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The impact of social context on mimicry

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Abstract

Facial mimicry, the tendency to imitate other's facial expressions, has frequently been described as a reflex-like mechanism that function independent of the relationship between expresser and observer. However, there is also evidence suggesting that it is a social cue regulating social interactions and that consequently mimicry varies as a function of social context and the type of emotion expression shown. Two studies were conducted to the assess impact of social group membership and type of expression on facial mimicry. Results suggest that the level of facial mimicry varies as a function of group membership. Moreover, mimicry levels were influenced by the kind of emotion displayed by the expresser. Although participants mimicked happiness displays regardless of the expresser's group membership, negative emotions were either not mimicked or only when shown by an ingroup member.
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1. Impact of social context on mimicry

Everyone can recall wincing at the sight of someone's expression of pain after being hurt, or smiling when a friend, overwhelmed with joy, tells us something great happened to him. These behaviors, mimicry, are an essential part of interactions in everyday life.

Mimicry is usually defined as the tendency to imitate facially, vocally or posturally people with whom we are interacting (e.g., Hess et al., 1999). There is ample evidence for the occurrence of mimicry in both children (e.g., Chisholm and Strayer, 1995; Haviland and Lelwica, 1987; Kagan et al., 1994; Reissland and Harris, 1991), and adults (Dimberg, 1982, 1986, 1987, 1988, 1990; Dimberg and Öhman, 1996; Lundqvist and Dimberg, 1995; Öhman and Dimberg, 1978).

1.1. The function of mimicry

According to Dimberg and colleagues mimicry is an unconscious and automatic process that is difficult if not impossible to suppress (Dimberg, Thunberg, and Elmehed, 2000;

Dimberg, Thunberg, and Grunedal, 2002). Chartrand and Bargh (1999) provide good evidence that mimicry creates liking and serves an affiliation goal. They use the term "Chameleon effect" to refer "to nonconscious mimicry of the postures, mannerisms, facial expressions, and other behaviors of one's interaction partners, such that one's behavior passively and unintentionally changes to match that of others in one's current social environment" (Chartrand and Bargh, 1999, p. 893).

Specifically, Lakin et al. (2003) posit that the function of behavioral mimicry has evolved from a communication role to a mechanism creating social coordination through affiliation between interaction partners. Since humans are a social species, social coordination is essential for their survival. Therefore, the display of affiliative tendencies represents a healthy strategy. Yet, this view also implies that mimicry should be shown preferentially to ingroup members or others with whom we cooperate. Specifically, we posit that if a competitive situation emerges in the course of the interaction or if the interaction partner is a known competitor/outgroup member, this same behavior may represent a bad choice, as it may allow the competitor access to resources that one does not want to share. Engaging in mimicking behaviors then becomes costly and consequently should be inhibited.

Chartrand and Bargh (1999) subsume mimicry as one of many automatic behaviors that are – in the widest sense – imitations (e.g., Bargh, 2005; Dijksterhaus and Bargh, 2001). Imitation in this very large sense may include walking more

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slowly when primed with the concept of elderly (Bargh et al., 1996) or speaking more softly when anticipating visiting a library (Aarts and Dijksterhuis, 2003). What this class of processes has in common is that they are not simply largely unconscious and often reflex-like, but because of a posited underlying perception–behavior link are presumed to be preconscious and not goal dependent (Dijksterhaus and Bargh, 2001), that is, they are obligatory. With regard to mimicry this means that "the effect should occur among strangers when no affiliation goal is present"(Chartrand and Bargh, 1999, p. 900). More recently, Lakin and Chartrand (2003) have attenuated this position by noting that mimicry is intensified when there is an explicit affiliation goal for the observer; also Aarts et al. (2003) found the above reported effects for the priming of a library context are modulated by conformity. Yet, overall, Chartrand et al. (2005) maintain their conclusion that "even in minimal circumstances there is substantial evidence that social perception leads to automatic social behavior. For instance, we mimic the behavior of strangers, people with who we have had no prior contact and have little reason to affiliate ... " (p. 356). Similarly, Dijksterhaus and Bargh (2001) already note in response to evidence (for example by LaFrance and Broadbent, 1976) that postural mimicry is related to such factors as involvement and interest, that this does not impinge on the notion that the only relevant precursor for the imitation of an behavior is the perception of the behavior.

In sum, the notion of automatic mimicry as elaborated above, implies that mimicry would be expected to occur in all situations were people observe behavior and this independent of the relationship between observed and observer as well as independent of the behavior that is observed. Whereas this point of view would admit some level of amplification of mimicry when affiliation intent is manifest, it does not allow for counter-mimicry or absence of mimicry. In contrast, it is our contention that mimicry occurs especially in minimal conditions of limited sociality, once a social context is salient the relationship between expresser and observer becomes relevant and will moderate mimicry. Further, we postulate that when it comes to mimicry of emotional behaviors, mimicry responses will be modulated by the social signal value of the behavior.

