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Emotional Mimicry in Social Context

CHAPTER 6

More than just a mirror: examining the cross-channel mimicry of emotional expressions

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One of the key elements in all forms of mimicry is that it is, in some way, an imitation of another's behaviour, whether in terms of gestures, posture, facial expressions, or other observable actions. We may mimic what we see or hear, but in order to define it as mimicry, there should be some match between the observed and mimicked behaviour. The issue that we will address in this chapter is the nature of this match. This issue is of particular importance because it tells us something about mimicry, and more importantly about the nature of emotional mimicry. We argue that the mimicry of an emotion can comprise the mimicry of expressions of that emotion in different channels, which is based on the representation of that specific emotion. This argument is in line with Bavelas et al.'s (1986, Study 1) original research on motor mimicry of pain, who adopted an extremely wide definition of mimicry by operationalizing it "as any expression of pain in the observer; it did not need to be literally what E1 had done, as long as it was appropriate to the other's situation" (Bavelas, Black, Lemery, & Mullett, 1986, p. 324). This study is widely cited in mimicry research, even though it does not fit the more narrow definition of mimicry in studies on automatic and unconscious behavioural imitation of others' gestural, postural, or facial expressions. In this latter research, mimicry is mostly defined in terms of exactly matching others' behaviours, such as foot tapping, body or face touching, or leg crossing (see, e.g., Ashton-James, van Baaren, Chartrand, Decety & Karremans, 2007), pen-playing (van Baaren, Fockenberg, Holland, Janssen, & van Knippenberg, 2006), or posture, body orientation, and position of arms and legs (van Baaren, Holland, Kawakami, & van Knippenberg, 2004). The match implied in the latter definition is more literal than the one implied by Bavelas and colleagues, and these different definitions also suggest different theoretical accounts of mimicry. We roughly distinguish two different theoretical

perspectives that explain mimicry and its functions. The first can be categorized as the Motor Mimicry view (Chartrand & Bargh; 1999; Dijksterhuis & Bargh, 2001). In this perspective, mimicry is seen as the result of an automatic tendency to observe another person's acts and to subsequently perform the same act oneself. This account thus assumes a direct, one-to-one matching between others' motor behaviours and those that we display ourselves. The similarity between what one sees and what one does is crucial to this account.

A second theoretical perspective emphasizes more flexibility in the relation between what we observe and what we mimic and argues that mimicry requires the perception of an emotional action in its broader context. Bavelas and colleagues' previously mentioned definition of mimicry and related research fits in this account, as it suggests that the imitation of a broader category or construct, such as an emotional state, can in principle result in a different action than the one that is actually observed. The loose connection between the perception of an emotion and the mimicry of the emotion is also in line with an embodiment view (e.g., Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005), arguing that emotional representations are not abstract, but grounded in one's bodily experiences and thus modality specific. In this view, mimicry can be considered an embodied response to an emotion. A similar perspective is taken by a Contextual view of Emotional Mimicry (see Hess & Fischer, 2013), which emphasizes the interpretational nature of emotion perception. The Contextual view assumes that the mimicry of an emotional state implies the categorization and interpretation of a specific behaviour or expression as belonging to an emotional category. Central to the topic of this chapter, this raises the question of how we define "mimicry." If there is no literal, one-to-one match between perception and action, (how) can we still call this mimicry? One particular case in which this issue is clearly illustrated is "cross-channel mimicry," in which another's emotion is imitated through a different expressive (i.e., facial, vocal, or postural) behaviour than the one in which it was originally expressed. As one example of this phenomenon, individuals tend to reflexively show a smile on their faces when they hear another person laugh. Emotional mimicry thus may traverse a particular non-verbal channel in which an expression is initially perceived. Although there is no literal match between hearing laughter and displaying a smile, there is a clear match in emotional meaning. In other words, observers may mimic the emotional meaning of what they have observed, rather than the objective features of what they saw. We will argue that such instances of cross-channel transmission of emotions have the same features and functions as uni-channel, or "classic," mimicry. In this chapter, we will first review evidence on cross-channel mimicry

and discuss its possible functions. We will subsequently discuss different mechanisms that might account for cross-channel mimicry, and the special position of facial expressions in this phenomenon.

