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What is This?

Emotional Mimicry as Social Regulation

Ursula Hess[1] and Agneta Fischer[2]

Abstract

Emotional mimicry is the imitation of the emotional expressions of others. According to the classic view on emotional mimicry (the Matched Motor Hypothesis), people mimic the specific facial movements that comprise a discrete emotional expression. However, little evidence exists for the mimicry of discrete emotions; rather, the extant evidence supports only *valence-based* mimicry. We propose an alternative Emotion Mimicry in Context view according to which emotional mimicry is not based on mere perception but rather on the interpretation of signals as emotional intentions in a specific context. We present evidence for the idea that people mimic contextualized emotions rather than simply expressive muscle movements. Our model postulates that (implicit or explicit) contextual information is needed for emotional mimicry to take place. It takes into account the relationship between observer and expresser, and suggests that emotional mimicry depends on this relationship and functions as a social regulator.

Keywords

facial mimicry, social regulation

Emotions can be expressed in many ways. They may be displayed subtly or explicitly, through silence or screaming, through the raising of one eyebrow or by hitting a fist on the table, or simply by telling others how one feels. People react to these emotional signals with their own emotions, and these emotions may be either similar or different from the emotions in others that provoked these reactions. For example, people may react with contempt to a sentimental reaction such as crying, become frightened when confronted with an aggressive person, feel Schadenfreude when seeing an enemy in terror, or be envious when seeing someone proudly smile. On the other hand, people may also get tears in their eyes when seeing someone cry, afraid when seeing someone trembling with fear, or happy when seeing someone smile.

The phenomenon of reacting with the same emotion as the one observed has been described as "catching" another person's emotions (Hatfield, Cacioppo, & Rapson, 1994). Hatfield and colleagues extensively described this phenomenon in their book, *Emotional Contagion*, and made the connection to other phenomena, such as motor mimicry, facial mimicry, and the facial feedback hypothesis. Their idea was that the contagious nature of emotions could be explained in different ways, but one important mechanism stood out. They referred to this phenomenon as "primitive emotional contagion," suggesting that when people perceive an emotion in others, they automatically mimic this emotion, and the bodily feedback derived from this mimicry also leads them to feel that emotion (Flack, 2006; Stepper & Strack, 1993). Since then, many studies have examined facial mimicry and its effects, but there remains considerable conceptual confusion and empirical ambiguity about what facial mimicry is, how it

occurs, and what functions it serves. In the framework of this article, we define *emotional mimicry* as the imitation of the emotional expression of another person. By contrast, we use the term *emotional contagion* to refer to the more generic process of "catching" another's emotion, without specifying the specific process that may underlie this outcome.

Our goals in this article are to describe the classic view of facial mimicry, to provide a critical overview of the empirical evidence, and to sketch the outlines of an alternative view. Two questions guide this review. First, is there conclusive evidence that congruent facial expressions (i.e., expressions in an observer that reflect the same emotions that were observed) are the result of *mimicry* or of other processes? Second, do congruent facial expressions reflect the mimicry of *discrete* emotions or of global affect? Our overall aim is to present a contextualized view of emotional mimicry and to argue that emotional mimicry is dependent on the social context. To do this, we discuss the different functions that have been proposed for emotional mimicry on the basis of the available evidence and finish with an outline of an alternative model that emphasizes that (implicit or explicit) contextual information is needed for emotion mimicry to take place.

This contextualized view of emotional mimicry suggests that whether mimicry occurs depends both on the nature of

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the emotional signal and the relationship between expresser and observer such that mimicry functions as a social regulator. One of the central points is that mimicry serves to foster affiliation but also crucially depends on an initial affiliative stance, that is, an initial openness to engage with the other. Importantly, we define "contextualized" in its broadest sense, namely, the inclusion of social information. Context information can be explicit, for example, in references to the situation in which the expression occurs (e.g., funeral, or winning a context), but context information can also be implicit. For example, a smiling face provides not only information about the emotional state of the person, but the smile also signals affiliative intentions (Hess, Blairy, & Kleck, 2000) and the face provides information on the social group membership of the expresser (i.e., man or woman, a baby or an old man).

The "Classic" View on Mimicry: The Matched Motor Hypothesis

Generally, emotional mimicry has been considered a special case of behavioral or motor mimicry (Chartrand & Bargh, 1999), which is defined as the imitation of the nonverbal display of another person (Hess, Philippot, & Blairy, 1999). According to the standard view, behavioral mimicry is an automatic, matched motor response, based on a perception–behavior link (Chartrand & Bargh, 1999; Preston & de Waal, 2003). We will refer to this idea as the Matched Motor Hypothesis, which assumes that merely perceiving a specific nonverbal display automatically entrains the same expression in the perceiver. The primary function of this imitative behavior is to foster affiliation and liking, because it smoothens the interaction and adjusts behavior by synchronizing the nonverbal behaviors of the interactants. Behavioral mimicry has therefore been referred to as "social glue" (Lakin, Jefferis, Cheng, & Chartrand, 2003).

Various mechanisms have been proposed to underlie this link between perception and behavior, such as shared schemas (Barresi & Moore, 1996), shared representations (Prinz, 1997), or spreading activation (see Chartrand & Dalton, 2009). The underlying mechanism responsible for the spreading activation effect is that perceptual activity spreads to behavioral representations, which in turn increases the probability of imitating that same behavior, without conscious awareness, control, or intent. In other words, overlapping brain areas are activated during both motor action and the observation of this motor action. This idea is consistent with recent research showing that specific premotor neurons, called mirror neurons, fire not only when an action is performed but also when the same action is observed (Decety & Jackson, 2006; Gallese & Goldman, 1998; Goldman & Sripada, 2005; Rizzolatti & Craighero, 2004).

Evidence for behavioral mimicry comes from studies of specific behaviors, such as increased foot tapping and face touching in the presence of an interaction partner who shows these behaviors (see Chartrand & Bargh, 1999), wincing when observing the pain of others (Bavelas, Black, Lemery, &

Mullett, 1986a, 1986b; Lanzetta & Englis, 1989), adopting congruent postures (Bavelas, Black, Chovil, Lemery, & Mullett, 1988; Bavelas et al., 1986a, 1986b; Bernieri & Rosenthal, 1991), or increased forearm muscle tension when watching arm wrestling (Berger & Hadley, 1975). In all of these cases, the same behaviors are performed as observed, occur spontaneously, are independent of the observers' intentions, and the crucial measure is the frequency (rather than the speed or accuracy) of the imitated behavior (see also, Heyes, 2011).

It has been implicitly assumed that emotional mimicry can be considered simply one of the different forms of behavioral mimicry (e.g., Lakin et al., 2003); thus implying that the perception of a specific emotion display leads to the imitation of that display, the only difference being that in emotion mimicry the imitated behavior represents an emotional signal. In other words, just as behaviors such as foot tapping or face touching are imitated, most researchers have assumed that the specific patterns of facial (or postural) movements associated with specific emotions, such as anger, sadness, happiness, disgust, or fear are imitated as well. Following the Matched Motor Hypothesis, the movements in the face are spontaneously copied, independently of the intentions of the observer or expresser.

