Emotional mimicry as social regulator: theoretical considerations

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ABSTRACT
The goal of this article is to discuss theoretical arguments concerning the idea that emotional mimicry is an intrinsic part of our social being and thus can be considered a social act. For this, we will first present the theoretical assumptions underlying the Emotional Mimicry as Social Regulator view. We then provide a brief overview of recent developments in emotional mimicry research and specifically discuss new developments regarding the role of emotional mimicry in actual interactions and relationships, and individual differences in emotional mimicry. We conclude with open questions for future research.

Defining emotional mimicry

(Human) mimicry is defined as the automatic imitation or matching of the nonverbal behaviours of others (Hess et al., 1999). These behaviours can be facial expressions (Hess & Fischer, 2013), bodily postures (Bavelas et al., 1986), vocal expressions (Neumann & Strack, 2000) or pitch (Karthikeyan & Ramachandra, 2016), but also pupil dilations or constrictions (Kret et al., 2015), or gestures such as face touching (Chartrand & Bargh, 1999). In humans, mimicry is a ubiquitous phenomenon that can be readily observed in everyday life.

In this paper, we will focus on the mimicry of emotional signals, i.e. emotional mimicry. Emotions can be signalled via different channels such as the face, voice, body postures, gestures (e.g. Bänziger, Grandjean, & Scherer, 2009) and even through touch (Hertenstein, Keltner, App, Bulleit, & Jaskolka, 2006). Emotional signals are defined as expressions that are perceived by an observer as signalling an emotional state. Although there is a debate as to the degree to which emotional expressions are actually related to internal emotional states (e.g. Cri- velli & Fridlund, 2019; Hassin et al., 2013), we argue that there is ample evidence based on the use of these expressions in the arts, films and literature as well as scientific evidence that people infer emotions from such expressions and that they react in function of this understanding (e.g. Niiedenthal & Brauer, 2012). Yet, what is understood by a given observer can differ depending on the context. For example, a frown can mean concentration as well as irritation and laughter may signal carefree happiness as well as malicious schadenfreude. Whether an observer concludes toward the one or the other can depend on many factors. But when a nonverbal expression is appraised as an emotional signal, it carries information about the expressers’ intentions in regard to the perceiver (or some other person), such as to back away, to approach, to attack, to ignore (Scarantino, Hareli, & Hess, in press). Non-emotional signals do not have this property and even though such emotionally meaningless behaviours like face touching are mimicked, some of the interpersonal sequelae of mimicry we discuss here cannot apply.

A related phenomenon that is often conflated with mimicry is emotional contagion. In fact, mimicry is sometimes referred to as motor contagion (e.g. Becchio et al., 2007; Blakemore & Frith, 2005). Hatfield et al. (1994) define emotional contagion as the “catching” of someone else’s emotional state and they consider mimicry a causal antecedent to...
contagion. Yet, emotional contagion refers to a feeling state whereas mimicry refers to an overt behaviour. Hence, conceptually, the two are independent. In fact, although both mimicry and emotion contagion have been examined in the same studies and in some cases have been found to be associated (Olszanowski et al., 2020), they do not necessarily co-occur (e.g. Hess & Blairy, 2001; Lundqvist & Dimberg, 1995). Hence, we consider these as distinct phenomena explained by different processes.

Another phenomenon that is often considered as a proxy for mimicry (e.g. Genschow & Schindler, 2015; Rauchbauer et al., 2016) is automatic imitation. Automatic imitation is defined as “a type of stimulus-response compatibility effect in which the topographical features of task-irrelevant action stimuli facilitate similar, and interfere with dissimilar responses” (Heyes, 2011, p. 463). There is some conceptual overlap between mimicry and automatic imitation in that some moderators seem to work similarly for both phenomena. For example, both phenomena can be found when the observed behaviour is effectuated by an avatar (Pan & Hamilton, 2015; Weyers et al., 2006), they are facilitated by social priming (Leighton et al., 2010; van Baaren et al., 2003) and impeded in the presence of outgroups (Rauchbauer et al., 2016; van der Schalk et al., 2011). Most importantly in this context, however, the signal that is “imitated” (typically an up and down movement of a finger) does not carry emotional meaning. Thus, automatic imitation, which focuses on the automatic effects of observing a movement on a voluntary movement effectuated by the observer, and emotional mimicry, which is an automatic reaction to an observed movement interpreted as an emotion signal, are not the same (Cracco et al., 2018) and need to be treated as separate phenomena.

