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Convergent and Divergent Responses to Emotional Displays of Ingroup and Outgroup

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In the present research, we test the assumption that emotional mimicry and contagion are moderated by group membership. We report two studies using facial electromyography (EMG; Study 1), Facial Action Coding System (FACS; Study 2), and self-reported emotions (Study 2) as dependent measures. As predicted, both studies show that ingroup anger and fear displays were mimicked to a greater extent than outgroup displays of these emotions. The self-report data in Study 2 further showed specific divergent reactions to outgroup anger and fear displays. Outgroup anger evoked fear, and outgroup fear evoked aversion. Interestingly, mimicry increased liking for ingroup models but not for outgroup models. The findings are discussed in terms of the social functions of emotions in group contexts.

Keywords: mimicry, emotional contagion, social categorization

Media coverage of intergroup conflict does not just provide us with cold facts and background analyses. The "human factor" of events and their consequences are an important aspect of newscasts. Indeed, looking at the winning photos of World Press Photo since 1955, 34 of 51 winners portray emotional expressions (World Press Photo, 2009). Such expressions provide meaning, even if we do not know these individuals, and they can make us laugh, cry, or feel angry.

Emotions of others move us and may trigger similar emotions in ourselves, resulting in emotional convergence. This phenomenon is explained by emotional contagion theory, which argues that individuals automatically "catch" other people's emotions (Hatfield, Cacioppo, & Rapson, 1994). The theory suggests that several steps can be distinguished in this process. First, perception of emotional expressions leads to automatic imitation of these expressions, a phenomenon referred to as *emotional mimicry* (see also Chartrand & Bargh, 1999, and Dijksterhuis & Bargh, 2001, for a demonstration and discussion of mimicry of other nonverbal behaviors). Second, it is presumed that the perceiver begins to *experience* the emotion that is being mimicked through a mechanism of afferent feedback, a phenomenon we refer to as *emotional contagion*. In this way, the behavior and feeling states of individuals become aligned through mimicry and emotional contagion, enhancing the chance of an appropriate response to a given situation (Hatfield et al., 1994). Emotions thus serve a social function by coordinating and synchronizing behavior and thereby strengthening social bonds between individuals (Keltner & Haidt, 1999).

Individuals' reactions to others' emotions are not necessarily convergent, however. It has been found that when people are in competition, for example, they show physiological responses that are the opposite of their opponents' displays (Lanzetta & Englis, 1989). In a competitive situation, smiles of the other person signal loss for the

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self, whereas a competitor's distress signals gain for the self, and thus the emotional responses of the observer are likely to diverge from the other's emotional displays. Such observations indicate that social interactions vary with the nature of the relation between individuals. People from opposing groups or who have opposing social goals may try to distance themselves from others, which is reflected in emotional divergence. In other words, emotional divergence would emphasize dissimilarities, whereas emotional convergence would stress similarity and affiliation between two individuals.

In the present paper, we report two studies in which we examine the idea that people *converge* toward emotional displays of ingroup members and *diverge* from emotional expressions of outgroup members. We further test the assumption that emotional convergence preserves and strengthens the social bonds within groups.

Emotional Convergence and Social Bonding

Fischer and Manstead (2008) proposed a social functional perspective of emotions. According to this view, emotional displays are meaningful signals that provide important information about the social environment (see also Van Kleef, 2009). In this way, emotions have an important function in coordinating behavior between individuals (Keltner & Haidt, 1999). Expressers of emotions communicate social information, and observers of the display can use this information to respond appropriately to the other person or the situation at hand. If expressed emotions provide social information, then the nature of the relationship between expresser and observer should influence one's reactions to emotions of others.

Several studies have found support for this assumption. It has been found, for example, that mimicry of sadness and happiness displays are attenuated when people have a negative previous attitude toward the other person, compared with when they have a positive attitude (Likowski, Mühlberger, Seibt, Pauli, & Weyers, 2007; see also McHugo, Lanzetta, Sullivan, Masters, & Englis, 1985, McHugo, Lanzetta, & Bush 1991). Not only a negative attitude, but the mere perception of another person as ingroup or outgroup member, may influence the nature of the interaction (Tajfel & Turner, 1986; Turner Hogg, Oakes, Reicher, & Wetherell, 1987). Emotions can be used to define such group boundaries by means of sharing emotions with group members and not sharing with outgroup members (Keltner & Haidt, 1999). In this way, group membership may influence reactions to emotions of others, and emotional mimicry and contagion may be attenuated when the expresser is an outgroup member. Indeed, some recent studies (Epstude & Mussweiler, 2009; Weisbuch & Ambady, 2008) have found a mood convergence effect in reaction to affective displays of ingroup members. In addition, Bourgeois and Hess (2008; Study 2) showed that ingroup sadness displays were mimicked to a larger extent than outgroup sadness displays (see also Mondillon, Niedenthal, Gil, & Droit-Volet, 2007). These studies thus show that there is some support for the general idea that people react differently to another person's emotions, depending on the similarity with or attitude toward the person displaying the emotion: the closer and the more likable the other person is perceived to be, the more the emotion is mimicked.

An additional factor that may influence responses to emotions of others is the meaning of the displayed emotion, however. Displays of anger are signals of warning, and displays of fear are signals of threat (Fridlund, 1994). The interpretation of these signals may differ depending on who is displaying the signal. Because of the potential of emotions to define group boundaries, we predict that emotional convergence to anger and fear is more likely to occur with ingroup members than with outgroup members.

This pattern may be different for happiness displays, however. Smiles have been regarded as a very strong affiliation signal (Fridlund, 1994), and many studies have shown mimicry effects in the case of smiling (e.g., Barger & Grandey, 2006; Hess & Blairy, 2001; Lundqvist & Dimberg, 1995). Because the smile is such a strong signal, it may also easily overrule group boundaries. Previous studies with a minimal group paradigm have indeed shown that group membership did not moderate mimicry of smiling (Bourgeois & Hess, 2008). Unless the other person is explicitly an enemy or a rival, the smile of another person may be easily returned because it suggests that the other wants no harm and shows a friendly signal. In short, the return of a happiness displays has low social costs (Bourgeois & Hess, 2008). We therefore predict that emotional convergence to happiness will not be influenced by the social category of the displayer.

Fischer and Manstead (2008) have further proposed that emotion expressions and social sharing reinforce bonding and help to strengthen social relationships. Therefore, we not only assume that group membership influences emotional convergence but also propose that emotional convergence may strengthen social bonds. The more one mimics and shares emotions with others—even if these emotions are negative—the closer one starts to feel with the other person and the more one likes the other person. There is some indirect evidence for this idea. For example, when people face a threatening situation, this increases their need to affiliate. As a result, people become more anxious when they are surrounded by a nervous other (Gump & Kulik, 1997). In addition, people who have a strong empathic disposition are more likely to mimic emotional displays of anger and happiness (Sonnby-Borgström, 2002; Sonnby-Borgström, Jönsson, & Svensson, 2003). Moreover, people who mimic positive and negative emotional displays also tend to behave more prosocially (Stel, van Baaren, & Vonk, 2008).

These findings suggest that emotional convergence serves the function of creating an empathic bond between the displayer and the observer. In the current research, the relationship between bonding and emotional convergence is investigated directly in two ways. First, we examine the effect of existing bonds (group membership) on emotional convergence, and second, we investigate the effect of emotional convergence on the evaluation of the displayer.