1.2. Emotional versus non-emotion mimicry

At this point it is important to note that mimicry as defined above refers to a vast number of possible behaviors. These range from showing increased muscle tension when observing arm wrestlers (Berger and Hadley, 1975) and foot tapping (Chartrand and Bargh, 1999), over wincing at the pain of others (Vaughan and Lanzetta, 1980), to imitation of emotional facial expressions (e.g., Blairy et al., 1999; Dimberg, 1982). On one hand, that imitation is found for such a range of behaviors provides impressive evidence for the ubiquitous nature of the phenomenon, but on the other hand it raises the question of whether there is more than one phenomenon at work. Specifically, these behaviors are not only different, but they differ in particular in the degree to which they are social signals

in their own right, rather than deriving social signal value by virtue of being mimicked as posited by Bavelas et al. (1986a,b). Specifically, behaviors such as foot tapping, face touching, or arm wrestling between strangers, do not signal social intent towards the observer, yet others such as the postural leaning towards or away studied by Bavelas et al. or the dominance behaviors studied by Tiedens and Fragale (2003) do. In what follows we will posit that this social signal value of the observed behavior should be an important determinant of whether the behavior will be mimicked and in which context.

In this context, it is important to note that emotional facial expressions not only signal emotional states, but inherently signal affiliative intent. Specifically, individuals who show happy expressions are perceived as highly affiliative, whereas individuals who show anger are perceived as highly non-affiliative, especially when the expresser is male (Hess et al., 2000; Knutson, 1996). Thus, the social signal value of emotional facial expressions can be expected to directly interact with the main function of mimicry, that is, to create linking and foster affiliation, in a way that foot tapping or forearm tension would not. Because of these considerations, it is impossible to study emotional mimicry without considering the specific emotion expression at hand. This implies that one would not expect all emotion expressions to be mimicked equally and independent of social context.

1.3. Emotional mimicry and social context

Arguably, we are generally more inclined to affiliate with those with whom we expect to cooperate rather than to compete. In fact, as mentioned above, signaling affiliative intent towards an outgroup member may not be a good overall strategy. Correspondingly, Lanzetta and Englis (1989) found that individuals mimic the former but not the latter. In fact, in the competition condition, counter-mimicry, that is, contrasting facial expressions were shown (i.e., a smile when the expresser winced in pain).

A more explicit test of the impact of affiliation motives was reported by Gump and Kulik (1997), who used the fact that threat increases affiliative tendencies (Schachter, 1959) to manipulate affiliation goals. Participants who found themselves facing a similar threat as a confederate were more likely to mimic the confederate. Also, McHugo et al. (1991) found that individuals who shared a relevant attitude with the expresser were more likely to mimic that expresser.

Specifically, McHugo et al. (1991) found that facial mimicry and self-reported emotional reactions in response to the facial emotional displays of political leaders varied as a function of the emotion displayed as well as a function of the observer's political attitude. Thus, supporters of Ronald Reagan showed more mimicry in response to his smile displays than towards his opponent's.

In sum, the relationship between observer and observed seems to be relevant for emotional mimicry reactions. Individuals with whom we cooperate or share something important seem to be more likely to elicit mimicry than those with whom we are in competition or with whom we fundamentally disagree.

1.4. Mimicry to emotional facial expressions

Further, evidence has accumulated that not all emotion expressions are mimicked equally. In fact, as mentioned above emotional expressions vary in the degree to which they convey affiliative intent (Knutson, 1996; Hess et al., 2000). Hess and Bourgeois (2006) showed that whereas mimicry for happiness expressions, which signal affiliative intent, did not vary substantially as a function of the sociality of the context, mimicry to anger expressions, which signal intent not to affiliate, was strongest in minimal situations where people were exposed to expressions by unknown others about whom they knew nothing. Most importantly, in an actual social situation anger mimicry was not shown (Bourgeois and Hess, 2007). We attribute this to the fact that anger mimicry would imply that both interaction partners signal intent not to affiliate as a means to signal affiliative intent – clearly a nonsensical message. However, this view also implies that in situations where the expressed anger is clearly directed at a third party (because of context or head tilt) and if the same anger-eliciting view is shared by actor and observer, anger mimicry may in fact serve an affiliative goal.

Yet, signaling affiliation via emotional mimicry may also have costs. For example, if someone mimics a sadness expression, thereby, as Bavelas et al. (1986a,b) put it so well, showing others what they feel, such signaling of understanding may be costly, as the person may be required to provide succor to the sad other. Thus, the costs of signaling affiliative tendencies in a particular emotional context have to be considered. For example, in a questionnaire study, Yabar et al. (2001) showed that the "decision" to mimic or not may depend on the type of emotion as well as on the perceived level of intimacy with the expresser. Specifically, they showed that for sadness displays, men reported themselves as likely to mimic another person only when that person was close to them rather than just a passing acquaintance. This tendency was even stronger when the emotional content of the interaction was perceived as intense and when the described situation allowed for an extended interaction. In contrast, participants generally considered themselves likely to mimic happiness regardless of the relationship with the expresser or the situational context. Further, to the degree that facial reactions to facial expressions can be considered affective phenomena in their own right (Moody et al., 2007), additional emotional costs of emotional mimicry may also accrue.