**Theoretical accounts of emotional mimicry**

Two main functions have been proposed for emotional mimicry. The first function of mimicry is related to affiliation (Chartrand & Lakin, 2013; Hess & Fischer, 2013). In this vein, mimicry occurs preferentially between individuals who already share some social bond. Thus, mimicry is more likely when participants have positive rather than negative attitudes towards the target (Likowski et al., 2008), when participants and targets are similar rather than dissimilar (Olszanowski et al., 2022), when they belong to the same rather than a different group (Bourgeois & Hess, 2008; van der Schalk et al., 2011; Weisbuch & Ambady, 2008) or want to cooperate rather than to compete with each other (Lanzetta & Englis, 1989; Seibt et al., 2013). Further, like other forms of social coordination or synchrony (Good et al., 2017; Reddish et al., 2013; Wiltermuth & Heath, 2009) mimicry facilitates cooperation between persons or groups (see below).

Interestingly, mimicry is not restricted to humans. In fact, in recent years mimicry has been described for several species. Mimicry has been observed not only in primates such as orangutans (Daveila-Ross et al., 2008) and in more “egalitarian” macaque species (Scopa & Palagi, 2016) but also in dogs (Palagi et al., 2015), meerkats (Palagi et al., 2019) and sun bears (Taylor et al., 2019). What these instances of mimicry have in common is that they typically occur during play or otherwise affiliative behaviour. As such, there is evidence that the notion that mimicry plays a role in affiliative contexts is not restricted to humans.

The second function is facilitating emotional understanding, typically defined as improving emotion recognition. This has been proposed as part of an embodiment approach to emotion recognition (e.g. Niedenthal et al., 2005). The muscle contraction in emotional mimicry activates the sensorimotor cortex, which in turn leads to a simulation of the experience of the specific emotion that is being mimicked. Mimicry thus reenacts the emotion experience. This reenactment is said to facilitate the decoding of the observed emotion (Niedenthal et al., 2017). Evidence for this view largely comes from research that examines the implications of blocking spontaneous mimicry. This evidence for the embodiment perspective is mixed, however, showing that emotional mimicry is not a necessary requirement for the recognition of clear, prototypical emotion expressions (e.g. Bogart & Matsumoto, 2010; Hess & Blairy, 2001). Nonetheless, there is some support for the idea that blocking emotional mimicry hinders emotion recognition of more subtle, complex or ambiguous emotion expressions (see, Niedenthal et al., 2010; Wood et al., 2016).

In our view, both proposed functions are based on one key theoretical assumption, namely that humans are social animals and emotional mimicry has a function in social life. The motivation to develop social bonds to fulfil our universal need to belong is one of the most powerful drivers of human behaviour (Baumeister & Leary, 1995). Emotional mimicry is the
unconscious element that serves our need to belong by supporting our aim to establish social and emotional connections, and to fulfill our basic need for shared understanding (Fischer & Hess, 2017). The core assumption of this view (Fischer & Hess, 2017; Hess, 2021; Hess & Fischer, 2013, 2014, p. 2017) is that emotional mimicry is a crucial process in creating affiliative interactions and that it is dependent on the goal to affiliate and to communicate to others that we understand them. This links back to notions formulated by Rogers (1957) and Bavelas et al. (1986).

This also implies that the mimicry of emotional signals requires an appraisal of the behaviour in the social context in which it occurs before it will be imitated. Is this an angry frown or concentration? Is this happy laughter or malicious schadenfreude? Whether mimicry follows or not will depend on this appraisal. Notably, these emotional appraisals are spontaneous and largely outside of awareness. Despite the common assumption about the role of mimicry, this view is fundamentally different from the embodiment perspective, which assumes that mimicry contributes to emotion decoding (see Wood et al., 2016) whereas the mimicry as social regulator view sees mimicry as based on emotion understanding.

In sum, the mimicry as social regulator view differs in important ways from theories that do not take into account the social context in which mimicry occurs and hence the social appraisal process that leads to mimicry, such as the perception behaviour link (Chartrand & Bargh, 1999), automatic imitation (Heyes, 2011), or embodiment theories of mimicry (Wood et al., 2016). These theories do not share the key assumption that the perception and imitation of emotional signals is intrinsically different from the perception and imitation of behaviours that do not carry an emotional signal and that the interpretation of a signal as emotional provides the basis for mimicry as defined by the emotional mimicry as social regulator view.

In what follows, we will discuss three important assumptions on which the social regulator view of emotional mimicry is based, namely the goal-dependency of emotional mimicry, the meaning of emotional signals, and the role of context. Top-down processes that assign meaning to signals are of crucial importance for all three assumptions.

We then turn to new directions of research on the impact of mimicry on interaction quality before turning to new conceptualisations of mimicry. Here, we will raise the question of whether mimicry can be conceived of as a trait.