Emotional Divergence

Emotions do not only serve a bonding function, they can also serve a distancing function, emphasizing the boundaries between self and others or protecting oneself from others (Fischer & Manstead, 2008; Keltner & Haidt, 1999). This would result in emotional divergence rather than convergence. As mentioned previously, Lanzetta and Englis (1989) found that participants who expected competition had a counterempathic response to emotions displayed by their opponent. Van Kleef, De Dreu, and Manstead (2004) also showed that respondents react with subjectively reported fear to verbal anger expressions in a negotiation context.

Even in the absence of competition, people may show emotionally divergent reactions to emotional displays of strangers. For

example, individuals report fear in reaction to anger expressions (Lundqvist & Dimberg, 1995; Dimberg & Öhman, 1996), presumably because anger signals a potential aggressive threat. Furthermore, individuals report aversion to fear displays (Lundqvist & Dimberg, 1995). It has previously been shown that individuals in interaction show dominant behavior in response to submissive behavior of their interaction partner, and vice versa (Tiedens & Fragale, 2003). With respect to discrete emotional displays, it could be argued that anger is appraised as a dominant signal and that fear is a divergent response to this emotion. Similarly, it could be argued that fear is appraised as a submission signal and that aversion is a divergent dominant response to displays of this emotion.

In intergroup contexts, some studies have suggested that outgroup emotion displays may result in affective divergence. Epstude and Mussweiler (2009), for example, showed that people report diverging mood states in response to displays of outgroup members. Participants reported more negative mood when they had been exposed to outgroup positive displays and reported more positive mood when they had been exposed to outgroup negative displays. Weisbuch and Ambady (2008), in addition, showed that people are faster to respond to positive stimuli when primed with negative outgroup emotional displays and faster to respond to negative stimuli when primed with positive outgroup emotional displays. They further showed that the affective tone of voice in which a story about an outgroup member was read diverged from the affective context of the story itself.

Although these studies support the general assumption that group membership is important for how one reacts to others, they did not include measures of different discrete emotions nor facial behavior (i.e., mimicry). It therefore remains unclear whether the affective divergence is based primarily on valence or whether it is a reaction to a more specific emotional signal.

Overview

The present research provides important extensions of previous studies. First of all, we examine specific emotional reactions—both convergent and divergent—to discrete emotional displays of ingroup and outgroup members (anger, fear, and happiness). Second, we include measures of both facial behaviors and subjective responses (anger, fear, happiness, and aversion). Third, our research tests the bidirectional relation between bonding and emotional convergence.

We report two studies, in which we used different manipulations of ingroup and outgroup and different measures of facial responses. In both studies, we presented participants with anger, fear, and happiness displays of ingroup or outgroup models. In Study 1, we tested emotional convergence effects for facial behavior. In Study 2, we included additional measures to examine emotional divergence and bonding effects.

Study 1

Study 1 investigated the basic premise that mimicry of specific emotions is attenuated for outgroup targets. We manipulated group membership by presenting the same models either as students of psychology (ingroup) or economics (outgroup). Participants were shown photos of anger, fear, and happiness displays as we measured facial muscle activity with facial electromyography (fEMG). We predicted that participants would show more convergent facial behavior to ingroup displays of anger and fear than to outgroup displays of these emotions but that participants would show equal levels of convergent facial behavior to ingroup and outgroup displays of happiness.

Method

Participants and design. Forty-seven women participated in the study in exchange for partial course credit or payment of €7 (approximately US $10). EMG recordings of two participants failed because of technical problems. Three participants were excluded because they were not psychology students. All data analyses were done with the remaining 42 participants (M_{age} = 20.33, SD_{age} = 2.67). The study had a 3 (emotions: anger vs. happiness vs. fear) × 2 (social category: ingroup vs. outgroup) within-subjects design.

Stimuli. Participants were shown photos of male models with facial displays of three emotions: anger, fear, and happiness. To manipulate social category, the model in each picture was presented either as a student of psychology (ingroup) or as a student of economics (outgroup). To label the models, the words "psychology student" or "economics student" were presented on the screen before stimulus onset. The social category label for each model was counterbalanced across participants.

Stimuli were presented in two blocks by social category condition. The order of the blocks was counterbalanced such that half of the participants viewed the ingroup before the outgroup and vice versa. Within each block, emotion displays (anger, fear, and happiness) were presented in random order. Four stimuli were shown for each emotion. This resulted in 12 stimuli per block and 24 stimuli in total.

Manipulation checks. As a manipulation check for emotions, we measured the attribution of emotions to the facial displays. Participants rated the intensity of fear, happiness, and anger after each stimulus on a scale from 1 ("not at all") to 5 ("very intense"). As a manipulation check for social category, we used an adapted version of the Overlap of Self Ingroup and Outgroup questionnaire (OSIO; Aron, Aron, & Smollan, 1992; Schubert & Otten, 2002). Participants indicated the overlap between themselves and psychology students and economics students on a scale from 1 (no overlap) to 7 (complete inclusion).

Facial EMG. Muscle activity was measured by bipolar placement of Ag/AgCl electrodes on the left side of the face with Signa electrode gel. Following Fridlund and Cacioppo (1986), the electrodes were placed to measure activity of the *corrugator supercilii* (which assesses the lowering of the eyebrow) and of the *orbicularis oculi* (which measures the wrinkling of the corners of the eye). We used corrugator activity as an indicator of convergent facial behavior to both anger and fear displays. Orbicularis activity was the measure of convergent facial behavior to happiness displays. The EMG signal was measured with a Biosemi Active Two amplifier, digitized with 24-bit resolution, sampled at 2 kHz, and recorded on a PC. After the data collection, the raw data were filtered with a 30–500 Hz band filter and a 50 Hz notch filter.

Procedure. Participants were seated in front of a PC, and electrodes were attached. All instructions were presented on the screen. EMG data were collected on a PC in a different room. Participants were told that it was their task to indicate the intensity

of different emotional expressions. To make salient the distinction between students of psychology and economics, participants were told that the specific interest of the study was to examine how people recognize expressions of different groups, namely psychology students compared with economics students.

A blank screen preceded each experimental trial for 1000 ms, during which baseline measures for EMG were taken. A fixation cross appeared in the center of the screen for 500 ms. This was followed by the social category manipulation (the letters "PSYCHOLOGY STUDENT" or "ECONOMICS STUDENT"), which was presented for 500 ms. The stimulus was then presented for 5000 ms. EMG was measured during stimulus presentation, synchronized with stimulus onset and offset. Subsequently, the manipulation check for emotion display was presented. At the end of the experiment, participants filled out a paper and pencil questionnaire, which included the manipulation check for social category and demographic variables (age, university subject). Finally, the participant was thanked, paid, and debriefed.

Results

Data treatment. We averaged the EMG data across the four exemplars for each emotion. The first 1000 ms of all the experimental trials (i.e., when participants looked at the black screen before the fixation cross appeared) was averaged into a single baseline score for each muscle. To control for individual differences in facial activity, we entered baseline as a covariate in all analyses (Russell, 1990).[1]

Manipulation checks.