However, *emotional mimicry* and *behavioral mimicry* differ in a crucial way. Emotional expressions, in contrast with most other nonverbal behaviors, are intrinsically meaningful. Emotions are based on an appraisal of the emotion-eliciting event, which in turn is based on the expressers' preferences, values, and motivations (e.g., Scherer, 1987). People's naïve emotion theories tend to be in line with these appraisals, that is, if people observe an emotion in others, they automatically try to infer why this person feels this emotion. Thus, naïve emotion theories presume emotions to be elicited by the same classes of events that appraisal theories predict (Parkinson, 1999, 2001; Roseman & Evdokas, 2004; Scherer, 1997; Smith & Ellsworth, 1985a, 1985b).

Thus, when a person shows an emotion, information about the person's interpretation of the event and his or her behavioral intentions is also transmitted. In addition, emotion displays may also provide information about the person's dispositions. For example, a person showing happiness is typically perceived as having affiliative intentions, whereas a person showing anger or disgust is not (Hess et al., 2000; Knutson, 1996). By contrast, behaviors such as foot tapping or face touching are generally less meaningful and do not carry such information about the expresser's appraisals, intentions, or dispositions. We contend that the dispositions and intensions of the expressers are crucial to emotional mimicry.

Empirical Evidence for a Matched Motor Hypothesis of Emotional Mimicry

Emotional mimicry has for the most part been studied in the area of facial expressions, and the general conclusion based

on this research is that emotions are mimicked just like other social behaviors, even when emotion displays are presented subliminally (Sonnby-Borgström, 2002) or when people try to suppress the mimicry reaction (Dimberg, Thunberg, & Grunedal, 2002). However, even though on first sight the evidence for mimicry of discrete emotions, as presumed by the Matched Motor Hypothesis, seems highly convincing, a closer look shows that this evidence is actually rather limited.

We considered 40 published studies that assessed emotional mimicry in at least one experimental group without additional manipulations such as emotion induction or manipulations that suppress mimicry (see Table 1). Emotional mimicry has typically been assessed by showing participants photos (e.g., Dimberg et al., 2002; Dimberg, Thunberg, & Elmehed, 2000) or videos (e.g., Hess & Blairy, 2001; Sato, Fujimura, & Suzuki, 2008) while measuring the activity of specific facial muscles, usually using electromyography (EMG; for example, Dimberg, 1982; Hess & Blairy, 2001; Van der Schalk et al., 2011) or sometimes the Facial Action Coding System (Ekman & Friesen, 1978; for example, Sato & Yoshikawa, 2007). Overall, these studies demonstrate that participants smile more in reaction to smiling than to frowning faces, whereas they frown more in reaction to frowning than to smiling faces.

The vast majority of these studies have focused on only two emotions—anger and happiness. Consequently, only limited evidence can be found for the mimicry of discrete emotions other than happiness and anger (see Table 1). The most common additional emotion is sadness, although disgust, fear, and surprise have also been studied (see Table 1). Even though it is possible to identify muscle activity specific to these discrete emotions—such as activity of the Frontalis for fear and surprise (lifting the eyebrows), the Levator Labii Aleaque Nasii for disgust (pulling up one's nose), and the Mentalis for sadness (pulling the chin down)—these separate muscles have usually not been measured, and if they were, few effects were found. For example, evidence for fear mimicry was assessed in eight studies, but in only one study was fear associated with Frontalis activity (Lundqvist, 1995, who assessed and found not only Frontalis activity but also Corrugator Supercilii activity for fear). In other studies, evidence of fear mimicry, where it was found, was based on activity of the Corrugator Supercilii—the muscle that also indexes the frown in anger mimicry. However, use of the Corrugator is actually not a good index for fear specifically, because during fear, the eyebrows are typically not lowered but raised. For disgust, mimicry effects were found only in one of three studies (Lundqvist & Dimberg, 1995), indexed by activity of the Levator. Only in the case of surprise was activity of a surprise-specific muscle (Frontalis) replicated in two studies (Lundqvist, 1995; Lundqvist & Dimberg, 1995). Thus, the evidence for the mimicry of fear and disgust is very limited, and we found evidence for the mimicry of surprise in only two studies. More evidence exists for the imitation of sadness, but this emotion is also indexed by Corrugator Supercilii activity and hence raises the same issues as the imitation of anger and fear when indexed by this muscle.

A second important observation about these studies is that the extant research neither allows us to draw a firm conclusion about the underlying mechanism, nor about the nature of the congruent response. Even though many of these studies show a pattern of facial expressions congruent with the displayed faces, such congruent facial reactions do not justify the conclusion that emotion-specific mimicry automatically occurs in all contexts. The occurrence of a frown does not necessarily reflect anger but rather may indicate a general negative mood (Larsen, Norris, & Cacioppo, 2003), a negative attitude toward the stimulus (Cacioppo & Petty, 1979), or even concentration or bewilderment, because a frown signals that something is wrong that needs our attention (Kaiser & Wehrle, 2001). Thus, frowning in response to a frown and smiling to a smile suggests that people show a response that is congruent with another person's mood, but this is at most affect-based mimicry and not the mimicry of a specific discrete emotion.

A third observation is that most studies have not provided any explicit social context. Thus, participants see faces that signal a prototypical emotion with the gaze directed at the participant but without specifying who this person is or why he or she is looking that way. The argument for omitting contextual cues is that the basic mechanism can be shown without any interference of contextual influences. Yet, we believe that context is a crucial part of the stimulus to which participants react. Looking at a person who is angry at _you_ elicits a different reaction than looking at a person who is angry at someone else. Given this lack of context, it remains possible that the observed frowns and smiles are not the result of imitation but rather are an affective reaction to the content of the image, similar to the smiles people show when seeing baby animals and the frowns elicited by dangerous objects (Larsen et al., 2003).

In sum, our review of the mimicry studies shows little evidence to support the Matched Motor Hypothesis of emotion mimicry. Even though the results of these studies demonstrate that people respond with a congruent facial muscle movement to photos or videos that show anger and happiness, it is unclear whether this effect is the result of motor matching. In particular, there is no unambiguous evidence for the mimicry of the specific muscles typically associated with negative emotions other than anger. In fact, for sadness and fear, the evidence is based on activation of the corrugator and/or deactivation of the zygomaticus, which converges with a valence-based account suggesting that only the valence of the expression but not the specific expressive movement is mimicked.

We propose an alternative view of emotional mimicry that is not based on configural processing strategies and the subsequent automatic imitation of isolated muscle movements (as a matched motor response), but rather on the idea that emotion recognition naturally occurs within a social context. We suggest that emotional mimicry is related to the understanding of an emotion in context and is involved in regulating one's relation with the other person, rather than

Table 1. List of Studies Examining Emotional Mimicry.