Finally, the notion that for the mimicry of emotional expressions knowing what the other feels, is as important as seeing what the other feels is supported by findings by Hess et al. (1997) showing that people "mimic" the upper half of an expression even when they can see only the lower half and that this effect is influenced by whether or not they decoded the expression correctly.

In conclusion, there is evidence that emotional mimicry is sensitive to social context and that emotional facial expressions should be mimicked only to the degree that such mimicry can serve affiliation goals and is not too costly. The present research proposes to study these notions explicitly. In particular, the question of whether mimicry is more likely when the observed person is a member of the same social group, either because of shared fundamental values, or because of a shared pertinent social identity, will be addressed. In this context we use the terms ingroup and outgroup rather widely to include larger social categories such as gender, religion and nationality (Brewer and Brown, 1998) or specifically in our case political affiliation and sport affiliation.

We predict that both social group membership and the emotional context of the interaction impact on the level of mimicry. Specifically, outgroup members should be mimicked less readily overall, and specifically when displaying negative emotions.

2. Study 1

Study 1 was conducted to assess whether social group membership defined through shared fundamental attitudes influences mimicry. For this, we adapted the study by McHugo et al. (1991) described above, who found that mimicry and emotional contagion effects associated with happiness displays were influenced by political attitudes. Yet, one possible problem with this study is that the two politicians differed in their general appeal. Reagan was a much more charismatic person and rather expressive. It is possible that non-supporters of Reagan found him fake or overly flamboyant when comparing his displays and Senator Hart's and thus did not mimic Reagan's happiness displays.

Consequently, Study 1 compared facial reactions to two political leaders who both were well respected, as well as considered charismatic and good communicators by both supporters and opponents. Specifically, we investigated observers' facial reactions towards smiles and frowns by two prominent Quebec politicians, Lucien Bouchard and Jean Charest, who both received 40.7% support in a poll conducted at the beginning of the 1998 election period (Salvet, 1998, September 5th).

Participants in the present study were generally in support of Bouchard's political views rather than Charest's, as Bouchard represented the Quebec separatist point of view, which was very popular with college and university students. In fact, it would have been very difficult if not impossible to recruit participants from the same population, i.e., French speaking, Quebec-born university students who were strongly in favor of Charest's political position of federal unity. We predicted that participants, because they were in favor of Bouchard's political views, would consider him as a member of their ingroup and hence be more likely mimic him rather than Charest. Following McHugo et al. (1991) findings, this should be expected for smiling, but as mentioned above, mimicry of smiles may be less responsive to social context than mimicry of negative emotion expressions. We also predicted that participants would mimic anger in this context, and this for two reasons, first the politicians looked at each other not at the participant, who therefore saw them in a 4/5th profile, that is, the expression was not directly directed at the participant, secondly, the context of the debate made it clear that the anger expressions were both legitimate and directed towards the opponent.

3. Method

3.1. Participants

A total of 54 students (19 men, 25 women, and 10 gender unknown) from the University of Quebec at Montreal with a mean age of 25 years participated individually. On average, participants rated their political attitudes as 4.2 out of 6 on the Quebec Nationalism Scale (Guimond and Dubé-Simard, 1983), which strongly reflects Bouchard's political position.

3.2. Facial stimuli

Twelve short video sequences of expressions displayed by Jean Charest and Lucien Bouchard (three smiles and three frowns each), lasting 13.2 s on average, were presented in a different random order for each participant.

The sequences were taken from a pre-electoral debate, which provided a highly standardized situation (both politicians were shown from the same camera angle with the same view, and the same lightening, etc). The expressions varied from low to medium intensity. The sequences were presented without sound, in order to eliminate the possibility of inducing emotions via reactions to the verbal message.

3.3. Dependent measures

3.3.1. Facial EMG

Facial EMG was measured on the left side of the face. Electrode placements were chosen according to Fridlund and Cacioppo (1986). Muscular activity was measured using bipolar placements of Med. Associates Inc. Ag/AgCl miniature surface electrodes with Med. Associates Inc. electrolyte gel (TD41). All pairs were referenced to a forehead electrode placed near the midline. The skin was cleansed with PDI disposable electrode prep pads (70% alcohol and pumice). A Contact Precision Instruments system with 60 Hz notch filter was used to amplify the raw EMG signals, which were integrated with a 200 ms time constant. The smoothed EMG signal was sampled at 20 Hz and stored to disk. *Orbicularis Oculi* and *Zygomaticus Major* were employed to assess smiling and *Corrugator Supercilii* was employed to assess frowning.