Social category. The extent to which participants categorized themselves as psychology students was assessed with the OSIO scale (Aron et al., 1992; Schubert & Otten, 2002) in a paired-sample t test. As expected, participants felt more inclusion with psychology students ($M = 4.14$, $SD = 1.22$) than with economics students ($M = 2.43$, $SD = .99$), $t(41) = 8.99$, $p < .001$. We concluded that the manipulation for student group was successful.

Emotions. We analyzed the attribution of emotions to the displays with repeated-measure analyses of variance (ANOVAs) with three (emotion attribution measure) levels. For the anger displays, we found a significant effect of emotion measure, $F(2, 82) = 748.54$, $p < .001$. As expected, participants attributed more anger to these displays ($M = 4.01$, $SD = .53$) than they attributed fear ($M = 1.42$, $SD = .50$) or happiness ($M = 1.07$, $SD = .20$) to the displays. For the fear displays, the predicted main effect of emotion attribution was also significant, $F(2, 82) = 416.45$, $p < .001$. Participants attributed more fear to these displays ($M = 3.30$, $SD = .63$) than anger ($M = 1.30$, $SD = .48$) or happiness ($M = 1.09$, $SD = .21$). For the happiness displays, the predicted main effect of emotion attribution was also significant, $F(2, 82) = 2184.93$, $p < .001$. Participants attributed more happiness ($M = 4.54$, $SD = .42$) than anger ($M = 1.04$, $SD = .18$) or fear ($M = 1.10$, $SD = .21$) to the displays. These results show that emotions were attributed accurately to the displays and that the manipulation was succesful.[2]

EMG.

Corrugator supercilii. We assessed the effects of condition with a 3 (emotion) × 2 (social category) analysis of covariance (ANCOVA), with baseline as covariate. We found a significant effect of emotion, $F(2, 80) = 5.59$, $p = .01$, $\varepsilon = .68$.[3] Inspection of the means shows, as expected, that corrugator activity was higher for the anger displays ($M = 6.67$, $SD = 4.36$) and the fear displays ($M = 6.40$, $SD = 4.12$) than for the happiness displays ($M = 4.70$, $SD = 2.22$). The simple contrast between the anger displays and the happiness displays was significant, $F(1, 41) = 16.02$, $p < .001$, as was the contrast between the fear displays and the happiness displays, $F(1, 41) = 14.44$, $p < .001$. The simple contrast between the anger displays and the fear displays was not, $F(1, 41) = 2.26$, $p = .14$. The predicted interaction between emotion and social category was also significant, $F(2, 80) = 6.58$, $p = .007$, $\varepsilon = .71$. To disentangle this interaction, we conducted three repeated-measures ANCOVAs comparing the social category conditions within each emotion condition, with baseline entered as a covariate. The means are displayed in Figure 1.

For anger, the predicted effect of social group was significant, $F(1, 40) = 10.84$, $p = .002$. Participants showed more corrugator activity in response to ingroup displays ($M = 7.03$, $SD = 5.74$) than to outgroup displays ($M = 6.31$, $SD = 3.46$). For fear, as well, the predicted effect for social group was again significant, $F(1, 40) = 5.97$, $p = .02$. Participants showed more corrugator activity in response to ingroup displays of fear ($M = 6.79$, $SD = 5.55$) than in response to outgroup displays of fear ($M = 6.01$, $SD = 3.34$). For the happiness displays, our results did not show a significant effect of social category, $F < 1$, ns. Thus, our results show that anger and fear displays of the ingroup were mimicked more than the same displays of the outgroup.

Orbicularis oculi. To test the effects of condition on orbicularis activity, we conducted a 3 (emotion) × 2 (social category) ANCOVA, with baseline as covariate. The main effect of emotion was not significant, $F = .60$, $p = .47$, $\varepsilon = .59$. Although the pattern of the means showed that participants had somewhat more orbicularis activity when they viewed happiness displays ($M = 3.48$, $SD = 2.59$) than when they viewed anger ($M = 2.86$, $SD = 1.49$) or fear displays ($M = 2.51$, $SD = 1.14$), this difference did not reach statistical significance. The interaction between emotion and social category was also not significant, $F = .61$, $p = .49$, $\varepsilon = .70$, nor was the comparison between ingroup happiness and outgroup happiness, $F < 1$, ns. Participants showed equal amounts of orbicularis activity when viewing ingroup displays of happiness ($M = 3.60$, $SD = 3.05$) and outgroup displays of happiness ($M = 3.35$, $SD = 2.41$), $F < 1$, ns (see also Figure 1).

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[1] Baseline was significantly related to corrugator and orbicularis activity, all Fs > 14, all ps $< .001$.

[2] We also tested for effects of social category. For the fear and happiness displays, no effects of social category were found. For the anger displays, however, there was a significant two-way interaction between emotion and social category, $F(2, 82) = 4.78$, $p = .02$, $\varepsilon = .76$. Inspection of the means showed that people attributed more anger to outgroup ($M = 4.11$, $SD = .61$) than to ingroup displays of anger ($M = 3.92$, $SD = .57$). This difference was significant in post hoc pair-wise comparison, $p = .03$. Participants still attributed more anger to ingroup anger displays than they attributed fear ($M = 1.43$, $SD = .52$) or happiness ($M = 1.08$, $SD = .20$), both ps $< .001$ in post hoc pair-wise comparison with Bonferroni correction. So, despite this unanticipated effect of social category, we concluded that the manipulation was successful for both ingroup and outgroup anger displays.

[3] Because the assumption of sphericity was violated, we used Greenhouse-Geisser correction to the degrees of freedom. This correction is indicated by ε in the results.

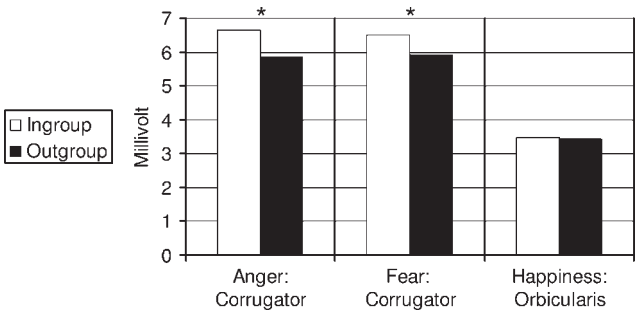

Figure 1. Mimicry as a function of social category and emotion (Study 1). * $p < .05$.

Discussion

The present findings support our predictions for the negative emotions. For both anger and fear displays, we found the predicted effect that participants mimic the ingroup more than the outgroup. It should be noted that anger signals may be interpreted differently, depending on whether the anger is directed at the observer, who is then the target of the anger. Stronger mimicry of ingroup anger could not only mean that there is stronger affiliation and sharing of emotions with ingroup members but also that being the target of ingroup anger is regarded as more threatening than being the target of outgroup anger. The fact that outgroup members are seen as more angry (see footnote 2) speaks against this conclusion, however, and suggests that the mimicry is way of sharing with, rather than reacting to, the ingroup member.

For happiness, the results were less clear. As expected, mimicry of happiness was not moderated by social category. However, we also did not find that happiness displays increased orbicularis activity, as compared with other displays. Thus, we did not replicate earlier studies that found mimicry of happiness displays (i.e., Hess & Blairy, 2001). One explanation for this absence of mimicry may be the specific measure we used. It has been argued that activity of the orbicularis is associated with intense experiences of happiness (Ekman, Friesen, & O'Sullivan, 2005), which the participants of the present study were not likely to feel. Thus, orbicularis activity may not have been sufficiently sensitive to capture mimicry of moderate happiness in the present context.