Source	Emotions	Muscle sites	Which muscles indexed which emotion
Van der Schalk et al., 2011	Happy Angry Fear	Corrugator Supercilii Orbicularis Oculi Levator Labii	Corrugator Supercilii: Anger, fear Orbicularis Oculi: Happy Levator Labii: Aversion, contempt
McDonald et al., 2010	Happy Angry	Corrugator Supercilii Zygomaticus Major	Control group only: Zygomaticus Major: Happy Corrugator Supercilii: Anger
Harrison, Morgan, and Critchley, 2010	Happy Angry Sad	Corrugator Supercilii Zygomaticus Major Mentalis	Corrugator Supercilii: Anger, sad Zygomaticus Major: Happy
Korb, Grandjean, and Scherer, 2010	Happy Neutral	Corrugator Supercilii Zygomaticus Major	Zygomaticus Major: Happy
Hess and Bourgeois, 2010	Happy Angry	Corrugator Supercilii Zygomaticus Major Orbicularis Oculi Levator Labii	Zygomaticus Major: Smiles Orbicularis Oculi: Smiles
Varcin, Bailey, and Henry, 2010	Happy Angry	Corrugator Supercilii Zygomaticus Major	Control group Corrugator Supercilii: Anger Zygomaticus Major: Happy
Fujimura, Sato, and Suzuki, 2010	Pleasant Unpleasant	Corrugator Supercilii Zygomaticus Major	Zygomaticus Major: Pleasant Corrugator Supercilii: Unpleasant
Bailey and Henry, 2009	Happy Angry	Corrugator Supercilii Zygomaticus Major	Corrugator Supercilii: Anger Zygomaticus Major: Happy
Halberstadt, Winkielman, Niedenthal, and Dalle, 2009	Happy Angry	Corrugator Supercilii Zygomaticus Major	Corrugator Supercilii: Anger Zygomaticus Major: Happy
Cannon, Hayes, and Tipper, 2009	Happy Angry	Corrugator Supercilii Zygomaticus major	Corrugator Supercilii: Anger Zygomaticus major: Happy
Bailey, Henry, and Nangle, 2009	Happy Angry Neutral	Corrugator Supercilii	Corrugator Supercilii: Anger
Hermans, van Wingen, Bos, Putman, and van Honk, 2009	Happy Angry	Corrugator Supercilii Zygomaticus Major	Low autism Corrugator Supercilii: Anger High and low autism Zygomaticus Major: Happy
Weyers, Mühlberger, Kund, Hess, and Pauli, 2009	Happy Sad Neutral	Corrugator Supercilii Zygomaticus Major	Neutrally primed group Corrugator Supercilii: Sad Zygomaticus Major: Happy
Oberman, Winkielman, and Ramachandran, 2009	Happy Sad Angry Fear Disgust Neutral	Corrugator Supercilii Zygomaticus Major Frontalis Lateralis Levator Labii Depressor Anguli oris	Reported analyses only for Corrugator Supercilii and Zygomaticus Major Corrugator Supercilii: Anger Zygomaticus Major: Happy
Schrammel, Pannasch, Graupner, Mojzisch, and Velichkovsky, 2009	Happy Angry Neutral	Corrugator Supercilii Zygomaticus Major	In direct gaze condition Corrugator Supercilii: Anger, neutral Zygomaticus Major: Happy
Beall, Moody, McIntosh, Hepburn, and Reed, 2008	Happy Angry Fear	Corrugator Supercilii Zygomaticus Major Frontalis Lateralis	Study 1 normal children Corrugator Supercilii: Anger Zygomaticus Major: Happy
Sato, Fujimura, and Suzuki, 2008	Happy Angry	Corrugator Supercilii Zygomaticus Major	Corrugator Supercilii: Anger Zygomaticus Major: Happy
Likowski, Mühlberger, Seibt, Pauli, and Weyers, 2008	Happy Sad Neutral	Corrugator Supercilii Zygomaticus Major	In response to positive characters only Corrugator Supercilii: Sad Zygomaticus major: Happy
Bourgeois and Hess, 2008, Study 1	Happy Angry	Corrugator Supercilii Zygomaticus Major Orbicularis Oculi	In- and out-group Zygomaticus Major: Happy Orbicularis Oculi: Happy In-group only Corrugator Supercilii: Anger
Bourgeois and Hess, 2008, Study 2	Happy Sad	Corrugator Supercilii Zygomaticus Major Orbicularis Oculi	In- and out-group Zygomaticus Major: Happy Orbicularis Oculi: Happy In-group only Corrugator Supercilii: Sad

(continued)

Table 1. (continued)

Achaibou, Pourtois, Schwartz, and Vuilleumier, 2008	Happy	Corrugator Supercilii	Corrugator Supercilii: Anger
	Angry	Zygomaticus Major	Zygomaticus Major: Happy
Sato and Yoshikawa, 2007	Happy	Corrugator Supercilii	Zygomaticus Major: Happy
	Angry	Zygomaticus Major	Corrugator Supercilii: Anger
Magnée, Stekelenburg, Kemner, and de Gelder, 2007	Happy	Corrugator Supercilii	Corrugator Supercilii: Fear
	Fear	Zygomaticus Major	Zygomaticus Major: Happy
Maurice, Magnée, De Gelder, Van Engeland, and Kemner, 2007	Happy	Corrugator Supercilii	Corrugator Supercilii: Fear
	Fear	Zygomaticus Major	Zygomaticus Major: Happy
Moody, McIntosh, Mann, and Weisser, 2007	Sad	Corrugator Supercilii	No mimicry analysis for neutral condition
	Angry	Zygomaticus Major	
	Fear	Frontalis Lateralis	Frontalis only with fear induction
Hermans, Putman, and van Honk, 2006	Happy	Corrugator Supercilii	Corrugator Supercilii: Anger
	Angry	Zygomaticus Major	Zygomaticus Major: Happy
			Attenuated in testosterone condition
de Wied, van Boxtel, Zaalberg, Goudena, and Matthys, 2006	Happy	Corrugator Supercilii	Corrugator Supercilii: Anger
	Angry	Zygomaticus Major	Zygomaticus Major: Happy
			Attenuated corrugator Supercilii for DBD boys
Sonnby-Borgström, Jönsson, and Svensson, 2003	Happy	Corrugator Supercilii	High empathy group:
	Angry	Zygomaticus Major	Corrugator Supercilii: Anger
			Zygomaticus Major: Happy
Sonnby-Borgström, 2002	Happy	Corrugator Supercilii	Corrugator Supercilii: Anger
	Angry	Zygomaticus Major	Zygomaticus Major: Happy
			Attenuated for low empathy
Sonnby-Borgström and Jönsson, 2004	Happy	Corrugator Supercilii	Corrugator Supercilii: Anger
	Angry	Zygomaticus Major	Zygomaticus Major: Happy
			For nondismissive attachment style
Hess and Blairy, 2001	Happy	Corrugator Supercilii	Corrugator Supercilii: Anger, sad
	Angry	Zygomaticus Major	Zygomaticus Major: Happy
	Sad	Orbicularis Oculi	Orbicularis Oculi: Happy
	Disgust	Levator Labii	
Hess, Philippot, and Blairy, 1998	Angry	Corrugator Supercilii	Corrugator Supercilii: Anger
	Happy	Zygomaticus major	
Dimberg and Thunberg, 1998	Angry	Corrugator Supercilii	Corrugator Supercilii: Anger
	Happy	Zygomaticus Major	Zygomaticus Major: Happy
Dimberg, Thunberg, and Elmehed, 2000	Angry	Corrugator Supercilii	Corrugator Supercilii: Anger
	Happy	Zygomaticus Major	Zygomaticus Major: Happy
Dimberg and Petterson, 2000	Angry	Corrugator Supercilii	Corrugator Supercilii: Anger
	Happy	Zygomaticus Major	Zygomaticus Major: Happy
			Larger on the left side
Dimberg, Thunberg, and Grunedal, 2002	Angry	Corrugator Supercilii	Corrugator Supercilii: Anger
	Happy	Zygomaticus Major	Zygomaticus Major: Happy
Lundqvist and Dimberg, 1995	Sad	Zygomaticus Major	Corrugator Supercilii: Anger, sad
	Angry	Corrugator Supercilii	Zygomaticus Major: Happy
	Fear	Levator Labii	Levator Labii: Disgust
	Surprise	Frontalis Lateralis	Frontalis: Surprise
	Disgust		
	Happiness		
Lundqvist, 1995	Angry	Corrugator Supercilii	Corrugator Supercilii: Anger, surprise
	Fear	Zygomaticus Major	Zygomaticus Major: Happy
	Surprise	Depressor Anguli Oris	Frontalis: Surprise, fear
	Happy	Frontalis Lateralis	
Dimberg and Lundqvist, 1990	Angry	Corrugator Supercilii	Corrugator Supercilii: Anger
	Happy	Zygomaticus Major	Zygomaticus Major: Happy
			More for women