3.3.2. Judgment data

To assure their focus on the video, participants were asked to rate each sequence on an emotion profile. Further, participants were asked to indicate how difficult the task was. Finally, the participants' emotional state was assessed once for each type of emotion and actor, four times in total. However, these data will not be discussed in the context of this report.

3.3.3. Participants' political attitudes

The participants' political attitudes were assessed using a Nationalism scale specific to the Quebec political situation (Guimond and Dubé-Simard, 1983). This scale consists of a series of six yes or no questions defining political topics (Official language, education, etc.).

We further used a modified version of the inclusion-of-other-in-the-self scale (Aron et al., 1992) to assess the participants' identification and closeness to different political concepts and parties. For this, a scale consisting of a series of circles that overlap to differing degrees was presented. The respondents' task was to indicate for each concept and party (Parti Québécois, Parti Libéral, Québec, Canada, etc.) the level of overlap that best describes their closeness.

Participants' perception of the two politicians' levels of dominance and affiliation were assessed using the Revised Interpersonal Adjective Scale (IAS-R) adapted by Knutson (1996). This scale consists of a series of 32 adjectives such as self-assured, crafty, introverted that sample the interpersonal dimensions of dominance and affiliation. Participants rated to what degree each adjective describes the politicians on a continuous scale anchored with "not at all" and "totally." The IAS-R yields two composite scores on a scale of 0–300, one for dominance and one for affiliation, as well as eight more specific trait scores. In the present context, the dominance and affiliation composite scores were of specific interest, in addition we calculated the mean score on the subscale describing "pleasantness" (*gentle, tender, agreeable, sympathetic*).

3.4. Procedure

Each participant was greeted by the experimenter and seated in front of a computer. The participants were informed that their task would be to rate a series of facial expressions regarding the emotional expression displayed. The psychophysiological measures were then explained. Participants who signed the consent form received detailed instructions regarding the task and the electrodes were attached. The experimenter then answered any questions regarding the procedure and left the room.

Participants initiated the stimulus sequence by using a mouse to click a start button. For each trial, the participants were first asked to focus on a circle in the middle of the screen. The short video sequence was then shown. Following the presentation of the stimulus, participants completed the rating tasks described above. After all sequences were rated, the participants filled out the questionnaires regarding their political attitudes and their liking of the two political leaders. To avoid contamination effects from the preceding task, this task was presented as being part of another study. It included questions about a third political party to make the participants believe the cover story.

3.4.1. Data treatment

All EMG data were *z* transformed within participant. To determine if specific facial muscle activity corresponded to the expected patterns of mimicry, a planned contrast was conducted for both happiness and anger. Specifically, significantly higher levels of *Corrugator Supercilii* than *Orbicularis Oculi* and *Zygomaticus Major* activity should characterize anger mimicry, while the reversed pattern is expected for happiness.

4. Results

4.1. Manipulation check

There were no differences in personal attitude ratings for the two politicians on the dominance (Bouchard: $M = 109.57$, S.D. = 80.42; Charest: $M = 112.18$, S.D. = 82.34) $t(53) = .190$, $p = .850$), the affiliation (Bouchard: $M = 18.11$, S.D. = 109.86; Charest: $M = 32.02$, S.D. = 75.95), $t(53) = .703$, $p = .485$), or the pleasantness (Bouchard: $M = 82.19$, S.D. = 40.16; Charest: $M = 76.31$, S.D. = 34.80, $t(53) = 1.019$, $p = .313$) subscales confirming that the two politicians were perceived very similarly as far as their personality was concerned. As mentioned earlier, participants were strong nationalists, based on their score on the Quebec Nationalism Scale. Further, an aggregate measure of attitude was derived from the inclusion scales concerning "Parti Québécois", the "Parti Libéral du Québec", "Québec" and "Canada." All participants had a positive score, with a mean attitude score of 5.67 on a scale ranging from -12 to 12, confirming that participants were globally in favor of Bouchard's position.