Another limitation to Study 1 is that we only used corrugator activity as a measure of mimicry for anger and fear. As a result, we could not differentiate between facial reactions to these displays, nor could we examine potential divergence effects. Moreover, we did not measure self-reported emotions and could not compare results for facial behavior and felt emotions. These issues were addressed in Study 2.

Study 2

We aimed to find further support for the effects of group membership on emotional convergence in Study 2 by using different manipulations of social category and different dependent measures. We additionally aimed to examine emotional divergence effects. We hypothesized that anger and fear displays of outgroup members would evoke emotional divergence, signaling a distance from the outgroup. We expected outgroup anger to be appraised as a direct threat and to evoke fear. Outgroup fear, on the other hand, should be appraised as a submission signal and evoke subsequent contempt or aversion. We did not predict convergence and divergence effects for happiness, for the same arguments presented in the introduction. Smiling is such a strong affiliation signal that it was not assumed to be sensitive to social categorization cues in these minimal group paradigms.

To better differentiate facial responses to the emotional displays, we measured facial behavior with the Facial Action Coding System (FACS; Ekman & Friesen, 1978). FACS is an observation-based coding system that measures specific movements in the face, which are called action units (AUs). Specifically, we investigated whether the convergence and divergence effects of anger and fear could be further disentangled by including AU4 (brow lowerer, associated with anger), AU5 (upper eyelid raiser, associated with fear), and AU10 (upper lip raiser, associated with aversion or contempt) (Ricci Bitti, Brighetti, Garotti, & Boggi-Cavallo, 1989; Scherer & Ellgring, 2007).

Because we did not find mimicry of happiness displays in Study 1, we used two measures of facial behavior for happiness, AU6 (cheek raiser and lid compressor, corresponds to orbicularis activity) and AU12 (lip corner puller, smiling). It has been argued that AU12 is a better indicator of less intense happiness or affiliation motives (e.g., Fridlund, 1994; Jakobs, Manstead, & Fischer, 1999).

Because emotional mimicry serves to foster social bonds (Fischer & Manstead, 2008), we hypothesized that emotional mimicry would result in increased liking of the displayer. We therefore added measures of liking, both before and after stimulus presentation. We predicted that liking of the ingroup would increase after viewing ingroup emotional displays and that the increased liking of ingroup models would be mediated by participants' mimicry. Because we predicted that mimicry would be attenuated in response to outgroup displays, we expected no increase in liking of the outgroup models.

We also included measures of self-reported emotions after stimulus presentation. According to emotional contagion theory, mimicry mediates subjectively experienced emotions. Results of previous studies, however, did not show a strong relation between subjectively reported emotions and facial behavior (e.g., Hess & Blairy, 2001; Lishner, Cooter, & Zald, 2008; Wild, Erb, & Bartel, 2001). We therefore expect that effects of social category and emotional displays on self-reported emotions would parallel the effects on facial behavior but would be weaker.

Finally, it has been suggested that emotional contagion and mimicry can be enhanced when dynamic stimuli are used (Hess & Blairy, 2001; Sato & Yoshikawa, 2007). Thus, to elicit more intense responses, we used video fragments of emotional expressions in the second study.

Method

Participants and design. Participants were 180 students of psychology (42 male, 136 female [2 sex not recorded]; M_{Age} = 20.4; SD = 3.86) who participated in exchange for partial course credit or €7 (approx. US $10). We excluded six participants because either they or one of their parents were not born in The Netherlands. All analyses were done with the remaining 174 participants. Recording of 1 participant failed due to technical errors, and 20 participants did not give permission to use the video

recordings. The measures of facial behavior for these participants were treated as missing variables. The study had a 3 (emotion displays: anger, fear, and happiness) × 2 (social category: Caucasian vs. non-Caucasian) between-subjects design.

Stimuli. We used video clips of anger, fear, and happiness displays of Caucasian (ingroup) and non-Caucasian (outgroup) models as stimulus material. We used five different video clips per emotion by social category condition. The clips were approximately 5 s long. All models started with a neutral expression, and the emotional displays reached apex after approximately 1 s.

Depending on social category condition, participants viewed emotional displays of either Caucasian or non-Caucasian models. The non-Caucasian models had different ethnic backgrounds, namely Moroccan, Surinamese, African, and Indonesian. These are all salient ethnic minorities in The Netherlands and are generally clearly recognized as not originally Dutch. The specific ethnic background of the models was not explicitly mentioned. The emotion that was displayed depended on emotion condition.

Manipulation checks. We used an adapted version of the OSIO questionnaire as a manipulation check for social category (Aron et al., 1992; Schubert & Otten, 2002). Participants indicated their perceived overlap with the groups "native Dutch" and "immigrants" on a scale from 1 (no overlap) to 7 (complete inclusion). As in Study 1, we measured emotion attribution as the perceived intensity of fear, happiness, and anger in the emotion displays on a scale from 1 ("not at all") to 5 ("very intense").

FACS. A FACS-certified coder calculated the frequency of specific AUs during stimulus presentation as measure of facial behavior. We calculated the frequency of AU4 (anger), AU5 (fear), and both AU6 and AU12 (happiness) as measures of convergent behavior. We also calculated the frequency of AU5 (in reaction to anger displays) and AU10 (aversion/contempt during fear displays) as measures of divergent behavior.

Self-reported emotions. We used an adapted version of the Discrete Emotion Scale (DES; Izard, Doherty, Bloxom, & Kotsch, 1974) as a measure of self-reported emotions. The DES measures specific emotions with several items per emotion category: anger was measured with the items "angry," "irritated," and "mad;" fear was measured with the items "anxious," "fearful," and "worried;" happiness items were "amused," "happy," "cheerful;" and aversion was measured with "aversion," and "repugnance." Participants indicated the extent to which they felt these emotions on a scale from 1 ("not at all") to 5 ("very intense"). Reliabilities of the emotion categories ranged from $\alpha = .87$ to $\alpha = .93$.

Liking. Before and after the experimental task, participants rated the friendliness and positivity-negativity of models on a scale from 1 to 7. We averaged these scores into a liking score for (1 = disliking, 7 = liking). Reliabilities of the liking scores ranged from $\alpha = .71$ to $\alpha = .91$.

Procedure. The experiment was administered via computer. As in Study 1, the experiment was presented as a study on recognition of emotional expressions. To make the ethnicity of the models salient, participants were informed that the specific goal of the study was the recognition of expressions of native Dutch models compared with immigrant models. First, participants were shown video clips of neutral expressions of the Caucasian and non-Caucasian models. Participants rated the friendliness and positivity-negativity of the models after each neutral video as the premeasure of liking. Then the experimental task started.

We used five different video clips per emotion by social category condition. Each video clip was approximately 5 s long, started with a neutral expression, and reached apex after approximately 1 s. The video clips were presented to participants consecutively and in a random order. The intertrial period between stimuli was 1 s. After the five stimuli had been presented, they were immediately presented again in the same random order. Thus, in each condition, participants watched 10 videos of the same emotional display by five models of one of the social categories. Total presentation of the stimulus material lasted for approximately 60 s.