Note: DBD = disruptive behavior disorder.

being the synchronization of meaningless individual muscle actions. That is, rather than merely seeing a movement of the eyebrow, people see anger in reaction to a threat or worry in reaction to a concern, and they mimic the anger or worry rather than the contraction of specific muscles. In other words, emotional mimicry involves the interpretation of signals as *emotions*, conveying emotional intentions, in a specific context.

Even though explicit context information is scarce in the paradigms used in this research, the imitation of *an emotional* expression requires a minimal form of a shared perspective between the observer and expresser. As we will

explain, even minimal contextual information can affect whether facial expressions are mimicked or not. This notion is supported by recent research showing that eye contact is crucial for facial mimicry (Rychlowska, Zinner, & Niedenthal, 2011) as eye contact signals an engagement with the other person.

Finally, even in research in which contextual cues are not provided, as has been the case for most facial mimicry research, context information is necessarily implied because faces themselves implicitly provide social context by informing us about the social identity of the expresser (ethnicity, age, gender, etc.). This categorization then activates stereotypical expectations regarding the person's likely emotional reactions (Hess, Adams, & Kleck, 2009; Hess & Kirouac, 2000).

The Role of Emotional Mimicry in Social Relations

Our review suggests that people show valence-congruent mimicry, but so far we have reviewed only evidence in which no explicit contextual information was provided. We now turn to studies in which the relational context has been varied in some way or another. We begin by discussing various contextual influences to examine the first function of emotional mimicry—to promote affiliation.

A first factor relevant to emotional mimicry is one's positive or negative attitude toward the target. A negative attitude may inhibit emotional mimicry and increase the interpretation of emotional signals as hostile, even if it is a smile. For example, a political leader's emotional displays leads to less mimicry in observers with a different political orientation or a negative attitude toward this politician, compared with those who hold the same political opinions (Bourgeois & Hess, 2008; McHugo, Lanzetta, & Bush, 1991; McHugo, Lanzetta, Sullivan, Masters, & Englis, 1985). Interestingly, Likowski, Mühlberger, Seibt, Pauli, and Weyers (2008) demonstrated that even when attitudes are newly formed by narratives about a specific character, the mimicry of that character is affected by the valence of the narratives: the sad and happy displays of "good" characters were mimicked more than the sad and happy displays of "bad" characters. Consistent with the finding that favorable attitudes toward another person increase mimicry, friends or close personal others are also more likely to be mimicked. For example, when people watch a funny movie with friends, they laugh more than if they see the same movie alone (Hess, Kappas, & Banse, 1995; Jakobs, Manstead, & Fischer, 1999; Wagner & Smith, 1991). In addition, in a study of mimicry of pride and disgust in a spontaneous interaction, Fischer, Becker, and Veenstra (2012) found that dyads composed of friends mimic each other's smiles of pride more than do dyads of strangers.

A second factor that may influence mimicry is whether the relationship between the expresser and observer is competitive or cooperative (Lanzetta & Englis, 1989; Weyers, Mühlberger, Kund, Hess, & Pauli, 2009). These studies

showed that a decrease or even absence of mimicry of smiling was observed in competitive or hostile interactions (Lanzetta & Englis, 1989; Weyers et al., 2009). Moreover, emotional faces may even elicit a divergent facial display, incongruent with the observed expression, such as smiling when people see the pain or fear of a competitor or a disliked out-group member (Herrera, Bourgeois, Cheung, & Hess, 1998; Lanzetta & Englis, 1989), as is, for example, the case when people show Schadenfreude (van Dijk, Ouwerkerk, Goslinga, Nieweg, & Gallucci, 2006). These results suggest that in competitive relationships, facial reactions are likely to be a reaction *to* rather than *with* the emotion displayed by the other person. That is, participants in a competitive relationship are usually in an antagonistic rather than affiliative frame of mind, and are therefore unlikely to mimic the facial displays of their opponent. Thus, the pained expression of a competitor may signal the competitor's loss and hence, will elicit a pleased smile in the winner rather than an imitation of the painful display.

Third, similarity with the expresser may also foster mimicry. Specifically, individuals are more likely to mimic the emotional reactions of in-group members than those of out-group members. This effect was shown for facial mimicry, for example, by Bourgeois and Hess (2008, Study 2) and by Van der Schalk and colleagues (2011). Another study that manipulated vocal prosody also showed that the anxious voice of an in-group member was imitated more than the anxious voice of an out-group member (Weisbuch & Ambady, 2008). In addition to a variation in the amount of mimicry, Van der Schalk and colleagues also found examples of divergent emotions, which supports the distinction mentioned above between reactions *to* and reactions *with* the expressed emotion. They found that participants reacted with contempt (AU10) to out-group fear faces, suggesting that they did not empathize with the out-group member's fear, but rather looked down on it. A similar finding was reported by Herrera, Bourgeois, and Hess (1998) who found more smiling to out-group fear, to the degree that participants had a more negative attitude toward the out-group.

