent (blue shading) with our hypotheses. It should be noted that minus signs denote that the inverse of the pattern shown in the column headings was observed. It is evident that across the studies, there was strong support for Hypotheses 1 and 2, and good support for Hypothesis 4, but only weak and inconsistent support for Hypothesis 3. The effects tested in the contrast analyses are also reflected in Figure 3, which shows the pattern of means for the key dependent variables averaged across the five studies.

We also used internal mini meta-analyses to assess overall contrast effects. Partial eta squared values were converted into Cohen's ds, using the procedure for an odd number of means (Cohen, 2013), and compared separately for each contrast and each dependent variable. Effects sizes for constructs measured with multiple questions (i.e. positivity about the outcome for own team and the other team in Studies 1 and 2, positivity and happiness in Study 3, pleasure and happiness in Study 4; see Supplemental Materials) were averaged to form one effect size. The significance of each contrast was then tested by a one-sample two-tailed t-test against zero. It is important to note that the internal meta-analytic estimates need to be treated with caution, given the limited number of effect sizes included in each meta-analysis and methodological differences between studies (Morris & DeShon, 2002; Vosgerau et al., 2019). The outcomes are reported in the footnote to Table 2, where it can be seen that, even if all three smile types conveyed more positivity and superiority than other expressions (H1, Contrast 1), affiliative smiles reliably communicated lower levels of positivity and superiority, marginally more desire to repair the relationship, and significantly more desire to change the decision than did dominance and reward smiles (H2, Contrast 2).

Relation between motives communicated by the representative and participants' trust

We predicted (H5) a negative relation between ratings of the representative's positivity and superiority and measures of trust, and (H6) a positive relation between ratings of the representative's desire to repair the intergroup relationship and to change

their decision and measures of trust. Table 3 displays correlations between measures of social motives and indices of trust for Studies 1–4 (trust was not measured in Study 5). A mini meta-analysis on these correlations (bottom line of Table 3) revealed that ratings of the representative's positive feelings tended to be negatively associated with measures of trust, consistent with H5. The correlation between the indices of superiority and trust was also negative overall, but this was not reliable across studies. In keeping with H6, ratings of the representative's desire to repair the relationship and ratings of the desire to change the decision were positively and reliably correlated with trust.

Discussion

Does a specific type of smile affect how the smiler's uncooperative intergroup behaviour is interpreted? To answer this question, we investigated how displaying dominance, reward, and affiliation smiles influenced perceptions and behaviours indicative of intergroup trust following uncooperative behaviour in three economic games.