Evidence for cross-channel mimicry and emotion processing

To date, mimicry research has overwhelmingly considered facial, vocal, and postural channels of expression in isolation from one another. However, there is broad evidence of an interrelation between the processing of emotion expressions through different channels. We can conclude this from the fact that the perception of emotion in facial, vocal/prosodic, and lexical channels is highly correlated (Borod et al., 2000). In addition, the processing of emotional stimuli in one channel, for example auditory, can produce reactions in another channel, for example facial. For example, Dimberg (1990) showed that participants produce more Corrugator Supercilii muscle activity (responsible for a frowning expression) than Zygomaticus Major muscle activity (responsible for smiling) in response to a highly aversive, that is a 95dB 1000-Hz, tone compared to a less aversive, that is 75dB 1000-Hz, tone.

The close association between emotion processing in different channels is also supported by research paradigms in which participants are presented with emotional stimuli in two different sensory modalities (De Gelder & Vroomen, 1996; 2000; Massaro & Egan, 1996). These studies have shown that emotion processing is facilitated when facial and vocal expressions signal the same emotion; visually presented emotional faces bias the selective processing of emotional tones of voice, and vice versa. For example, De Gelder and Vroomen (2000) showed that when participants are presented with a continuum of happy and sad faces and at the same time hear a sentence spoken in a happy, sad, or neutral tone, they are quicker to identify a face as belonging to one of the two emotion categories if this is congruent with the same emotional tone of voice. Pairings of facial and vocal expressions communicating the same emotion thus facilitate quick and accurate recognition of stimuli, whereas incongruent pairings reduce speed and accuracy, regardless of whether the target stimuli are facial or vocal (De Gelder, Pourtois, & Weiskrantz, 2002; De Gelder & Vroomen, 2000; De Gelder & Bertelson, 2003; Dolan, Morris, & De Gelder, 2001; Hietanen, Leppänen, Illi, & Surakka, 2004; Massaro & Egan, 1996; Pell, 2005). In addition, fMRI research has shown that similar parts of the somatosensory cortex are involved in the processing of both facial and acoustic stimuli (Banissy et al., 2010). These studies all suggest, at minimum, that the neural systems involved in processing emotional information communicated through different channels are interrelated and can therefore be seen as parts of a more integrative system

(e.g., Warren et al., 2006). What evidence exists that we also mimic expressions across expressive channels? From a purely motor-resonance (non-emotional) view, auditory and visual yawning stimuli appear to activate facial motor responses in similar ways. While it has long been known that seeing another person yawn increases facial yawning in observers (Provine, 1986), neuroimaging research has also found that merely *hearing* yawning vocalizations activated brain regions involved in executing mouth actions and increased listeners' self-reported urges to yawn (Arnott, Singhal, & Goodale, 2009). Within the more relevant context of emotion expression, Verona and colleagues (Verona, Patrick, Curtin, Bradley, & Lang, 2004) examined prison inmates' facial electromyography (fEMG) responses to collections of non-verbal vocalizations with positive (e.g., baby laughter, erotic moans) or negative (e.g., attack sounds, baby cries) connotations. As predicted, activity in the Zygomaticus Major (smiling) and Corrugator Supercilii (frowning) facial muscles increased when hearing the positive and negative sounds, respectively. Similar facial responses have been reported when participants have listened to speech fragments with happy and angry (Hietanen, Surakka, & Linnankoski, 1998) or happy and fearful tones of voice (Magneé, Stekelenburg, Kemner, & De Gelder, 2007). These concordant frowning and smiling facial responses have additionally been observed when participants view images of fearful and happy body postures. Magnée and colleagues (2007) tested this multi-sensory integration of emotions by presenting participants happy and fearful face-voice pairs (Experiment 1) in an emotion-congruent or incongruent way. They found that participants who were presented with congruent fearful faces and voices showed more Corrugator Supercilii activity than participants presented with happy faces and fearful voices, or vice-versa. In addition, participants presented with happy faces and voices showed more Zygomaticus Major activity than participants presented with happy faces and fearful voices, or vice-versa. In a second experiment, participants saw happy or fearful bodies or happy or fearful faces. The results showed similar facial reactions to bodies as to faces, with Corrugator Supercilii responses being higher for bodies, and Zygomaticus Major activity higher in response to faces than bodies. Based on these findings, the authors suggested that there is no role for mimicry, but rather that the recognition of emotions, independently of the channel, elicits motor activity in the face. These preliminary studies demonstrating the cross-channel matching of emotion share one important caveat, in that none could make the case for *emotion-specific* mimicry between expressive channels. Instead, they only suggest that cross-channel mimicry extends to general distinctions between positive and negative emotions. Researchers have consistently relied on measuring the same facial