A fourth factor that provides contextual information about the relationship between observer and expresser is the head orientation or gaze direction of the person displaying the emotion (Hess, Adams, & Kleck, 2007). Without any information about the reason for another person's anger, direct anger expressions are less likely to elicit anger mimicry, because they are not interpreted as signaling an affiliative intention. In contrast, an averted anger face is more likely to indicate that someone is not angry with the observer but rather with a third person. This anger can be shared and thus mimicked more easily than anger directed at the observer (Bourgeois & Hess, 2008, Study 1). Yet, unexplained averted anger expressions may also elicit negative affect in the perceiver, as they may also signal an environmental threat (see also, Adams, Gordon, Baird, Ambady, & Kleck, 2003). This interpretation is supported by the finding that direct anger

displays targeted at the observer are perceived as less affiliative, elicit higher levels of anxiety and repulsion, and foster a lower desire to approach than do averted anger expressions (Hess et al., 2007).

Finally, the facial display itself tells the observer something about his or her potential relation with the expresser and, thus, provides implicit information about the intentions of the expresser. Specifically, some emotional expressions signal affiliation, whereas others do not. For example, when people do not have any other information, they spontaneously mimic a smile more than a frown. This effect is nicely illustrated in a study by Hinsz and Tomhave (1991) who observed people in shopping centers, stores, or the library and counted reactions to smiles and frowns. They found that 53% of smiles, but only 7% of the frowns evoked a matching expression. Smiles, and to a lesser extent fearful or sad expressions (Jakobs, Manstead, & Fischer, 2001), are generally perceived as more relationship enhancing than frowns or disgusted faces (Hess et al., 2000; Knutson, 1996). The assumption that smiles generally signal affiliation intent may also explain why people mimic smiling in-group members as well as smiling out-group members (Bourgeois & Hess, 2008; Van der Schalk et al., 2011). In addition, a smile has a very low social cost. Whereas mimicking sadness, for example, signals understanding of the other person's suffering and, hence, may result in requests for aid and succor, smiles signal that all is well and that no immediate action is required. Thus, whereas people would probably not smile in reaction to the smile of an enemy (Herrera, Bourgeois, & Hess, 1998), they may mimic the smile of a stranger, at least as long as it is effortless and costless, and affiliation can be expected (see also, Hinsz & Tomhave, 1991). In fact, the smiling of a stranger might even signal that no animosity should be expected and that resources will be shared (e.g., a happy salesman may give you something for free). This line of reasoning may also explain why covering the lower part of the face that makes the smile invisible, for example, when wearing a niqab, has negative consequences, because this affiliation signal is absent (Fischer, Gillebaart, Rotteveel, Becker, & Vliek, 2012). Yet, if enough information from the eye region is available to deduce the presence of the smile, even if it cannot be directly seen, then such invisible smiles are mimicked (Blaison, Hareli, Strauss, & Hess, 2012)—as would be expected from the Emotional Mimicry in Context view but not from the classic Matched Motor View.

Obviously, it should be noted that not all smiles are alike. Apart from happiness, smiles may signal pride, love, pity, arrogance, contempt, shame, embarrassment, or uncertainty (Niedenthal, Mermillod, Maringer, & Hess, 2010). Whether people mimic smiles thus depends on how they are interpreted and specifically whether they are considered an affiliative signal or not.

In contrast to smiles, facial movements that signal potential animosity, such as a frown, a tightened jaw, or pressed lips, do not imply an affiliative desire to share one's feelings but are more likely understood as a warning signal. An angry face thus signals a lack of affiliative intent (Hess et al., 2000; Knutson, 1996) and the imitation of an angry face in a social context is unlikely to facilitate affiliation. Thus, the imitation of anger, disgust, and probably contempt, is inherently incongruent with the notion that mimicry functions to facilitate affiliation. In an experiment in which participants were presented with angry or sad expressions shown by their partner, Häfner and IJzermans (2011, Study 2) showed that individuals high in communal strength showed less frowning in reaction to angry expressions than to sad expressions, suggesting that the emotional signal elicited by angry or sad faces elicits a differential invitation to mimic. A study by Bourgeois and Hess (2008, Study 1) corroborates this notion. Only when anger was clearly directed at a common foe, it was mimicked. In the same vein, a study by Fischer, Becker, et al. (2012) showed that in an interactive setting where disgust was evoked, disgust was not mimicked either by friends or strangers, whereas the smiles accompanying the disgust experiences were mimicked, albeit only by friends. These findings clearly suggest that some emotion displays are less likely to be mimicked, presumably because they are seen as antagonistic and oppose an affiliation tendency. Thus, unless the explicit social context of the interaction suggests otherwise, anger, disgust, and related expressions are not likely to be mimicked. In sum, mimicking emotion signals without any consideration of contextual goals is not necessarily socially functional and does not facilitate social interaction or foster social bonds (see also, Fischer & Manstead, 2008; Keltner & Haidt, 1999).

The reviewed evidence shows that mimicry is sensitive to context, implying that the reaction to an emotional signal depends on the intentions of the expresser and the observer. These intentions can be inferred from the direction and type of the emotional signal, the relationship between observer and target, and the emotional state or disposition of the observer. The results of these studies show that emotional mimicry generally occurs when the relationship is at least neutral, and preferably positive, and does not occur (or occurs only in a limited way) if the relationship is negative or when people appraise the emotional signal as having a negative consequence for themselves. Moreover, similar to the social bonding function of behavioral mimicry (cf. Hess et al., 1999; Lakin & Chartrand, 2003), there is evidence that in these contexts, emotional mimicry also serves to increase perceived similarity and liking (Hess et al., 1999; Van der Schalk et al., 2011; Yabar & Hess, 2007).

That said, for human beings as a social species, affiliative intent can be assumed to be the default stance for situations in which the other is a potential in-group member and no information suggesting otherwise is provided by the context. This is indeed the case for most of the traditional, acontextual mimicry research. In other words, it is not necessary that an explicit affiliative context is provided for mimicry to occur. It suffices that the emotional signal in a specific

context does not reflect a negative or competitive or otherwise nonaffiliative intention by the expresser.

Given the conclusion that emotional mimicry occurs only in specific circumstances, we distinguish between two types of facial expressions in reaction to an emotional display, which may be the result of different underlying processes (see also, Van Kleef, 2009). First, a facial expression may be an emotional response to the expression—for example, being confronted with a person who looks angry may not only elicit irritation and anger because of the implied insult but also fear, for example, if the person is in a position to cause harm. In this case, the facial reaction can be either congruent (in the case of anger) or incongruent (in the case of fear). Such a reaction could be referred to as a *reactive* emotion *to* the anger (see also Davis, 1994, for a similar distinction related to empathy). Thus, even when the facial reaction is congruent, that is, a frown, mere congruency is not a sufficient indicator that mimicry of the angry expression has occurred. The second reaction is one where the observer shares the reaction of the other, as in the study by Bourgeois and Hess (2008) where observers imitated the angry frown that was not directed at them but presumably at a common adversary. We refer to only this latter facial reaction as emotional mimicry, because it implies a shared understanding of an event.