During stimulus presentation, facial activity was unobtrusively filmed. These recordings were used to FACS-code participants' facial behavior. The facial expressions of the participants were coded from first stimulus onset until last stimulus offset. Self-reported emotions were measured directly after stimulus presentation. At the end, the emotion attribution measure was administered. Next, participants were shown the neutral expressions of the models for the second time, and the postmeasure of liking was taken. Finally, the manipulation check for social category and demographic variables were administered before the participant was thanked, paid, and debriefed.

Results

Manipulation checks.

Social category. As expected, participants reported more overlap between themselves and native Dutch models ($M = 4.92$, $SD = 1.38$) than between themselves and immigrants ($M = 3.48$, $SD = 1.23$; $t(173) = 11.53$, $p < .001$. We concluded that the manipulation of intergroup context was successful.

Emotion attribution. For each emotion condition, we conducted a repeated-measure ANOVA with three (emotion attribution measure) levels. For the anger displays, the effect of emotion attribution was significant, $F(2, 118) = 168.80$, $p < .001$. Participants attributed more anger to anger displays ($M = 4.25$, $SD = 1.17$) than to fear ($M = 1.67$, $SD = .80$) or happiness ($M = 1.27$, $SD = .66$) displays. For the fear displays, we also found a significant effect of emotion attribution, $F(2, 112) = 158.58$, $p < .001$. Participants attributed more fear to the fear displays ($M = 4.04$, $SD = 1.22$) than to anger ($M = 1.61$, $SD = .80$) or happiness ($M = 1.21$, $SD = .59$) displays. For the happiness displays, the main effect of emotion attribution was also significant, $F(2, 112) = 413.35$, $p < .001$. In the happiness condition, participants attributed more happiness to the happiness displays ($M = 4.44$, $SD = .60$) than to anger ($M = 1.28$, $SD = .68$) or fear ($M = 1.37$, $SD = .77$) displays. Together, these results show that emotions were attributed to the displays as intended and that the manipulation of emotion was therefore successful.[4]

FACS.

Convergent facial responses. Table 1 displays the means and standard deviations of facial behavior. The effects of social category on convergent facial behavior are also graphically displayed in Figure 2. For each emotion condition, we recalculated the relevant AU into a single mimicry score (AU4 for anger, AU5 for

[4] Within each emotion condition, we also analyzed for effects of social category on the relevant emotion attribution measure, but no effects were found, all Fs < 2.4, all ps $> .10$.

Table 1
Means (M) and Standard Deviations (SD) of AU-Activity per Emotion by Social Category Condition (Study 2)

Facial behavior	Emotion condition								
	Anger			Fear			Happiness		
	n	*M*	(*SD*)	*n*	*M*	(*SD*)	*n*	*M*	(*SD*)
AU4									
Ingroup	26	**2.42***	(3.07)	24	.92	(2.55)	23	.65	(1.15)
Outgroup	26	**.96***	(1.71)	27	1.15	(1.92)	27	.48	(1.22)
Total	52	**1.69**^{a}	(2.57)	51	1.04^{b}	(2.22)	50	.56^{b}	(1.18)
AU5									
Ingroup	26	**.46**	(1.33)	24	**2.33**†	(2.68)	23	.35	(.65)
Outgroup	26	**.15**	(.61)	27	**1.48**†	(1.42)	27	.41	(.84)
Total	52	.31^{b}	(1.04)	51	**1.88**^{a}	(2.13)	50	.38^{b}	(.75)
AU6									
Ingroup	26	1.19	(2.47)	24	1.42	(2.21)	23	**1.09**	(1.95)
Outgroup	26	1.08	(2.08)	27	.89	(1.76)	27	**2.04**	(3.25)
Total	52	1.13	(2.26)	51	1.14	(1.98)	50	**1.60**	(2.75)
AU12									
Ingroup	26	4.92	(5.70)	24	2.58	(3.12)	23	**3.96**	(3.96)
Outgroup	26	2.77	(3.00)	27	4.56	(4.21)	27	**3.67**	(4.62)
Total	52	3.85	(4.64)	51	3.70	(3.84)	50	**3.80**	(4.29)
AU10									
Ingroup	26	.65	(1.32)	24	**.50***	(1.10)	23	1.00	(2.32)
Outgroup	26	.15	(.46)	27	**1.15***	(1.49)	27	1.33	(3.20)
Total	52	.40	(1.01)	51	.84	(1.35)	50	1.18	(2.80)

Note. Means in bold represent measures of convergent and divergent behavior. Means in the same row with a different superscript differ at $\alpha = .05$. Means in the same column sharing. † differ at $\alpha = .10$. Means in the same column sharing. * Differ at $\alpha = .05$.

fear, and AU6 for happiness). A 3 × 2 ANOVA on this mimicry score revealed the predicted interaction between emotion and social category, $F(2, 147) = 3.29$, $p = .04$. No other effects were found.[5]

We further analyzed the effects of condition for each AU separately. Because we had specific hypotheses for the effects of emotion and for the effects of social category for each AU, we used planned contrast comparisons. The first contrast compared the relevant emotion condition with the other emotion conditions (e.g., for AU4, we compared the anger condition to the fear and happiness conditions). The second contrast compared the ingroup and outgroup conditions within the relevant emotion condition (e.g., for AU4, we would compare the ingroup-anger condition with the outgroup-anger condition).

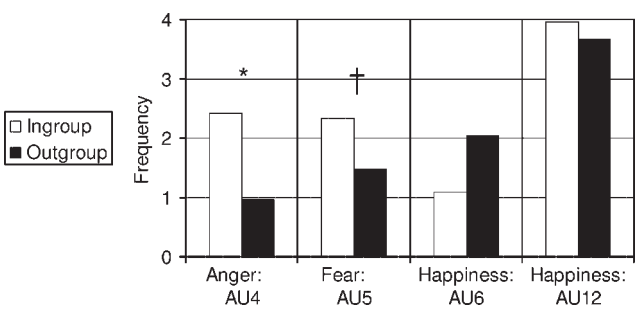

Figure 2. Mimicry as a function of social category and emotion (Study 2). † $p < .10$. * $p < .05$..

For AU4 (associated with anger), the planned contrast comparing the anger condition with the other emotion conditions revealed that people showed more AU4 responses to anger displays than to other emotion displays, $t(147) = 2.29$, $p = .01$. Second, the planned contrast comparing the ingroup-anger condition with the outgroup-anger condition revealed, as expected, that participants showed more AU4 responses to ingroup displays of anger than to outgroup displays of anger, $t(147) = 2.12$, $p = .02$.

For AU5 (associated with fear), the first planned contrast again revealed that people showed more AU5 responses to fear displays than to other emotion displays, $t(147) = 4.91$, $p < .001$. The second planned contrast, comparing the ingroup-fear condition with the outgroup-fear condition, showed a marginally significant trend in the expected direction. Participants tended to show more AU5 responses to ingroup displays of fear than to outgroup displays of fear, $t(147) = 1.39$, $p = .09$.