4.2. Mimicry effects

For anger displays, the a-priori contrast confirmed that *Corrugator Supercilli* activity was indeed higher than *Orbicularis Oculi* and *Zygomaticus Major*'s, $F(1,52) = 16.41$, $p < .0001$, $\eta^2 = .24$. Further, as predicted, a significant politician by muscle site interaction emerged, $F(2,51) = 10.55$, $p < .0001$, $\eta^2 = .29$. Specifically, participants showed more *Corrugator Supercilii*, $F(1,52) = 10.67$, $p = .002$, $\eta^2 = .17$, as well as less *Orbicularis Oculi*, $F(1,52) = 9.09$, $p = .004$, $\eta^2 = .15$ and less *Zygomaticus Major*, $F(1,52) = 3.81$, $p = .056$, $\eta^2 = .07$, when judging Bouchard's anger displays than when judging Charest's
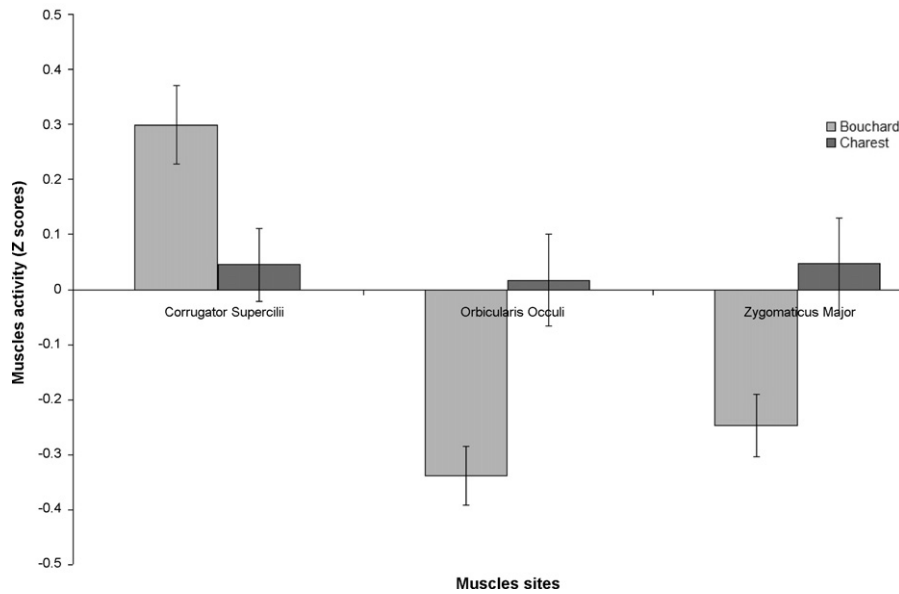
Fig. 1. Mean EMG activity (Z scores) for Bouchard's and Charest's anger displays.

anger displays (See Fig. 1). That is, participants showed increased frowns, as well as increased relaxation of the muscles involved in smiling, in reaction to the ingroup member's compared to the outgroup member's anger displays.

The a-priori contrast for happiness displays revealed that participants showed less *Corrugator Supercilii* activity ($M = -.15$, S.D. $= .37$) than *Orbicularis Oculi* ($M = .17$, S.D. $= .32$) and *Zygomaticus Major* activity ($M = .10$, S.D. $= .30$), $F(1,52) = 16.41$, $p < .0001$, $\eta^2 = .24$, a pattern indicative of smiling,. However, contrary to expectations, no significant interaction emerged between politician and muscle site, $F(2,51) = .72$, $p = .491$, $\eta^2 = .03$, that is, participants smiled about equally in response to both politicians' smiles.

5. Discussion

The present results suggest that social group membership, as defined by shared political attitude, influences facial mimicry. Specifically, although Bouchard's supporters showed congruent muscle activity to his anger displays, they showed no clear muscle pattern while judging Charest's anger displays. For happiness displays, however, participants showed equivalent mimicry for both Bouchard and Charest's displays. This finding is congruent with the notion that happiness, because it incurs low social costs, may be mimicked regardless of social context.

In contrast, McHugo et al. (1991) reported that participants who were supporters of Ronald Reagan showed higher mimicry levels towards his happiness displays than non-supporters did, while no attitudinal effect was found concerning the politician's anger displays. However, as mentioned before, the two politicians used in McHugo et al.'s study differed in general appeal. Thus, it is very likely that individuals who did not support Reagan found his highly expressive style 'fake' and it has been suggested that fake expressions are not mimicked; also McHugo et al. used straight on facial displays shown without context, that is, no clear target of the anger expressions was specified. As explained above, in those cases anger mimicry can be expected to be absent.

However, in the present case it is also possible that the effects for smiling are due to what is called a "juvenescence effect". Specifically, individuals with large eyes, a round face, thin eyebrows and a small nose, all strongly present in Charest's face, are perceived to have a baby-like face (e.g., Zebrowitz and Montepare, 1992). Consequences of having a babyface include other's perception of childlike traits (Zebrowitz and Montepare, 1992), naivety, honesty, kindness and warmth (Berry and McArthur, 1985). It has been suggested in the ethological literature that such juvenescence invites approach and specifically, smiling behaviors. One of the few studies trying to assess this notion experimentally was conducted by Fridlund and MacDonald (1998) who found more approach and smiling behaviors in response to a puppy than to the same dog after he had lost his juvenescent appearance. Although this study was conducted with a dog as a cause of the juvenescence effect, it is plausible that a similar effect can be triggered by a human with a pronounced babyface such as Charest.

In sum, Study 1 presents evidence that political attitudes may influence mimicry of anger displays directed at a shared anger-eliciting cause. Furthermore, both proposed explanations for the findings regarding happiness mimicry, that is, the potentially lower costs of such mimicry or the possible impact of the juvenescence characteristics of Charest's face, point to the importance of the social attributes of the stimulus in this context.