In line with Hypothesis 1, compared to displays of regret and to a neutral expression, representatives who displayed smiles tended to communicate higher levels of positive feelings and superiority, and less desire to repair the relationship and to change the decision. Furthermore, and consistent with Hypothesis 2, representatives who displayed an affiliation smile tended to be perceived as less positive and less superior than representatives displaying a reward or dominance smile. Importantly, representatives who displayed an affiliation smile also tended to be rated as having greater desire to repair the relationship and to change the decision, compared to the two other smiles. In addition, representatives' affiliation smiles increased some measures of trust. However, Hypothesis 3 was only partially supported: Although the representatives displaying a dominance smile tended to appear as less positive than representatives displaying a reward smile, there was no consistent difference for perceived superiority, desire to repair the relationship, desire to change the decision, or trust. Consistent with Hypothesis 4, representatives expressing regret tended to be rated as higher in desire to repair the relationship and to change the decision and, in some studies, more trustworthy, than representatives displaying a neutral expression. Finally, and as predicted in Hypotheses 5 and 6,
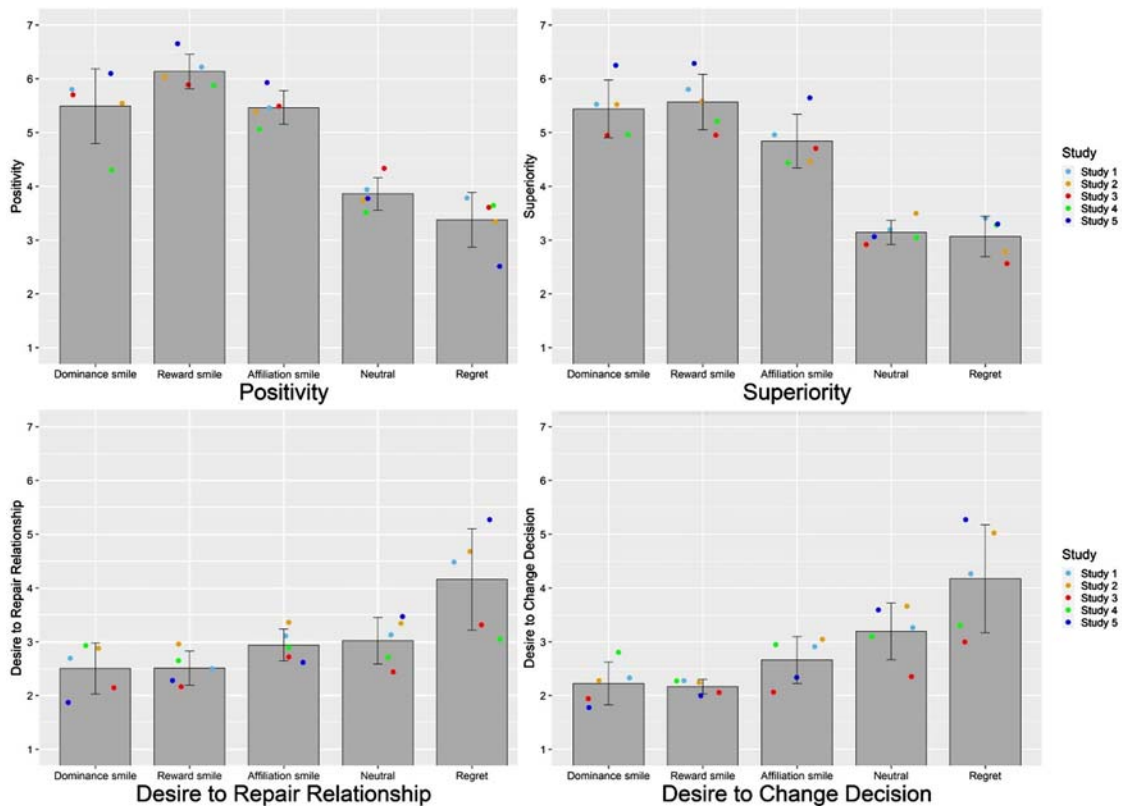
Figure 3. Key dependent measures for Studies 1-5. Bars show average values across studies, while data points show individual study values. Error bars denote standard deviations. For ease of comparison in this figure, Study 4 measures were converted to 7-point scales.

ratings of positivity tended to be negatively associated with trust indices (H5) and perceptions of the representative wanting to repair the relationship between groups and to change their decision were associated with greater trust (H6). Overall, there was consistent support for Hypotheses 1, 2, 4, 5, and 6 across studies, but support for hypothesis 3 (the contrast between reward and dominance smiles) was weak. Furthermore, the evidence for the effects of different smile types on the behavioural and quasi-behavioural measures of trust was weak and inconsistent.

To our knowledge, the present studies are the first to document the effects of different types of smiles in a negative intergroup context, providing insights into what these expressions communicate and how they relate to the unfolding process of economic decision-making. As such, our results extend previous evidence on generally positive effects of smiles in absence of context (e.g. Harker & Keltner, 2001; Otta et al., 1996) and in trust-relevant situations (Kret &

De Dreu, 2019; Scharlemann et al., 2001). Importantly, our findings were replicated in five studies, using different economic games and three expresser identities, including male and female models. Although it would be desirable to replicate the present results using a larger sample of individuals displaying dominance, reward, and affiliation smiles, the consistency of our findings across (a) different expressers, (b) within – and between-subjects designs, and (c) games assessing different facets of economic decision-making speaks to the robustness of the effects of the different smile types.

Importantly, we show that smiles displayed after a transgression communicate positivity and superiority and can be detrimental to subsequent exchanges between groups (see Table 2, Contrast 1). Extant evidence (De Melo et al., 2014) links positive emotions with goal conduciveness, and in the present studies ratings of outgroup representative's positivity tended to be negatively associated with trust. In previous research on smiles that decontextualised

Table 3. Summary of correlations between the indices of trust and social motives communicated by the other group's representative in Studies 1-4.