For AU6 (associated with happiness), the contrast comparing happiness with the other emotion conditions was not significant, $t(147) = 1.03$, $p = .15$. Participants did not show more AU6 responses to happiness displays than to anger or fear displays. The planned contrast comparing the ingroup-condition with the outgroup-happiness condition was also not significant, $t(147) = -1.43$, $p = .16$. Participants showed equal levels of AU6 activity

[5] For the aggregated mimicry score, AU4, AU5, and AU10, Levene's test showed that the assumption of homogeneity of variance was violated, Fs > 5, ps $< .001$. We therefore used the corrected degrees of freedom for the error term for determining significance.

in response to ingroup and outgroup displays of happiness. For AU12 (also associated with happiness), participants also did not show more AU12 responses to happiness displays than to the other emotion displays, $t < 1$, ns. Here, too, there was no difference in AU12 activity in response to ingroup and outgroup happiness displays, $t < 1$, ns.

Divergent facial responses. We predicted that participants would show more AU5 activity (associated with fear) in response to outgroup anger displays than to ingroup anger displays and more AU10 activity (associated with aversion) in response to outgroup fear displays than to ingroup fear displays. The means and standard deviations are displayed in Table 1. The effects of social category on divergent facial behavior within the relevant emotion conditions are graphically displayed in Figure 3.

For AU5, the contrast comparing the ingroup-anger condition with the outgroup-anger condition was not significant, $t(147) = -1.07$, ns. Participants did not show more AU5 responses to outgroup anger displays than to ingroup anger displays. For AU10, however, the contrast comparing the ingroup and the outgroup conditions within the fear condition revealed a significant effect in the expected direction, $t(147) = 1.78$, $p = .04$. Participants showed more AU10 activity (aversion) in response to outgroup displays of fear than to ingroup displays of fear. No other effects of social category were found.

Self-reported emotions.

Convergent emotions. We hypothesized that emotional displays would elicit convergent emotions and that this would be stronger for ingroup displays. We analyzed the effects of emotion and social category conditions with 3 × 2 ANOVAs and planned contrast comparisons. Table 2 displays the means and standard deviations.[6]

For the anger measure, there was a significant main effect of emotion, $F(2, 168) = 4.52$, $p = .01$. Planned contrasts revealed that participants reported more anger after viewing anger displays than after viewing other emotion displays, $t(168) = 2.48$, $p = .01$. There was no significant main effect of social category. The predicted interaction between emotion and social category was not significant, $F(2, 168) = 1.04$, $p = .36$, and neither was the planned contrast comparing the ingroup-anger condition with the outgroup-anger condition, $t(168) = -.81$, ns. Participants did not report more anger after viewing ingroup anger displays than after viewing outgroup anger displays.

For the fear measure, there was also a significant main effect of emotion, $F(2, 168) = 5.31$, $p = .006$. Planned contrast revealed that participants reported more fear after viewing fear displays than after viewing other emotion displays, $t(168) = 2.49$, $p = .01$. The main effect of social category was not significant. The predicted interaction between emotion and social category was not significant, $F(2, 168) = 2.11$, $p = .12$, and neither was the planned contrast comparing ingroup-fear with outgroup-fear, $t(168) = -1.19$, ns. Participants did not report more fear after viewing ingroup fear displays than after viewing outgroup fear displays.

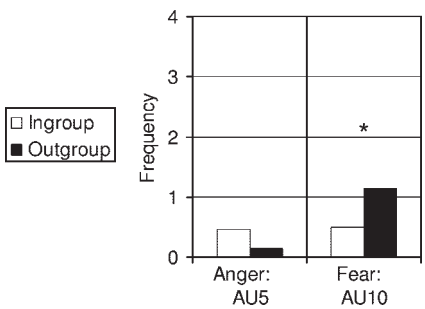

Figure 3. Divergent facial behavior as a function of social category and emotion (Study 2). * $p < .05$.

For the happiness measure, there also was a significant main effect of emotion, $F(2, 168) = 11.10$, $p < .001$. Here, too, planned contrasts revealed that participants reported more happiness after viewing happiness displays than after viewing one of the other emotions, $t(168) = 4.99$, $p < .001$. The main effect of social category was not significant. The interaction between emotion and social category was also not significant, $F < 1$, ns, and neither was the planned contrast comparing ingroup happiness with outgroup happiness, $t < 1$, ns. Participants reported equal levels of happiness after viewing both ingroup and outgroup happiness displays.

Divergent emotions. We expected that outgroup anger would elicit fear and that outgroup fear would elicit aversion. The means are displayed in Table 2. For self-reported fear, planned contrasts revealed, as expected, that participants reported more fear after viewing outgroup anger displays than after viewing ingroup anger displays, $t(168) = 2.40$, $p = .01$. For self-reported aversion, the contrast comparing ingroup-fear with outgroup fear revealed a trend in the expected direction, $t(168) = 1.61$, $p < .06$. Participants tended to report more aversion after viewing outgroup displays of fear than after ingroup displays of fear.

Liking of the models. We analyzed liking of the models in a 2 (time: before vs. after stimulus presentation) × 3 (emotions) × 2 (social category) mixed ANOVA. There was a main effect of time, $F(1, 168) = 9.04$, $p = .003$, and a marginally significant main effect of social category, $F(1, 168) = 3.70$, $p = .06$. Both main effects were qualified by a significant two-way interaction between time and social category, $F(1, 168) = 9.61$, $p = .002$. No other effects were found. For the ingroup models, there was a significant increase in liking ($M_{before} = 3.89$, $SD_{\text{before}} = .71$; $M_{after} = 4.13$, $SD_{\text{after}} = .70$), $F(1, 172) = 19.49$, $p < .001$. For the outgroup, however, there was no effect of time ($M_{before} = 3.81$, $SD_{\text{before}} = .70$; $M_{after} = 3.80$, $SD_{\text{after}} = .82$), $F < 1$, ns. These results suggest that viewing emotional displays of the ingroup led to a more positive judgment of the ingroup, whereas viewing emotional displays of the outgroup had no such effect. Notably, the three-way interaction between time, social category, and emotion was not significant, $F < 1$, ns, indicating that the pattern of results for time and social category was similar in all three emotion conditions.

We further tested whether emotional mimicry would increase the bond between group members by testing whether mimicry mediated the effect of social category upon liking. Because the effect of social category on mimicry depended on the emotion displayed, we tested whether the mediation was moderated by emotion. The model is graphically represented in Figure 4.

[6] For all reported emotion measures, Levene's test for homogeneity of variance was significant, Fs > 2, ps < .05. We therefore used correction for the degrees of freedom of the error term for determining significance.