6. Study 2

Study 1 supports the notion that mimicry can be influenced by aspects of the social context, in this case, cues relevant to the shared group status of observer and target. Also, the findings suggest that mimicking different emotions might entrain different costs, leading to variation in the level of mimicry shown. However, in Study 1, the ingroup and outgroup member

were two different people, thus it is possible that some of the effects were particular to the individuals in question, as suggested by the possible juvenescence effect. Therefore, Study 2 varied both social context and emotion displays but in addition controlled for the specific characteristics of the stimulus by presenting the same individuals as either ingroup or outgroup members. Thus, differences in mimicking behavior should be solely caused by the assigned group membership of the expresser and not by any accidentally associated characteristics.

Because one way of identifying with a social group is through salient information such as ethnicity or gender, members of two different ethnic groups, Africans and Quebecois, were used to create different social target groups in the present study. Moreover, as mentioned above, to control for idiosyncratic characteristics, the "common ingroup identity model" (Gaertner et al., 1993, 1989, 1994) was used to create an artificial ingroup/outgroup structure, combining individuals of the two ethnic groups. The applicability of such a group construction in the context of EMG measures was shown by Ensari et al. (2004).

For the present research, the common ingroup was constructed through a common sport – basketball. Specifically, we asked basketball players and people who do not play basketball to rate a series of facial expressions. Half the expressers, who were either Sub-Saharan Africans from Gabon or Ivory Coast or Quebecois, were labeled as basketball players and half as non-players. The labels were counterbalanced across stimuli and participants, eliminating the possibility that observed mimicry reactions could be caused by anything else than the basketball player/non-player social identity.

Basketball was chosen as the unifying category because it is a category in which both African and European descent expressers are viewed positively. However, because of the lack of women's basketball teams in the surrounding universities at the time the study was conducted, only men were chosen to be participants in this study.

In Study 1, only happy and angry displays were used because the setting of a political debate severely restricts the range of emotions displayed. To assess the notion that the mimicry of sadness expressions, because of the associated higher social costs of signaling empathy, would be restricted to ingroup members, whereas happiness may be freely mimicked, Study 2 also included sadness.

In sum, the principal goal of the present study was to assess the hypothesis that facial mimicry is dependent on the ingroup/outgroup relationship between the expresser and the observer as well as on the type of emotion shown by the expresser. Specifically, we expected that the social costs associated with sending an affiliative 'I understand you' signal would be higher for sadness. Typically in designs of this type, members of the double ingroup are most favorably evaluated, whereas members of the double outgroup are least favorably evaluated, with the other two groups between the two (for a review see Migdal et al., 1998). In the present context, this implies that mimicry by Quebecois Basketball-players should be least costly and most pronounced with regard to Caucasian Basketball-players and least pronounced for Sub-Saharan African non-players.

Conversely, the Quebecois non-players should preferentially mimic Caucasian non-players and show the least mimicry for Sub-Saharan African players.

7. Method

7.1. Participants

Sixty French Canadian men (with a mean age of 23.5 years) participated individually. Half the participants were active basketball players recruited from sports centers at the University of Quebec at Montreal and nearby Colleges, the other half of the participants, also recruited from the University of Quebec at Montreal and nearby Colleges, did neither play basketball themselves nor were basketball fans.

7.2. Facial stimuli

The facial stimuli consisted of expressions of happiness, sadness and anger by four Quebecois and four Sub-Saharan African men, taken from the MSFDE (Montreal Set of Facial Displays of Emotion, Beaupré and Hess, 2005). This series is composed of emotional facial expressions by young Quebecois, African and Asian adults. The MSFDE contains prototypical facial expressions that have been shown to be well recognized (Beaupré and Hess, 2005). Thus, each participant saw 12 photos, half of which were labeled as basketball players, and half of which were labeled as non-players. The labeling was counterbalanced across participants. The stimuli were presented in a different random order for each participant.

8. Dependent measures[1]
8.1. Judgment data

Following the presentation of each stimulus, subjects were asked to assess the emotions portrayed as well as their intensities using an emotion profile. These data will not be discussed in the context of this article.

8.2. Facial EMG

The same procedure as in Study 1 was employed with the exception that activity of the *Levator Labii Aleaque Nasii*, the muscle that lifts the lip in a scowl, was also recorded.[2]

8.3. Procedure

Each participant was greeted by the experimenter and seated in front of a computer. The participants were informed that their task would be to rate a series of facial expressions regarding the

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[1] At the end of the experiment, participants were asked to fill in different questionnaires to assess individual differences. Specifically, the Aversive Racism Scale (Kleinpenning and Hagendoorn, 1993), the IACIAI (Matsumoto et al., 1997) and the PAQ (Spence and Helmreich, 1978) were used. Further, participants were asked to evaluate their level of contact with French-Canadians, Canadians of African descent and immigrants in general and their beliefs regarding the typical expressive behavior by these different ethnic groups. Since these data fall beyond the scope of this article, they will not be discussed in the present context.
[2] However, because of a recurrent technical problem, there were many missing data at this particular muscle site. Thus, data concerning *Levator Labii Aleaque Nasii* activity will not be discussed in the context of this article.

emotional expression displayed. A cover story was presented to the participants to justify the labeling of pictures as basketball players and non-basketball players. The psychophysiological measures were then explained. Participants who signed the consent form received detailed instructions regarding the task and the electrodes were attached. The experimenter then answered any questions regarding the procedure and left the room.