Study (Measure of trust)	Positivity	Happiness	Pleasure	Superiority	Desire to repair the relationship	Desire to change decision
Study 1 (Expectations)	-.04	-	-	-.09	**.44****	**.33****
Study 2 (Expectations, Trust game)	-.05	-	-	**-.36[†]**	**.58*****	**.47***
Study 2 (Expectations, Split or Steal)	-.21	-	-	**-.53*****	**.66****	**.44***
Study 3 (Expectations)	-.09	**-.10[†]**	-	-.04	**.17****	**.17****
Study 4 (Expectations)	-	**-.10***	-.06	-.05	**.27*****	**.13****
Study 4 (Behavioural trust)	-	-.03	-.01	.06	**.10***	.05
Overall effect size[‡]		**-.10[†]**		-.21	**.37***	**.27***

Note: Correlations in bold are significant or trending, with $^†p < .10$, $^*p < .05$, $^{**}p < .01$, and $^{***}p < .001$. Dashes denote measures that were not collected in a given study. The last row reports overall effect sizes derived from a random effects internal mini meta-analysis (Goh et al., 2016). Bold fonts and superscripts indicate that the overall effect size was significantly greater than zero in a one-sample t-test ($N = 5$). *Full correlation tables can be found in the Supplemental Materials.*

‡ To compute the effect sizes, we used a random effect approach, which maximises generalisability and is more suitable when the sample size is confounded with a moderator variable, such as study design (Goh et al., 2016). Effect sizes for different trust and positivity measures with repeating participants within each study were averaged to form one effect size (see Supplemental Materials for all measures). That is, we assessed correlations between (1) expectations in Study 1, (2) average of expectations and predicted trust for Trust game in Study 2, (3) average of expectations and predicted trust for Split or Steal in Study 2, (4) average of expectations and predicted trust in Study 3, (5) average of expectations and behavioural trust in Study 4, with measures of positivity, superiority, and desire to repair the relationship and change decision.

economic exchanges (Krumhuber et al., 2007; Martin et al., 2021), participants were more trusting towards counterparts who displayed reward or genuine smiles than towards counterparts who displayed affiliation or false smiles. In the present studies this pattern of results was reversed: Following uncooperative or untrustworthy decisions, trust tended to *decrease* when counterparts displayed reward smiles rather than affiliation smiles, showing that expressing joy can be problematic following uncooperative or untrustworthy behaviour. In other words, an uncooperative context may make reward smiles that normally signal trustworthiness akin to dominance smiles, in that they both communicate superiority and pleasure at others' misfortune (Kjeldgaard-Christiansen, 2018). This interpretation is supported by the similarity in participants' ratings of reward and dominance smiles.

Importantly, these negative intergroup consequences of smiling were less marked in the case of the affiliation smile (see Table 2, Contrast 2). Representatives displaying this smile were perceived as less positive and superior, and as feeling a greater desire to repair the relationship and change the uncooperative decision. The last two regret-related perceptions (Zeelenberg et al., 2000), in turn, were robustly associated with increased trust. Thus our findings provide new insights into the social functions of affiliation smiles, particularly in economic exchanges. Because affiliation smiles convey appeasement, prosocial motives, and acknowledgment of group norms (Martin et al., 2017), they are conceptually

different from dominance smiles that communicate superiority, and from reward smiles that communicate joy and happiness. Despite these differences, previous research revealed that observers tend to confuse reward and affiliation smiles and are less accurate in identifying affiliation smiles compared to reward smiles (Rychlowska et al., 2017). In the studies described here, affiliation smiles differed from the two other smile types in that they conveyed more prosocial motives, such as desire to repair the relationship and to change an uncooperative decision, and tended to elicit higher levels of trust than did reward and dominance smiles. This suggests that although correctly labelling decontextualised affiliation and reward smiles can be challenging, these expressions convey different social meanings when presented in a specific context. Our findings therefore reveal that affiliation smiles are distinct from both reward and dominance smiles. Despite their subtlety, the morphological differences between the three smile types are sufficient for affiliation smiles to convey prosocial motives. Such signals are likely to be especially relevant following a transgression.

While the noteworthy consistency of findings across five studies and two stimulus sets is a strength of the current research, it needs to be acknowledged that the study procedures did not allow for real interaction, in the form of back-and-forth exchanges, between groups. The constrained nature of the interactions in the current studies enabled us to present dominance, reward, and affiliation smiles in a standardised way but may have affected the believability of

the scenarios, as well as participants' responses (Johnson & Mislin, 2011; Sanfey et al., 2003). Future studies could investigate the impact of different smile types on social judgments and behaviours in more naturalistic settings, although this would involve sacrificing some experimental control.

It should also be acknowledged that the effect sizes were much larger in Studies 1, 2, and 5, using within-subjects designs, than in Studies 3 and 4, using between-subjects designs and involving real-time decision-making. This difference may in part reflect perceivers' need to have more information (in the form of repeated behaviours) in order to arrive at judgments relating to trust, but it is also unsurprising that participants saw more differences between the presented facial expressions when they could make internal comparisons in the within-subjects designs. It is nevertheless worth noting that ratings of the motives communicated by the representative and the correlations between these measures and indices of trust were broadly similar across studies, suggesting that the findings were not solely due to the fact that participants could make direct comparisons between expressions.