**Mimicry is goal dependent**

The emotional mimicry as social regulator view considers emotional mimicry to be a social act, while assuming that a basic requirement is some form of affiliation intention or a shared mind. This implies that people are more likely to mimic others’ emotions in contexts in which this goal is present, even unconsciously. The importance of the affiliation goal is supported by evidence showing that the occurrence of mimicry is dependent on liking (Salazar Kämpf et al., 2018) and perceived (physical) similarity between mimicker and mimickee (Clerke & Heerey, 2021; Olszowski et al., 2022), but also, as noted above, on ingroup versus outgroup status of the mimickee (Bourgeois & Hess, 2008, Study 2; van der Schalk et al., 2011; Weisbuch & Ambady, 2008), or the desire to cooperate rather than to compete with the mimickee (Lanzetta & Englis, 1989; Seibt et al., 2013). Attitudes formed prior to exposure to humans or avatars also influence mimicry (Blocker & McIntosh, 2016; Likowski et al., 2008) such that expressions by negatively evaluated individuals are not mimicked to the same extent or at all. In sum, we can assume that an affiliative goal is present when the relation between mimicker and mimickee is positive, or when the mimicker has a positive attitude towards the mimickee, whether implicit or explicit. In the absence of this goal, mimicry is absent or much reduced.

**The meaning of emotional signals**

This brings us to the meaning of emotion expressions and the goals they elicit. We argue that the strength and even the occurrence of emotional mimicry depends on the perception of the emotion expression as serving an affiliative goal. Some emotion expressions intrinsically convey the affiliative intent of the expresser (Hess et al., 2000; Knutson, 1996), such as smiling. As a consequence, we preferentially mimic smiles, because they signal affiliative intentions. Mimicry of smiles is thus often present in situations where mimicry would be otherwise reduced or absent, for example when the other is an outgroup member, or a disliked other (e.g. Bourgeois & Hess, 2008; Hess et al., 2017b; Seibt et al., 2013; van der Schalk et al., 2011). Happy smiles signal an intention...
to affiliate, partly irrespective of the person who displays it. Moreover, facial expressions signal the state of an expresser and state information on behavioural intentions tends to override more stable sources of information such as group membership (Küster et al., 2019). Thus, unless the target is judged very negatively (Likowski et al., 2008), the affiliative state signal of smiling may suffice to motivate affiliation.

Yet, although smiles evoke a strong affiliative intention, the meaning of emotion expressions, including smiles, always depends on context. For example, mimicry of the same laughter episode is stronger when the laughter is presented as a reaction to a benign amusing scene rather than a schadenfreude scene. Smile mimicry was even absent when the laughter followed a disgusting scene (Mauersberger, Kastendieck, Hetmann, Schöll, & Hess, in press). Whereas laughter in reaction to benign funny scenes signalled amusement, an affiliative playful emotion, laughter to the somewhat malicious scenes signalled schadenfreude, a socially less acceptable emotion (Provine, 2001) and laughing when someone experiences a degrading event is even more malicious and perceived as inappropriate (Mauersberger et al., in press). Similarly, individuals who saw videos of smiling individuals mimicked those who smiled during weddings, but not those who smiled during funerals (Kastendieck et al., 2020). This effect was mediated through interpersonal closeness, which in turn depended on the perceived appropriateness of smiling in the given context. In other words, inappropriate smiling signals something negative about the person who smiles in that context – it is not a carefree affiliation signal anymore and hence reduces both perceived closeness and mimicry.

Sadness is also an emotion that signals affiliative intent – but not in the sense of carefree sharing, but as an appeal for help and succour (Scarantino et al., in press). Given the affiliative goal, sad expressions should be readily mimicked – but this may also depend on the implied demand for help. For example, two studies suggest that sad expressions are only mimicked when they are deemed appropriate to the situation (Fischer & Hess, 2018; Kastendieck et al., 2020). Also, the same sad face that was mimicked when not showing tears was not mimicked when showing tears (Fischer & Hess, 2018), suggesting that sad expressions that are too intense might not be mimicked. Yet, at the same time mimicry of sad expressions was found to be independent of the perceived closeness to the expresser (Kastendieck et al., 2020), and when the expresser wore a surgical mask (Kastendieck et al., 2021), which reduces perceived closeness. These somewhat mixed results might be due to the higher social cost of sadness mimicry implied by the appeal for help.