In most previous research on emotional mimicry, it is impossible to disentangle reactive and mimicry responses, especially because both anger and happiness are likely to elicit reactive emotions that are congruent with the observed emotion. Thus, it cannot be excluded that the generally undifferentiated frowning to an angry or sad face is due to a negative reaction evoked by the face, whereas the smile in response to a smile is a positive reaction to a pleasant stimulus.

The Role of Emotional Mimicry in Understanding Others' Emotions

A second function that has been proposed for emotional mimicry is understanding others' emotions (Lipps, 1907). Although emotion understanding can have different meanings, varying from empathy and perspective taking to emotion recognition, most research has operationalized emotion understanding as the accurate recognition of others' emotions. Although different variants of the idea that mimicry subserves emotion understanding have been proposed (Gallese, 2005; Goldman & Sripada, 2005; Hatfield et al., 1994; Lipps, 1907), the basic assumption is that observers mimic emotional expressions, and these imitated expressions entrain a feedback process, which in turn elicits a corresponding emotional state in the observer. This similar emotional state then provides input (the specific form of this input differs between theories) that facilitates the emotion recognition process.

The relation between mimicry and emotion recognition has been examined using various paradigms. In one line of research, the function of mimicry has been examined by comparing two conditions in which participants' mimicry is either blocked or not. For example, Niedenthal, Brauer, Halberstadt, and Innes-Ker (2001) demonstrated that respondents who were free to mimic were faster in recognizing a change in emotion display (from sad to happy and vice versa) than respondents who were prevented from mimicking. In the same vein, Stel and van Knippenberg (2008) found that individuals whose mimicry was inhibited by explicit instructions were slower to recognize positive or negative affect in briefly exposed emotional faces, although this was the case only for women and not for men. In contrast to these findings, Hawk, Fischer, and Van Kleef (2012) showed that blocking a smile can also result in *faster* recognition of the transition from laughter to crying (and vice versa). Although these latter findings seem inconsistent with the previous results, the differences may be explained in terms of the different task and stimuli that were used. Facial mimicry helps people to see a change when it is possible to compare slightly sad and happy faces, for example, by moving a slider back and forth. But mimicry can also slow down recognition, as was the case in the Hawk et al. (2012) study, if mimicry makes one focus on the first stimulus at the expense of the second stimulus. In both cases, mimicry seems to facilitate the processing of *congruent* stimuli. However, further research is required to understand the conditions under which mimicry presents an advantage or disadvantage for emotion recognition.

Another question is whether mimicry facilitates only the detection of emotional changes or also the recognition of a single discrete emotion. Oberman, Winkielman, and Ramachandran (2009) examined the effect of mimicry blocking on the recognition of four discrete emotions to test whether the recognition of an emotion is affected by the inability to move the relevant facial muscles. They included three different facial conditions in which muscle activation was manipulated and one baseline condition. In one experimental condition, participants had to bite on a pen that activated all facial muscles in a constant way, thereby creating overall muscular noise rather than blocking one type of signal. Results suggested that blocking muscles negatively affects the recognition of happiness. One of the blocking conditions also reduced the recognition of disgust. No effect was found for sadness or fear. This study therefore provides only limited support for the hypothesis that mimicry facilitates the recognition of emotions other than happiness.

The relevance of mimicry for the recognition of happiness is further supported by research in which the effect of mimicry on the ability to distinguish between different types of smiles was studied (Niedenthal et al., 2010). In one study, for example, respondents who were free to mimic an avatar's smile were better in differentiating true (happy) smiles from fake smiles than respondents for whom mimicry was blocked (Maringer, Krumhuber, Fischer, & Niedenthal, 2011). Conversely, contextual cues (whether the smile was expected in this context) were more important for judging smile authenticity when mimicry was blocked than when respondents were free to mimic, suggesting that mimicry

cues are useful but not necessary in typical social contexts (Maringer et al., 2011).

Thus, several studies have shown that blocking mimicry leads to less accurate recognition of happiness. However, other studies (e.g., Blairy, Herrera, & Hess, 1999) found no effect of blocking mimicry on the recognition of five distinct emotions, namely, anger, fear, sadness, disgust, and happiness. Furthermore, studies (Fischer, Becker, et al., 2012; Hess & Blairy, 2001) in which mimicry was measured rather than blocked also did not find any relation between the degree of mimicry and the level of emotion recognition. Although an explanation for these inconsistencies has not been tested to date, the absence or presence of mimicry effects may be related to the type of emotional stimulus that needs to be recognized, suggesting that only the recognition of nonprototypical facial displays benefit from mimicry. In the Oberman et al. (2009) study, for example, the happy stimuli were adjusted to a level that they were not highly recognizable, and the studies by Niedenthal and colleagues reported above focused on subtle differences between smiles. By contrast, Blairy et al. (1999) presented prototypical smiles, which may account for the fact that no effect of blocked mimicry was found. The explanation does not fit with the results of the study by Hess and Blairy (2001), however, who showed spontaneous facial expressions, which are also more subtle and difficult to decode. Nonetheless, at this point the most likely interpretation of the extant literature is that mimicry facilitates emotional understanding specifically when subtle distinctions have to be made or the recognition task is especially difficult.

A second line of research that provides relevant evidence to the question of how mimicry influences emotion recognition includes highly functioning autistic individuals, who do not spontaneously mimic others' facial expressions (McIntosh, Reichmann-Decker, Winkielman, & Wilbarger, 2006). This research shows that such individuals are as competent as nonautistic individuals in recognizing categories of facial expressions of emotion (Castelli, 2005; Spezio, Adolphs, Hurley, & Piven, 2007). Furthermore, a study by Bogart and Matsumoto (2010) showed that adults with Moebius syndrome (a condition characterized by congenital bilateral facial paralysis) did not differ from a matched control group on a facial expression recognition task including seven emotions (anger, contempt, disgust, fear, happiness, sadness, and surprise). In this research, the emotion stimuli (derived from Matsumoto and Ekman's [2006] Multi-Ethnic Facial Expression Set) were also posed and thus, prototypical, supporting our assumption that mimicry does not necessarily help in recognizing very clear emotional expressions. In addition, mimicry may be reduced, or even eliminated, when the task does not require full processing of the emotional information. For example, mimicry was not spontaneously recruited when participants were specifically asked to make a nonemotional judgment of an emotional expression (Cannon, Hayes, & Tipper, 2009; Hess, Philippot, & Blairy, 1998; Stel, van Dijk, & Olivier, 2009).