Table 2
Means (M) and Standard Deviations (SD) of Self-Reported Emotions Per Emotion by Social Category Condition (Study 2)

	Emotion condition								
	Anger			Fear			Happiness		
Self-report	*n*	*M*	(*SD*)	*n*	*M*	(*SD*)	*n*	*M*	(*SD*)
Anger									
Ingroup	31	**1.58**	(.98)	28	1.25†	(.40)	29	1.33	(.45)
Outgroup	29	**1.78**	(.94)	29	1.55†	(.79)	28	1.26	(.43)
Total	60	**1.68**^{a}	(.96)	57	1.40^{b}	(.64)	57	1.30^{b}	(.44)
Fear									
Ingroup	31	**1.20***	(.39)	28	**1.52**	(1.08)	29	1.36	(.48)
Outgroup	29	**1.51***	(.56)	29	**1.89**	(1.20)	28	1.19	(.34)
Total	60	1.35^{c}	(.50)	57	**1.71**^{d}	(1.15)	57	1.27^{c}	(.42)
Happiness									
Ingroup	31	3.38	(1.06)	28	3.14	(1.18)	29	**3.98**	(.91)
Outgroup	29	3.34	(1.03)	29	3.17	(.87)	28	**3.99**	(.71)
Total	29	3.36^{e}	(1.04)	29	3.16^{e}	(1.03)	28	**3.98**^{f}	(.81)
Aversion									
Ingroup	31	1.52	(.92)	28	**1.36**†	(.76)	29	1.19	(.45)
Outgroup	29	1.88	(1.24)	29	**1.76**†	(1.10)	28	1.16	(.36)
Total	60	1.69^{a}	(1.09)	57	1.56^{a}	(.96)	57	1.18^{b}	(.41)

Note. Means in bold represent convergent and divergent emotion responses. Means in the same row with a different superscript differ at $\alpha = .05$. Means in the same column sharing. † differ at $\alpha = .10$. Means in the same column sharing. * Differ at $\alpha = .05$.

Following the procedure to establish moderated mediation prescribed by Muller, Judd, and Yzerbyt (2005), we first established the direct (unmoderated) path of the predictor (social category) on the criterion (poststimulus measure of liking). Because the pattern of results for mimicry was similar in the anger and fear conditions, we collapsed these emotion conditions and created a new predictor variable (negative emotions).[7] As discussed above, social category significantly predicted liking, $\beta = .21$, $SE = .07$, $p = .006$, and this effect was not moderated by displayed emotion, $\beta = .03$, $SE = .08$, ns.

In the next step, we regressed the mediator (emotional mimicry) on the predictor variable (social category), where we controlled for the moderator variable (emotion, positive or negative). As discussed in the section on convergent facial behavior, the effect of social category upon emotional mimicry was moderated by emotion, $\beta = .21$, $SE = .09$, $p = .014$. Simple slope analyses showed that the difference between the ingroup and outgroup condition was significant in the combined anger and fear condition, $\beta = .46$, $SE = .19$, $p = .02$, whereas it was not in the happiness condition, $\beta = -.38$, $SE = .28$, $p = .17$.

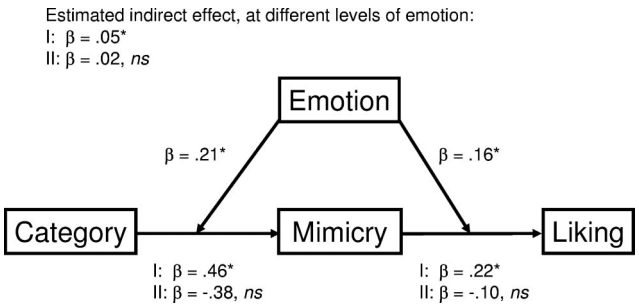

Figure 4. Indirect effect of social category on liking through mimicry, at different levels of emotion. Roman numbers indicate conditional effects at specific values of emotion. I: beta-weights in the combined anger and fear conditions. II: beta-weights in the happiness condition. *Beta-weights are significant at $\alpha = .05$.

In the final step, we again regressed the criterion (liking) on the predictor (social category) while controlling for the mediator (emotional mimicry) and its combined effect with the moderator (emotion, positive or negative) and the predictor (social category). The interaction between mimicry and emotion was a significant predictor of liking, $\beta = .16$, $SE = .08$, $p < .05$, and social category was no longer a significant predictor, $\beta = .14$, $SE = .08$, $p = .11$. No other effects were found. Simple slope analyses showed that, in the combined anger and fear condition, mimicry significantly predicted liking, $\beta = .22$, $SE = .10$, $p = .03$, whereas in the happiness condition, the effect of mimicry was nonsignificant, $\beta = -.10$, $SE = .13$, $p = .40$.

The conditional indirect effect of group on liking through emotional mimicry was also estimated with 5000 bootstraps (Preacher, Rucker, & Hayes, 2007). In the combined anger and fear condition, the estimated indirect effect was significant, $\beta = .05$, $SE = .03$, $z = 1.79$, $p = .04$ (1-tailed). In the happiness condition, the estimated indirect effect was not significant, $\beta = .02$, $SE = .03$, $z = .82$, $p = .21$ (1-tailed). These analyses show that anger and fear displays of the ingroup were mimicked to a greater extent than the same displays of

[7] We also analyzed the results when anger and fear were coded as separate predictors. This revealed a similar pattern of results, although somewhat weaker for fear.

the outgroup and that emotional mimicry of these emotions increased the bond that people felt toward the ingroup.[8]

Discussion

Study 2 replicated the effects of social category on emotional mimicry found in Study 1, using a different social category manipulation and a different measure of facial behavior. The facial displays of anger and fear were mimicked more in reaction to ingroup members, as compared with outgroup members. In addition, the finding that emotional mimicry mediates increased liking for ingroup members supports our hypothesis that emotional convergence motivates bonding with ingroup members. Interestingly, for subjective emotional reports, moderation of emotional convergence by social category was not found. One explanation for this finding is that emotional self-reports are less automatic than nonverbal displays. We will return to this issue in the general discussion.

We also found the expected divergence effect, both at the level of mimicry and subjective reports. Angry outgroup displays resulted in more self-reported fear. In addition, fear displays of the outgroup elicited nonverbal displays of aversion, as well as self-reported aversion. The effects for emotional divergence, however, were weaker than for convergence. The fear-response to outgroup anger was not paralleled in facial behavior, and the effect found on self-reported aversion did not reach standard levels of statistical significance.

With regard to mimicry of happiness, we again found no effect of social category, nor did we find a general mimicry effect on AU6. We had additionally included AU12 because we assumed that this might be a better indicator of moderate happiness as experienced in a laboratory setting but still did not find mimicry effects. This lack of effect for AU12 may reflect a ceiling effect. The pattern of results indicates that it was not the lack of smiling to happiness displays, but rather the relatively high levels of smiling in the other emotion conditions, that explains the absence of differences between emotion conditions. We return to this point in the general discussion.

General Discussion

The current research shows that emotional convergence is more likely to occur when individuals share a group membership. In line with our predictions, we found that mimicry of anger and fear was reduced if the emotion was displayed by an outgroup member. Study 2 further showed that subjective emotional reactions may also diverge, as was illustrated by the fact that outgroup anger displays evoked fear, and outgroup fear displays evoked aversion, although these effects were less strong. The second study also provided evidence for the bidirectional relation between liking and emotional mimicry. Shared group membership increased mimicry of negative emotions, and this in turn increased liking.

The social functional perspective on emotions assumes that emotions enable individuals to respond adequately to others and the situation at hand (Keltner & Haidt, 1999). This implies that emotional mimicry and convergence need not be the most adaptive reaction in some situations. Convergence with others' emotions can be considered functional, when these are a means to affirm shared identities, as is the case when we react to ingroup emotions. On the other hand, absence of mimicry—and even a divergence from emotions—might be considered functional when these are as a means to assert group boundaries (see also Keltner & Haidt, 1999).