muscles (Zygomaticus Major and Corrugator Supercilii) in order to make the case for concordant responding, even though different emotions have been examined between studies (see Hess & Fischer, 2013, for a more extensive examination of this issue). This point is especially pertinent with regard to negative emotions such as anger, disgust, sadness, and fear, because while all of these emotions might include activation of the Corrugator Supercilii muscle (Ekman & Friesen, 1978), each also incorporates facial movements that are relatively unique. A grimace of disgust prototypically features a wrinkled nose and a raised upper lip, for example, while a turned-down mouth is an iconic feature of sadness. A stronger case for emotion-specific mimicry across channels would be made if these additional movements also appeared on observers' faces when exposed to other forms of non-verbal expressions, such as in the voice or body. In order to examine whether individuals might also mimic these more emotion-specific actions across expressive channels, Hawk, Fischer, and Van Kleef (2012, Studies 1 and 2) presented participants with sound fragments of laughing, crying, disgust noises (e.g., "eeeww!"), and angry growls. A hidden camera recorded their facial expressions during these tasks. Using the Facial Action Coding System (FACS), the researchers were able to examine participants' emotion-specific facial actions. Results showed that participants' more specific facial expressions (e.g., wrinkled noses, downturned mouths) tended to conform to the discrete emotion sounds that they heard. These findings suggest that cross-channel responses to emotion expressions do not merely reflect the positive or negative valence of the signals. Instead, they might actually involve more specific actions involved in discrete emotional behaviour. Thus, ample evidence exists that observers' facial expressions register the emotional signals that others convey across a spectrum of non-verbal channels, eliciting the mimicry of these expressions. This evidence would seem to contradict a Motor Mimicry view. Instead, it appears that interaction partners match the particular emotional *meanings* of each other's expressions, supporting a contextual model. This implies that we mimic not only concrete actions but also more abstract categories that can be represented by a broader constellation of behaviours. Extending mimicry to these more abstract forms of emotional matching requires evidence that such mimicry would contain the same features and fulfils the same functions as "classical" mimicry.

Functions of emotional mimicry

1. Processing of Emotional Information. First, emotional mimicry has been proposed to facilitate accurate and fast recognition of others' emotions (see also Chapter 2). In other words, mimicry helps us to