If mimicry facilitates the recognition of subtle emotional changes, it is possible that mimicry accompanies a motivation to better understand the other. In this case, mimicry should facilitate other means to better understand another's emotion, such as perspective taking. Indeed, a study by Hawk, Fischer, and Van Kleef (2011) showed that observing an embarrassed emotion display of a person dancing to a silly song elicited both mimicry and perspective taking, as measured by self-reports. The observed emotion display further evoked empathic embarrassment, which was indirectly influenced by mimicry of the observer. Thus, both mimicry and perspective taking may help people to feel empathy with another person, and thus, to understand their emotions. The extent to which either the more cognitive route of perspective taking or the more automatic route of mimicry will be most influential in recognizing or empathizing with others' emotions remains a challenging question for future research.

In sum, the evidence indicates that mimicry affects recognition accuracy and recognition speed for subtle, less intense emotional expressions, but that recognition of prototypical emotion displays is not affected when mimicry is blocked. In other words, mimicry does not seem to be required for the identification of discrete emotions from prototypical facial expressions—a task that can be performed by sufficiently sophisticated automated systems (Cohn & Kanade, 2007; Littlewort et al., 2011). Thus, emotion mimicry is not necessary for recognition; yet, this does not exclude its potential usefulness for a more subtle or more empathic understanding of the other's emotion. More detailed research using neuropsychological approaches may help disentangle the effects of mimicry on emotional understanding.

Mimicry as an Emotional Response

The fact that people spontaneously mimic when engaged in tasks that require emotional processing suggests that mimicry is an emotional response to an emotional signal in a meaningful social relation (Parkinson, Fischer, & Manstead, 2005). If this is the case, then observers' subjective emotions should play a mediating role in the mimicry process. The fact that people return a smile may be an automatic motor response, but it might also be the result of a warm feeling, which is expressed by smiling. This would contradict the idea that mimicry is a matched motor response and emphasize the emotional character of mimicry. A study by Moody, McIntosh, Mann, and Weisser (2007) in which participants viewed fearful, angry, and neutral facial expressions while either a fearful or neutral state was induced nicely demonstrated this role of the observer's emotional state. The results showed that participants who experienced fear showed greater activity of the Frontalis muscle in reaction to both the angry and the fear face than participants in a neutral state. This finding supports the idea that mimicry is a reaction to an emotional signal, as emotional expressions are differently interpreted as the result of one's own emotional

state. Not only the observers' own emotional state but also a more conscious attempt to put oneself in the other's place, influences the amount of mimicry. Lamm, Porges, Cacioppo, and Decety (2008) found mimicry-like effects in a pain empathy paradigm, but only when participants were asked to imagine *themselves* in the other's place (i.e., to simulate the experience) rather than to imagine how the other person may feel. The results of these studies suggest that a subjective emotional experience, whether instructed or elicited, can mediate the mimicry response.

Finally, if mimicry is a reaction to an emotional signal, emotional mimicry should occur even when people do not see the exact expression but merely infer the emotion. This effect was shown by Houde, Simard, and Hess (2009) who found Corrugator Supercilii, Orbicularis Oculi and Zygomaticus Major activity congruent with expressions of anger, sadness, and happiness when people saw neutral expressions but were told that the targets felt these emotions. No such patterns were found when trait descriptions were provided instead (Simard, Lasalle, Houde, & Hess, 2011). In other words, the mere imagination of how these targets felt and not the actual facial displays produced a mimicry-like process. Evidence that mimicry is an emotional response rather than a matched motor response is also found in another line of research. Tamietto et al. (2009) presented pictures of facial and postural displays of happiness and fear to two patients with cortical blindness to one eye, due to unilateral destruction of the occipital visual cortex. They found that these patients responded with activity of the zygomaticus major and the corrugator supercilii and with responses in pupil dilation, depending on the emotional nature of the stimulus (happy or fearful), but independent of whether the stimulus was presented in the intact or blind visual field of the patients. Moreover, both facial and bodily emotion displays produced similar facial reactions in these patients, further indicating that their facial displays were not a simple match of what they had seen.

Moreover, there is evidence that observers "mimic" an emotional signal in another channel, for example, facial mimicry to emotional sounds (Hawk et al., 2012; Hietanen, Surakka, & Linnankoski, 1998; Magnée, Stekelenburg, Kemner, & de Gelder, 2007; Verona, Patrick, Curtin, Bradley, & Lang, 2004). This finding suggests that hearing an emotional sound entrains the simulation of a corresponding facial expression. Also, evidence suggests that observers mimic expressions in parts of the face that were obscured in the presented stimulus (Blaison et al., 2012; Hess, Herrera, Bourgeois, & Blairy, 1997).

One might argue that such matched expressions do not represent mimicry, as there are no facial displays to be mimicked. From our point of view, however, emotional mimicry is not the result of exact copying of what one sees but rather the interpretation of an emotional signal. This interpretation is based on some minimal form of shared understanding, as conveyed by one or more emotional signals. In the above examples, participants used nonfacial stimuli (the voice or text) to infer the likely emotional state of the target and reacted to this information with congruent facial expressions. These congruent reactions take the same form as emotional mimicry.

From our theoretical perspective, these facial mimicry reactions can be considered the result of an enactment of an emotional intention. Seeing a sad face, hearing a sad voice, or just being informed that someone is feeling sad rather than perceiving an eyebrow movement and downturned corner of the mouth, results in a reenactment because the mental representations of sadness are activated. However, such representations are only activated if the relationship is potentially affiliative and the observer wants to understand the emotions of the other. Because emotions are mentally represented as abstract concepts (amodal) and not as specific modalities (faces, gestures, feelings, etc.), activation of an emotional state need not be embodied in the same channel (Hawk et al., 2011; Houde et al., 2009). A facial expression in reaction to a vocal stimulus can thus be considered as a reenactment of the emotion in the same way as a facial expression to a facial stimulus. Thus, emotional mimicry can be considered a case of embodied simulation. This embodied simulation both elicits liking and rapport and seems to support emotional understanding as outlined above.

In sum, we believe that if a nonverbal display is interpreted as an emotional signal, it will activate an emotional state in the perceiver, albeit not necessarily resulting in a congruent emotion display. The fact that people "mimic" across channels and "mimic" faces that they do not or could not see suggests that people mimic emotions rather than muscle movements. Depending on the context in which the emotional expression occurs, however, either a mimicry process or a reactive process may be activated. In some cases, the outcomes of these different processes may be the same.