In sum, there is good evidence that affiliative motives, whether expressed by a clear affiliative emotion signal such as the smile or inferred from the context in which an expression occurs, are an important precondition of mimicry. Yet, most of this evidence is, while face valid, somewhat indirect because the proposed mediation by the affiliation motive has not been tested. One problem in this regard is that the affiliation motive is often presumed to be implicit (McClelland, 1987) and there is not yet a good methodological procedure to measure the implicit affiliation motive as a state. However, in a recent study, the implicit affiliation motive, measured as a trait – using the picture story exercise (Schultheiss et al., 2008) – predicted facial mimicry in both positive and negative contexts (Mauersberger & Hess, 2019).

What is being imitated? Meaning versus muscles

The assumption that the meaning of the emotion expression is crucial leads to a third assumption, namely that emotional mimicry does not necessarily depend on the specifics of what is being observed. That is, people mimic what they understand an emotion signal to mean – and not necessarily specific muscle movements.

The most direct evidence for this assumption comes from studies on cross-modal mimicry that demonstrate facial mimicry in response to emotional sounds (Hawk et al., 2012) – even by congenitally blind individuals (Arias et al., 2021) – or body postures (Magnée et al., 2007) or conversely body mimicry when watching emotional facial expressions (Moody et al., 2018). In these cases, what is mimicked is not the expression that is observed, but the emotion that is inferred from the expression, in other words, the emotional signal. One could argue that this form of cross-channel mimicry is a form of embodiment rather than emotional mimicry, in that the “full” expression is reproduced from the partial expression observed. Thus, a clearer test of this assumption, would be evidence that expressions are not required at all. This has indeed been shown by a study where
mimicry was shown in reaction to neutral expressions, merely based on verbal labels that supposedly indicated the emotion felt by the person (Hess et al., 2014). In other words, people mimicked a happy expression in reaction to a neutral face, when they thought the person felt happy.

In sum, considering emotional mimicry a social act is based on the assumption that although emotion emotional mimicry is an automatic process, this process is goal dependent. Thus, mimicry only occurs when the emotional signal is perceived as affiliative, either because there is an affiliative goal, or because the context or the nonverbal expression itself leads to the inference that the mimickee’s motives are affiliative. This is in line with one of the main functions of mimicry, namely smoothing social interactions and establishing or maintaining social bonds.

The role of emotional mimicry in interaction

The notion of emotional mimicry as a social act clearly suggests that it has an important role in improving the quality of social interactions. However, much of the early research on emotional mimicry has been conducted in laboratory contexts with highly controlled context-free photo or video stimuli, limited to so-called prototypical facial expressions for which the underlying muscle activity is known (see Hess & Fischer, 2014). Yet, even though these designs do not tap actual interactions, some findings converge to suggest the importance of mimicry for successful interactions. For example, individuals who feel lonely did not mimic happiness expressions even though they showed spontaneous reactions to positive, negative, or neutral IAPS images (Arnold & Winkielman, 2021).

Studies that manipulate mimicry to study the consequences of emotional and behavioural mimicry point to increased liking (Yabar & Hess, 2007) and empathy (Stel et al., 2013), which also suggests that emotional mimicry is associated with positive interactions. This notion is more explicitly supported by a study by Salazar Kämpf et al. (2018) who conducted an analysis of several dyadic interactions of the same individuals in a round-robin design. They found that initial liking of the mimickee predicted mimicry, which in turn increased liking of the mimicker. Thus, once emotional mimicry starts, on the basis of initial liking, it reinforces a cycle of reciprocal liking. Salazar Kämpf and colleagues, however, did not differentiate between mimicry of positive and negative expressions, nor a positive or negative context, leaving open the question of what happens in negative interactions.

Mauersberger and Hess (2019) explicitly tested the impact of mimicry on interaction quality in a virtual conflict situation in which participants interacted with another person over video chat. Responses by the simulated interaction partner were given with either an affiliative demeanour or an antagonistic demeanour, but in both cases, the participants’ suggestions were rejected. Activity of the corrugator supercillii – which indexes frowning – was mimicked to a lesser extent than was activity from zygomaticus major and orbicularis oculi (which index smiling). Notably, and in line with predictions – in the affiliative context, mimicry increased interaction quality. In the antagonistic condition, however, mimicry decreased interaction quality. As the actors in the simulated negative interaction were instructed to avoid smiling and to frown frequently, mimicry, when shown, was mimicry of an antagonistic frowning expression. This mimicry resulted in decreased interaction quality. This finding confirms that, in contrast to the original formulation of the Chameleon effect (Chartrand & Bargh, 1999), not all mimicry is good for affiliation. Rather, mimicry only fosters affiliation when it occurs in an affiliative context and communicates affiliative intent.