It is also worth noting that the effects of smiles on participants' perceptions and trust were observed following lack of cooperation in an intergroup setting involving group representatives, where restoration of trust is known to be especially challenging (Reinders Folmer et al., 2019). Future studies using interpersonal settings and multiple rounds of different economic games would provide further insights into how smiles and other facial expressions influence trust-related perceptions and behaviours. Further research could also seek to establish whether and in what contexts dominance and reward smiles are interpreted differently. Finally, it is important to investigate whether the present effects generalise to a larger sample of dominance, reward, and affiliation smiles, expressed by different individuals, preferably from different cultures.

The present studies show that smiles displayed by a representative of another group, following an exploitative decision in an intergroup exchange, increase perceptions of that person's positivity and decrease perceptions of willingness to change behaviour, thereby decreasing trust between groups. Although this finding is consistent with previous research documenting the negative effects of smiles in the context of winning (Kalokerinos et al., 2014), we show here that these potentially detrimental

outcomes depend on the type of smile displayed. Affiliation smiles convey less positivity and greater willingness to repair the situation, and such perceptions have the potential to increase intergroup trust. When displayed after transgressions, dominance and reward smiles have similar effects on perceptions and behaviours. The fact that affiliation smiles were sufficient to restore some degree of trust in such situations shows the power of subtle facial expressions in social interactions and the positive consequences that these can have over and above economic considerations. As well as revealing the unique pattern of social motives conveyed by affiliation smiles, our findings highlight the importance of social context. A smile that in one setting would be read as a signal of trustworthiness can, in another setting, be seen as evidence of bad intentions.

Notes

1. Subsets of data from Studies 1 and 2, specifically ratings of reward smiles as well as neutral and regret expressions, were used in previous research (Rychlowska et al., 2019) focusing on the social functions of regret. That research did not examine differences between reward, affiliation, and dominance smiles, which is the focus of the present studies.
2. In addition, participants also rated how positive the representative felt about the outcome for the participant's group (Studies 1 and 2), and how happy (Study 3) and pleased (Study 4) the representative felt about their decision. Because of the great degree of overlap between these measures and the similarity in findings, the results for these additional measures are reported in Supplemental Materials.
3. Full results for all dependent measures are reported in the Supplemental Materials.
4. These contrasts are depicted graphically in the Supplemental Materials.
5. Another group of participants completed the same task in an interpersonal, rather than intergroup, setting, for a 2 (setting) × 2 (game) × 5 (expression) design. The interpersonal condition yielded a similar pattern of results to the one found in the intergroup condition but is not the focus of the present research and will not be discussed further.
6. The original study involved 107 subjects (75 females, age mean $M = 31.04$ years, $SD = 2.70$) recruited via Pureprofile and paid for their time.
7. The interaction of expression with game was not significant, $F(4, 192) = 0.96$, $p = .43$, $\eta_p^2 = .02$.
8. The interaction of expression with game was not significant, $F(4, 192) = 1.28$, $p = .28$, $\eta_p^2 = .03$.
9. The interaction of expression with game was not significant, $F(4, 192) = 0.77$, $p = .54$, $\eta_p^2 = .02$.
10. The interaction of expression with game was not significant, $F(4, 192) = 1.06$, $p = .38$, $\eta_p^2 = .02$.

11. The analysis of manipulation checks showed that the identification manipulation did not affect participants' ratings of how much they had in common with their own group and the other group (see Supplemental Materials). Because of this, subsequent analyses collapsed across the two identification conditions and focus on the effects of expression.
12. The interaction of expression with gender of the model was also significant, $F_{(4, 236)} = 5.13$, $p = .001$, $\eta_p^2 = .08$. A subsequent contrast analysis conducted separately for the male and for the female model revealed an identical pattern of results such that all 4 contrasts for both models were significant at $p < .05$, and so we collapsed across gender.
13. The interaction of expression with gender of the model was not significant, $F_{(4, 236)} = 0.72$, $p = .58$, $\eta_p^2 = .01$.
14. The interaction of expression with gender of the model was not significant, $F_{(4, 236)} = 0.92$, $p = .45$, $\eta_p^2 = .01$.
15. The interaction of expression with gender of the model was not significant, $F_{(4, 236)} = 0.84$, $p = .50$, $\eta_p^2 = .01$.

Data availability statement

Supporting data will be openly available at https://osf.io/n82s9/.

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Disclosure statement

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