The Emotion Mimicry in Context View

Although there is abundant evidence for the mimicry of emotions, which at first glance seems to support the Matched Motor Hypothesis, a review of the evidence has lead us to conclude that there is little evidence for the mimicry of discrete emotions, and that this evidence does not exclude alternative explanations for mimicry. First, the evidence does not confirm the idea that specific facial emotion displays give rise to specific mimicry patterns. Rather, the evidence shows that participants react with frowning (corrugator supercilii) to negative emotions (anger, sadness, and fear) and with smiling (zygomaticus major) to the one positive emotion that has been assessed in these studies, namely, happiness. At most, these findings suggest a valence-based account in which observing negative emotions leads to increased corrugator activity and observing positive emotions leads to increased zygomaticus major activity. Even when other facial muscles were measured, mimicry of discrete emotion patterns often has not been found. This may be due to a lack of contextual
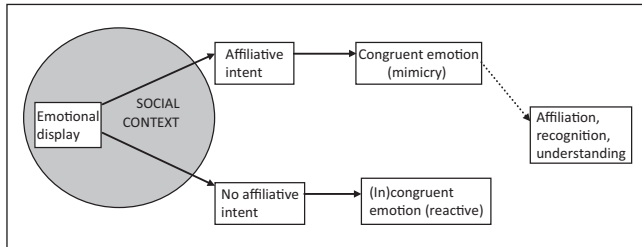
Figure 1. The emotional mimicry in context model.

information that could have disambiguated the negative emotion signal and its situational meaning, but it could also be that the mimicry of discrete emotions signals does not occur.

A second problem is that it is not justified to conclude that congruent facial reactions in an acontextual paradigm are necessarily the result of an imitation process. We have distinguished two types of reactions to a facial display: a mimicry response and a reactive response (Preston & de Waal, 2003). These two types of reactions often cannot be disentangled, especially not in an acontextual paradigm in which participants see an emotional face without any additional information the person or the cause of his or her emotion. We have argued that a mimicry response occurs only if there is potential affiliative intent between the observer and the target (indicated by the upper route in Figure 1). The basic assumption of a contextual model of mimicry is that people mimic a discrete emotion only if they share the perspective that gave rise to that specific emotion (see Figure 1).

Various studies have demonstrated that spontaneous mimicry occurs only when a minimal form of affiliation or bonding exists between observer and target. This means that social interaction goals or inferred intentions should be minimally neutral, and preferably affiliative, for emotional mimicry to occur. In social contexts that are adversarial in any form, mimicry would be dysfunctional (see the lower route in Figure 1). People neither mimic the pride of their competitor who won the contest nor the fear of spiders of their enemy. On the contrary, such situations evoke reactive emotions, such as envy, Schadenfreude, or contempt.

As outlined earlier, another set of findings that contradict the Matched Motor Hypothesis of emotional mimicry involves instances when people "mimic" an emotion or behavior that they have not (yet) seen as is the case when mimicking neutral faces of persons who the observer thinks are experiencing an emotion, or when people facially mimic emotional sounds or postures. Frijda (2010) also observed that sometimes the actual mimicry may precede the mimicked behavior. For example, when people watch a fight, they may feel a tension in their leg that reflects the tendency to kick the aggressive person even before the expresser has actually shown a kicking movement. Both sets of findings suggest that people do not mimic the actual expressions but rather their understanding of the other person's emotional intentions. This understanding may thus be derived either

from the observed expressions or from information about the situation (Frijda, 2010).

By contrast, as our review of the literature on the role of mimicry in emotion understanding shows, mimicry does not seem to be required for the identification of discrete emotions from prototypical facial expressions even though there is some evidence that mimicry affects recognition speed and the recognition of subtle, less intense emotional expressions in certain contexts.

However, even though mimicry is not necessary to recognize emotions, it seems necessary for an observer to be interested in the emotional state of the other for mimicry to occur. Observers may be interested because they like the person or because the person belongs to the same group, and they are therefore motivated to understand him or her (Thibault, Bourgeois, & Hess, 2006). This line of reasoning implies that the focus of the observer must be on the emotion of the expresser. This stipulation then explains the reduction in mimicry when participants watch emotional expressions but are asked to do nonemotional tasks at the same time (Cannon et al., 2009; Frijda, 2010).

We have shown that a contextual view, which takes into account the social context in which mimicry occurs has greater support (see also, Parkinson, 2011) than the matched motor view. A contextual view is also more in line with other simulation accounts (Barsalou, 1999; Niedenthal, 2007) because it implies that people seek emotional meaning and understanding through emotional simulation. Facial mimicry should therefore be seen as a form of emotional simulation that may occur in reaction to any nonverbal signal that is interpreted as an emotion and is seen as relevant for the observer.

The requirement of affiliation and shared perspective does not mean that mimicry cannot be automatic. Many emotional reactions have been previously learned within a social context and then become nonconscious. People do not need to think about not smiling at the smile of their enemy. They are simply not tempted to mimic such a smile because they do not see it as an invitation to play or enjoy together. At a more detailed level of information processing, it is still unclear, however, whether we can disentangle the processing of social category information from emotional, facial information. Research suggests that face identity recognition and facial expression recognition are partially subserved by overlapping neural systems (Calder & Young, 2005; Haxby, Hoffman, & Gobbini, 2000) and facial expressions have been found to impact on the perception of gender (Hess, Adams, Grammer, & Kleck, 2009), suggesting some overlap in processing. This is an important venue for future research.

In sum, two functions of mimicry have been proposed: reinforcing social bonds and improving emotion understanding. There is excellent evidence for the first function showing that emotion mimicry can indeed lead to enhanced liking of another person (Hess et al., 1999; Van der Schalk et al., 2011; Yabar & Hess, 2007). There is also qualified support for the second function, although we have shown that emotion

mimicry is not necessary for emotion recognition. The fact that people can recognize the emotions of strangers, and even their enemies, whom they rarely mimic (Frijda, 2010) suggests that emotion mimicry is not crucial in recognizing emotions. We have shown that emotion mimicry may help to recognize subtle emotions or fast emotion changes on the face. These results suggest that emotional mimicry has a function in emotion recognition or understanding, but it remains unclear when spontaneous emotion mimicry improves emotion recognition. The different paradigms that are used do not allow to draw firm conclusions, because in some studies mimicry may be the result of increased attention, for example, because the signal is difficult to distinguish, whereas in other studies, it may reflect an empathic process, such as perspective taking. It could be an interesting aim of future research to manipulate the type of judgment in addition to the relationship with the expresser, when participants observe emotional faces. One example of such a task is to ask participants to speculate about the reasons for the emotion shown.

The combined evidence regarding both functions of mimicry suggests that mimicry regulates people's relations with others. This function implies that, as mentioned above, mimicry is most likely to occur when people are motivated to "bond" with the other, and that mimicry should not occur when the observer risks being overwhelmed by the other's emotion. This consideration may explain why no clear evidence for the mimicry of fear and disgust was found (see also, Fischer, Becker, et al., 2012). If people wish to take distance from the fear or disgust of another person, they will mimic less. Even though this may sometimes be a conscious decision, for example in some professional settings where an emotionally reserved stance is required in the more typical case, this will be an automatic response. Emotional mimicry thus functions as social regulator: emotionally mimicking others can create not only social warmth but also social coolness when people do not mimic the other. Emotional mimicry is a function of interaction goals, and a change of those goals, whether conscious or automatic, has an effect on whether people mimic others' emotions or react to them.

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