In fact, we have argued that antagonistic mimicry – the mimicry of antagonistic emotions – is not mimicry at all, but rather represents an emotional reaction to the expression of the other (Hess & Fischer, 2014). This view is a departure from the original definition of mimicry, which simply defines mimicry as the imitation of the nonverbal behaviour of others. This, in turn, is usually operationalised as two people showing the same expression at the same time. However, there may be many reasons why people may show the same expression (Elfenbein, 2014) and mimicry is only one of them. When we take the mimicry as social regulator view seriously, however, a more appropriate definition would be that mimicry is the imitation of another person’s affiliative nonverbal behaviour with the goal to affiliate.

In sum, there is good evidence for the notion that emotional mimicry is a social act that serves to regulate interactions. A somewhat related view has been suggested by the STORM (social top-down response modulation) model by Wang and Hamilton (2012). Yet, this model further assumes that mimicry is a
form of (unconscious) strategic behaviour and focuses very strongly on the presumed positive outcomes of mimicry for the mimicker. By contrast, the mimicry as social regulator model understands mimicry as a social act that is based on the (largely unconscious) social appraisal of the context. As such, the focus is more strongly on the antecedents of mimicry and on its use as a social act in a larger context. In this vein, we propose that mimicry can be considered as social tool and even seen in a trait-like manner.

Mimicry as an individual difference variable

Up to this point, we have considered mimicry as a response in a certain context, in other words as a situational variable. However, in more recent years we have developed the notion of mimicry as an individual difference variable (Hess et al., 2017a). People who tend to show affiliative mimicry have a tool in their social competence toolbox that allows them to create warm and pleasant interactions. By contrast, people who mimic less or show antagonistic “mimicry” experience less pleasant interactions (Mauersberger & Hess, 2019). In this sense, mimicry can be conceptualised as a stable behavioural tendency. To the degree that mimicry can be considered an interaction tool, this tendency should also be related to personality traits that impact interaction skills.

We tested the notion that mimicry is a stable behavioural tendency that is linked to personality and predicts everyday interaction quality in a study in which participants came to the laboratory to complete a standard mimicry task – they saw photos of faces showing anger, sadness, disgust and happiness, while their facial EMG was measured. Prior to the laboratory task, they completed a series of personality questionnaires and following the laboratory task, they kept a diary for 10 days in which they recorded the quality of meaningful interactions lasting 10 min or more. As expected, mimicry in the laboratory, in conjunction with personality, predicted interaction quality in that personality predicted the likelihood of mimicry and also moderated the effect of mimicry on social interactions.

Specifically, sadness and happiness mimicry – in conjunction with agreeableness and conscientiousness respectively – predicted positive interaction quality for the diary recorded interactions. By contrast, disgust mimicry, in conjunction with neuroticism, predicted negative interaction quality. Finally, for anger, the effect depended on emotion regulation ability – for people high in emotion regulation ability the effect of anger mimicry on interaction quality was positive, whereas for those low in emotion regulation ability it was negative. The positive effect of anger mimicry seems at first surprising. However, anger can be positive in that “righteous” anger signals positive interpersonal qualities and motivates positive change (Hess, 2014). As such, it is possible that people high in emotion regulation ability are able to confine their anger mimicry to appropriate situations in which anger can serve a positive interaction goal.

Overall, this study suggests that mimicry has trait-like features. Alternatively, one could call it an ability. However, unlike typical abilities, mimicry cannot be learned as it occurs automatically and largely outside of awareness. However, its antecedents – especially an affiliative stance towards others – can be modified.

Conclusion

Future directions

Although recent years have seen many different new lines of research that shed light on the different forms, conditions and implications of emotional mimicry, there are still many open questions regarding its role, especially in social interactions. One example is the trustworthiness of a person. People can and do use emotions strategically to influence others. Hence, we do not always trust our interaction partners, and the question is how this affects mimicry. In addition, we may sometimes evaluate others’ expressions as insincere. Some recent studies of facial reactions to inappropriate or exaggerated tears suggest that expressions that are not seen as authentic lead to expressions opposite to mimicry – so-called counter-mimicry – such as smiling to tears (Fischer & Hess, 2018).

Curiously, given mimicry’s role in fostering affiliation, studies on mimicry are almost exclusively conducted with strangers as participants. The role of mimicry in friendship dyads and its role in fermenting friendships have not been studied, nor has mimicry research been extended beyond the dyad. How mimicry functions in group contexts and facilitates leadership or specific types of interactions, are only a few of many open questions.
In sum, we think that emotional mimicry fosters affiliation and creates interpersonal warmth in an affiliative context, but we think there are still many questions to answer, especially with regard to its social implications and its role in negative interactions.

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