understand and process emotional information more fluently (Effron, Niedenthal, Gil, & Droit-Volet, 2006; Niedenthal, Brauer, Halberstadt, & Innes-Ker, 2001; Oberman, Winkielman, & Ramachandran, 2007; Stel & Van Knippenberg, 2008, but see Hess & Blairy, 2001). One line of research in uni-channel mimicry that has examined and found support for this idea is research in which mimicry has been blocked through some kind of physical interference, resulting in impaired emotional processing. For example, participants who were instructed to avoid making facial movements showed reduced recognition of positive and negative emotional displays (Stel & Van Knippenberg, 2008). Additionally, blocking the ability to smile by instructing participants to bite down on a pen with their teeth not only resulted in poorer recognition of happiness but also lowered recognition of disgust, when compared with a rest condition (Oberman et al., 2007). Across different studies, blocking the smile through a variety of manipulations (e.g., use of a mouth guard) has also resulted in poorer detection of authentic smiles compared to false smiles (Maringer et al., 2011; Rychlowska et al., 2014), or in slower detection of a happy face transitioning from a sad face (Niedenthal et al., 2001, see also Stel, Chapter 2, and Niedenthal et al., Chapter 3). The blocking of actual motor activity with different techniques not only has an effect on emotional processing in the same channel, however, and there is some evidence that blocking emotions in one channel may reduce recognition of the same emotion in another channel. For example, suppressing sensorimotor activity via transcranial magnetic stimulation seems to interfere with the discrimination of *auditory* emotions (Banissy et al., 2010). Further, studies of patients with brain lesions have investigated whether there is a common neuroanatomical basis for face and voice recognition, and evidence suggests that there is a relation between face and voice recognition impairments (Van Lancker, 1997). In a similar vein, Hawk and colleagues (2012, Study 3) blocked or allowed participants' facial mimicry of smiling during a task in which participants had to identify as quickly as possible a shift in volume prominence between two auditory emotion expressions (from laughter to crying or vice versa). The results showed that participants attended more to the expressions when they could freely mimic them, to the point of being less accurate in identifying the moment at which the other sound became more prominent. Individuals who were prevented from mimicking did not over-attend to the initial sound in this manner, and thus were more accurate in identifying the point of transition. Together, these studies suggest that blocking mimicry in one expressive channel affects the speed, accuracy, and level of attention involved in processing emotional information in other channels, just as has been found within single channels of expression.

2. Similarity and liking. Emotional mimicry has been suggested to serve at least three functions. The first is similar to behavioural mimicry, that is, to enhance social bonds or affiliation. Mimicry, at least appropriate mimicry (see Leander, Chartrand, & Bargh, 2012), and when there is no *a priori* disliking (Stel et al., 2010) can result in more liking of the mimicked person. There is ample evidence for this phenomenon in unimodal mimicry (Stel & Vonk, 2009; Stel et al., 2010). Signals of shared emotion facilitate social bonds and communicate appreciation of another's current circumstances (Batson, Turk, Shaw, & Klein, 1995; Bavelas et al., 1986). It also generates feelings of understanding, trust, and liking, thereby enhancing interpersonal rapport (Anderson & Keltner, 2002; Bavelas et al., 1986; Chartrand & Bargh, 1999; Fischer & Manstead, 2008; Keltner & Haidt, 1999; Van Kleef et al., 2008; Van der Schalk et al., 2011). Conversely, several studies have demonstrated that *a priori* liking and interpersonal/group similarity strengthens the mimicry of both non-emotional (Stel et al., 2010) and emotional behaviour (Van der Schalk et al., 2011). The links between mimicry and interpersonal rapport thus appear to be quite reciprocal in nature (see also Hess et al., Chapter 5). In a study on the relation between group membership and responses to "canned laughter" (Platow et al., 2005), researchers exposed participants to the same audio recordings of a stand-up comedy routine. The audience in these recordings was characterized as being students at participants' own university, or as members of a political party with very low membership at that particular college. Participants displayed heightened levels of smiling, as well as combined smiling and laughter, when they believed that the audience was composed of in-group members. Thus, at least one half of the bidirectional association between liking/similarity and mimicry has been demonstrated in prior research. To date, there is less evidence that cross-channel mimicry results in greater liking or similarity perceptions towards the mimicker. Based on Bavelas' (1986) original research, however, we may speculate that the mimicry of emotions across channels would have a similar effect on similarity and liking, as long as the recipient both observes the response and interprets the behaviour as an expression of a similar emotion.