Participants initiated the stimulus sequence by using a mouse to click a start button. For each trial, the participant first saw the poser's neutral expression and then the emotional facial expression followed by the ratings scales.

8.4. Data treatment

As for Study 1, all data were z-transformed within participants. For each emotion (anger, happiness, and sadness), a planned contrast was calculated to assess whether the facial activity conformed to expected patterns of mimicry. Specifically, for anger and sadness, mimicry should be indexed by significantly higher levels of *Corrugator Supercilii* than *Orbicularis Oculi* and *Zygomaticus Major* activity, while the reversed pattern is expected for happiness.

9. Results

9.1. Manipulation check

Participants were chosen based on whether they were member of a basketball team or not. However, to make sure that non-basketball players were not hardcore basketball fans, and thus would highly identify themselves with basketball players, we assessed participants' level of identification with basketball, using a modified version of the inclusion-in-the-self scale (Aron et al., 1992). The validity of this scale for ingroup identification has been established by Tropp and Wright (2001). Results showed that there was a clear difference in how both groups relate to basketball. Specifically, basketball players ($M = 5.2$, S.D. = 1.54) highly identified with basketball whereas non-basketball players ($M = 2.1$, S.D. = 1.18) did not identify themselves with this sport at all,[3] $t(57) = 8.659$, $p < .0001$; $d = 2.26$.

9.2. Mimicry effects

For anger displays, no significant effects emerged. However, for happiness the planned contrast confirmed significantly higher *Orbicularis Oculi* and *Zygomaticus Major* than *Corrugator Supercilii* activity, $F(1,59) = 18.80$, $p < .0001$, $\eta^2 = .24$. No interaction between muscle and either ethnic group or player group emerged significantly, that is,

participants mimicked happiness regardless of the social group status of the expresser. For sadness, we had predicted that only sadness expressions by ingroup members should be mimicked. The a priori contrast emerged significantly across groups. Specifically, *Corrugator Supercilii*'s activity was higher than *Orbicularis Oculi* and *Zygomaticus Major* activity, $F(1,59) = 26.34$, $p < .0001$, $\eta^2 = .31$. However, as predicted this effect was qualified by a player group by ethnic group by muscle site interaction $F(2,58) = 7.23$, $p = .002$, $\eta^2 = .20$.

To follow up on the three-way interaction, we collapsed the factor muscle site by computing the predicted contrast (i.e., increase in *Corrugator Supercilii* activity combined with decreases in *Zygomaticus Major* and *Orbicularis Oculi* activity) for each participant. On these data a 2 (player group status) × 2 (ethnic group status) analysis of variance was conducted. A significant main effect emerged for player group, $F(1,59) = 5.86$, $p = .019$, $\eta^2 = .09$. As expected the mimicry pattern was most pronounced for the double ingroup ($M = .33$, S.D. = 1.13), followed by the player ingroup/ethnic outgroup condition ($M = .24$, S.D. = .70). Both the double outgroup and the player-outgroup/ethnic ingroup expressers were not mimicked, with contrast values close to 0. This finding suggests that the player ingroup status overrode possible effects of ethnic ingroup status, suggesting that the former was a more salient group characteristic than the latter. This also suggests that the mimicry effects were not due to differences in the appearance of the expressers because the same individuals were labeled as either basketball players or non-players.

In sum, Study 2 provided further evidence for the notion that shared interests and attitudes may increase the tendency to mimic the other. Further, we again found that mimicry was moderated by the type of emotion expression shown by the expresser. Whereas, happiness was mimicked across in- and outgroup members, sadness was mimicked only when shown by a member of a salient ingroup. Also, as predicted for the present context, anger expressions were not mimicked.

10. Discussion

In sum, the results underline the impact of the relationship between expresser and observer for facial emotional mimicry. Further, we found that men did not mimic unknown angry men but did mimic other emotions displayed by men. This finding replicates findings by Bourgeois and Hess (2007) who found this effect for both sexes. Yet the finding contrasts with previous studies that found mimicry of anger expressions (e.g., Dimberg, 1982, 1988). However, those results were obtained in experimental settings that excluded all reference to social context. In contrast, in the present study, group membership provided a relevant social context that may have made the social cost of mimicry more salient.