We may speculate how the reported effects are related to status differences between groups. It is possible to argue that members of low status and/or minority groups may show stronger ingroup convergence and stronger outgroup divergence. We base this argument on the fact that group membership is more salient for members of minority groups (e.g., McGuire, McGuire, Child, & Fujioka, 1978), that they identify more strongly with their ingroup (e.g., Ellemers, Doosje, van Knippenberg, & Wilke, 1992), and that they display stronger intergroup bias (Mullen, Brown, & Smith, 1992). In addition, previous studies have shown that individuals show complimentary behavior rather than convergent behavior in response to submissive and dominant displays of others (Tiedens & Fragale, 2003). This suggests that divergent responses may be enhanced when status differences between groups indicate dominant and submissive roles. However, we argue that emotional convergence serves an affiliating function. It could also be argued that members of low status groups are more motivated to affiliate with high status others and are more inclined to converge to emotions of high status outgroup members. Future studies could further investigate the effects of status differences on emotional convergence and divergence. This would be an interesting venue for future studies.

Mimicry Versus Contagion

An interesting finding is the differential pattern of results for facial behavior and self-reported emotions. For both anger and fear, participants mimicked the ingroup more than the outgroup, whereas self-reported emotions were not moderated by group membership. For exploratory purposes, we correlated the relevant facial behavior with self-reported emotions within each emotion condition, but none of the correlations was significant ($r_{\text{AU4-anger}} = -.04$, ns; $r_{\text{AU5-fear}} = -.02$, *ns*; $r_{\text{AU6-happiness}} = .12$, *ns*). Other researchers also reported nonsignificant correlations between mimicry and emotional contagion (Gump & Kulik, 1997; Hess & Blairy, 2001) or discontinuity between facial behavior and self-reported emotions (McHugo et al., 1985; Sonnby-Borgström, 2002). These findings contradict the core assumption of emotional contagion theory, which argues that subjective emotional convergence is mediated by mimicry through afferent feedback (Hatfield et al., 1994).

One explanation for the discrepancy between facial behavior and self-reported emotions is that facial behavior is more automatic and thus does not leave room for deliberate interpretation, whereas subjective reports imply reflections on a feeling state and are by definition more conscious. The fact that our respondents

[8] It could also be argued that liking predicts mimicry. We first analyzed the effects of the premeasure of liking on mimicry. The premeasure of liking did not predict mimicry, $\beta = .07$, $SE = .08$, ns. We next tested whether the postmeasure of liking was a mediator for the relation between social category and mimicry. Despite the fact that mimicry was significantly predicted by the combined effect of liking at Time 2 and emotion, $\beta = .20$, $SE = .09$, $p = .02$, the indirect effect of social category on mimicry through liking (estimated with 5000 bootstraps) was not significant for negative or for positive emotions, both $ps > .05$ (1-tailed). We concluded that mimicry mediated the effect of group on liking (moderated by type of emotion displayed) rather than the other way around.

reported a similar level of emotional contagion toward ingroup members and outgroup members, whereas their facial reactions were more sensitive to the identity of the other person, may suggest that facial behaviors are automatic reactions to subtle social cues from the other person and also a more unobtrusive measure of emotional responses.

The paradigm used in the studies was minimal and did not provide information about the relation between groups, the reason for the display, or the target of the emotion. It is possible that this kind of contextual information adds personal relevance to the situation and makes people more emotionally immersed. This could make people more attuned to their bodily responses. In turn, facial behavior and self-reports could become more aligned. Future studies should investigate whether personal relevance results in stronger correlations between facial behavior and self-reported emotions (see also Sonnby-Borgström, 2002).

Emotions and Liking

An interesting finding of the current study is that perceiving negative emotional displays of the ingroup increased liking of these models but that this effect did not occur for the outgroup. The finding that mimicry of negative emotions mediated the increase in liking suggests that emotional mimicry is one of the basic processes maintaining group relations. Sharing emotions with other group members, even at this automatic level, strengthens the bonds between ingroup members.

So far, most studies have only examined the effects of nonemotional behavioral mimicry upon liking (e.g., Cheng & Chartrand, 2003; Lakin & Chartrand, 2003). The current study extends these findings to the domain of spontaneous emotional mimicry. Furthermore, whereas most previous studies have focused on the effects of mimicry upon the person being mimicked, the current research shows that the act of mimicking, in itself, also increases liking (see also Stel, van Baaren & Vonk, 2008). The present findings also suggest that the relation between mimicry and liking is bidirectional. Only when people have a bond and share group membership will they converge emotionally, which in turn will strengthen their bond (see also Stel et al., 2010).

Strengths and Limitations

A strong point of the present research is that, although we used different manipulations of group membership in the two studies, we found similar effects. The effects of social category were therefore not just the result of ethnic or cultural group differences (Study 2) but apply to less chronically salient groups as well (i.e., field of study, Study 1). In Study 1, we even used similar models, which were only labeled as different group members. Moreover, the use of different measures of facial reactions in both studies (EMG and coding of facial behavior) also resulted in similar patterns of emotional reactions, increasing the robustness of our findings.

One potential limitation of the present studies is that the effects we reported were generally small, and some of the predicted findings in Study 2 did not reach statistical levels of significance. In particular, the effects for emotional divergence must therefore be interpreted with some caution. Effects in studies on emotional mimicry are generally small, however, and the pattern of findings for emotional convergence in terms of facial behavior was similar in both studies. We believe that the small effect sizes are also caused by the minimal paradigm we used. We presented participants with emotional faces without providing any contextual information about the reason or the target of these displays, whereas it could be argued that in everyday life this information is readily available. This minimal research paradigm is also a strong point, on the other hand, because it shows that, even when there is no information about the individual and emotion involved, categorizing people into ingroups and outgroups leads to differential reactions to emotional displays.

One unexpected finding is that we did not find mimicry of happiness displays in either study. As we argued previously, this lack of findings for AU6 and orbicularis oculi-muscle activity can be explained by the fact that the happiness stimuli did not produce responses that were intense enough. For AU12 (smiles), the reason for the lack of findings may be different. There was a relatively high frequency of AU12 in the anger and fear conditions. This suggests that smiling is a pervasive form of behavior that occurs in response to different types of emotional stimuli or events (see also Jakobs, Manstead, & Fischer, 2001). We may smile toward an angry or fearful face for various reasons; for example, because we know it is not real, because we try to protect ourselves, because we feel embarrassed, or because we like the person we see. Smiles may express happiness, but also appeasement, or even jeering (Fridlund, 1994). Unfortunately, we cannot disentangle these different motives for smiling in the present research. This finding for smiling (or lack thereof), however, further supports our argument that the range of behavioral responses to emotional displays is broader than mere convergence. Smiling behavior might provide interesting routes for research on emotional divergence and other differential responses to emotional displays.

Conclusion

In sum, the present research may help us to interpret different reactions to news coverage of intergroup strife, which often shows images of innocent victims on both sides of the conflict. Both sides often show anger and fear. Our findings suggest that individuals may converge toward the emotions portrayed and that this may increase sympathy or the tendency to affiliate with others, but only for the group with which we already feel similar. Our emotional reactions to other groups may diverge, however. If individuals have a goal to reach a fair and balanced judgment in issues of intergroup conflict, they need to attenuate their gut reactions to displays of anger and fear. We are not blind to the emotions of others, but we may not be similarly sensitive to them, either.

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