Specifically, anger displays are threat displays (Aronoff et al., 1988, 1992), which carry the potential of sending the wrong message (i.e.: "I am responding aggressively to your threatening display" instead of: "I understand what you feel by showing what you feel"). Furthermore, even if expressers were identified as ingroup members, they were unknown men and no

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[3] Only one non-player participant identified himself to any marked degree with basketball. Analyses conducted after removing data from that participant were entirely consistent with analyses conducted on the complete data set. Thus results concerning the complete data set will be presented.

contextual information was provided to justify their anger expression. In such a setting, matching facial expressions should not be a means to signal affiliative intent.

For sadness displays, results illustrate the complexity associated with the costs and consequences of showing mimicry. Specifically, mimicked sadness displays transmit the message that the mimicker understands what the other feels, implying a willingness to provide support if needed. Yet, to offer support to a sad person is much more "expensive" than to simply share a happy moment with someone. Consequently sadness mimicry was restricted to double ingroup members and members of the salient player ingroup.

Finally, in the case of happiness, mimicry implies the sharing of positive feelings (e.g. Christophe and Rime, 1997), which are usually non-threatening and non-costly. Indeed, for happiness displays, there is mimicry independently of group membership.

11. Conclusions

In sum, the results from both studies suggest that emotional facial mimicry is affected by the relationship between the expresser and the observer as well as by the type of emotion expression that is shown. In both studies, negative emotion expressions were mimicked only when shown by an ingroup member; in contrast, happiness was always mimicked.

As mentioned above, the function of mimicry is to increase rapport between interaction partners (Chartrand and Bargh, 1999, see also Hess et al., 1999). However, this leads to the question of whether it is always of interest to the organism to affiliate with others. Clearly, when the other is competing for resources or, as outgroup member, is at least not contributing resources, affiliation may not be the best response. From this perspective, we predicted that outgroup members would be mimicked less or not at all as suggested by findings by Lanzetta and co-workers (Lanzetta and Englis, 1989; McHugo et al., 1991). This prediction was confirmed for anger in Study 1 and for sadness in Study 2.

However, a second consideration regards the type of emotion expression that is shown. Specifically, the present results suggest that happiness is mimicked regardless of whether the expresser is an in- or outgroup member. We suggest that this is because happiness is a "low cost" emotion. Showing happiness signals that all is well in the environment (see e.g., Frijda, 1986; Lazarus, 1991) and does not require action by the observer. In addition, happiness as such signals affiliative intent, which implies in the case of an outgroup member, that the other person has already made a first step and signaled affiliative intent, hence signaling affiliative intent back is also of low risk, as rejection of this affiliative offer is unlikely.

This is different for both sadness and anger. Anger signals threat (Aronoff et al., 1988, 1992) and in addition intent to not affiliative. As such mimicking this emotion, even when shown by an ingroup member, may convey aggressive intent or at least non-affiliative intent – a message quite in opposition to the main function of mimicry. And indeed, in Study 2 no evidence for anger mimicry was found, confirming similar findings by Bourgeois and Hess (2007). Although previous studies found such effects (Dimberg, 1982, 1988), those results were obtained in experimental settings that excluded all reference to social context. In contrast, in the present study, as in Bourgeois and Hess (2007), a salient social context was provided.

However, in cases where anger is deemed not only to be legitimate but also clearly directed at a shared anger object, as was the case in Study 1, the shared expression of anger may indeed be conducive to affiliation, and in this context, we observed anger mimicry.

Finally, for sadness displays, we predicted that they would be preferentially mimicked when shown by close other. This prediction was based on the notion that signaling affiliative intent and emotional understanding to someone who is sad may incur costs as the other may reasonable expect to receive help and succor. As Yabar et al. (2001) found, men report in general that they would not show a matching expression of sadness in response to the sadness of another person when this person was not close to them. This matches the finding that participants in Study 2 showed the most evidence for sadness mimicry in response to double ingroup members.

In conclusion, the present findings support the notion that mimicry is influenced by social context factors, such as group membership, and hence is not always purely automatic and reflex-like. Moreover, group membership does not have the same impact on mimicry depending on the particular emotion expressed. This research provides highly suggestive evidence for the notion that emotional mimicry is an affiliative signal that has an important role in the maintenance and regulation of social interactions.

The present research focused on emotional mimicry because emotional facial expressions are intrinsic social signals and affiliating with individuals who experience emotional states can be differentially costly to the observer. As such, social signal value and emotional cost are issues that have to be considered whenever emotional mimicry is studied. Yet clearly these considerations can also apply to certain other behaviors in specific situations. Thus leaning towards or away from a person (Bavelas et al., 1988, 1986b) or displaying highly dominant behaviors (Tiedens and Fragale, 2003) also signals social intent and similar consideration should apply. Yet other behaviors have no social meaning and their imitation can be expected to be less influenced by the relationship between observer and expresser as long as this relationship is not openly antagonistic.

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