3. Facilitating emotion contagion. Third, emotional mimicry may result in emotional contagion, or experiencing feelings similar to those communicated by others in the environment. It is still unclear whether this contagion is the result of mimicry or is elicited directly by the emotional display of the other person. Within expressive channels, however, there is ample evidence that individuals often report feeling emotions similar to those that they observe. This has been supported not only by studies testing the facial feedback hypothesis (Duclos et al., 1989; Flack, Laird, & Cavallaro, 1999; Larsen, Kasimatis, & Frey, 1992; Strack, Martin, & Stepper,

1988) but also by studies examining the direct elicitation of emotion via exposure to affective signals. For example, Provine (1992) has shown that mere exposure to canned laughter is sufficient to elicit smiling, laughter, and positive mood. Further, Hawk et al. (2012) found that hearing discrete vocal expressions of anger, joy, disgust, and sadness increased participants' own subjective experiences of those emotions (Study 1). Indeed, interfering with participants' ability to make matching facial expressions when hearing such sounds also appeared to inhibit these stronger emotional experiences (Hawk et al., Study 4), implying that congruent emotional responses to expressions presented in one channel can be diminished by interfering with the mimicry of those emotions in other channels. Importantly, all three of these functions are crucial to physical and social survival. At the individual level, accurately recognizing emotions, sharing in others' feelings, and enhancing liking through mimicry (or alternatively, mimicking those we like) provides additional, intrapersonal cues about experiences that should be pursued or avoided (e.g., Fischer & Manstead, 2008; Keltner & Haidt, 1999; Klinnert, Emde, Butterfield, & Campos, 1986; Sorce, Emde, Campos, & Klinnert, 1985; Van Kleef, 2009) and prepares the mind and body to meet the same environmental challenges as our interaction partners. At the interpersonal level, emotion recognition, contagion, and mimicry-related bonding help individuals to synchronize social intentions and facilitate joint or group action (Anderson & Keltner, 2002; Fischer & Manstead, 2008; Keltner & Haidt, 1999; Preston & De Waal, 2002; Yabar & Hess, 2007). It stands to reason that these social functions of mimicry would be best served by a system that allows for more flexibility in the representation and re-enactment of an emotional expression, as opposed to a more strictly literal response. In conclusion, the unichannel evidence for these three functions of emotional mimicry seems to extend to cross-channel mimicry, at least on the basis of preliminary evidence. The evidence thus suggests that emotional mimicry does not merely reflect motor activity, but incorporates a broader network of affective systems (e.g., Duclos et al., 1989; Flack, 2006; Flack, et al., 1999; Niedenthal, 2007; Niedenthal, Winkielman, Mondillion, & Vermeulen, 2009). This brings us to the question how to explain cross-channel mimicry.

Theoretical accounts of cross-channel mimicry

There is still substantial debate over both the mechanisms governing mimicry responses, generally speaking, and the boundary conditions under which they operate. With regard to emotional mimicry, more specifically, evidence for the existence of cross-channel mimicry may bring us closer to a discussion on the pervasiveness of this phenomenon.

Motor Mimicry

The first broad theoretical account is Motor Mimicry, also referred to as the Perception–Behaviour link (e.g., Dijksterhuis & Bargh, 2001), which seems the least suitable to incorporate cross-channel mimicry. Particularly in stricter accounts of this perspective, the observation of an emotional expression is thought to directly and automatically activate a specific, one-to-one mental representation of the same behaviour in an observer. Interestingly, research advocating this stricter perception–behaviour link has often focused on non-emotional and concrete behaviours, such as foot-shaking (e.g., Chartrand & Bargh, 1999), that have no particular social meaning or corresponding representations in different modalities. In contrast, grounding mimicry in the direct perception of another's emotional display cannot account for the fact that we might mimic something we do not actually see. There are several other theoretical perspectives, however, that could explain cross-channel mimicry.

Perception Action Model

The Perception Action Model of empathy (PAM; Preston & De Waal, 2002) takes a somewhat broader perspective and situates the automatic imitation of emotional expressions within a wider framework of empathic responding, which also includes perspective-taking, identifying with others' experiences, and subjectively experiencing inner states. The PAM states that the "attended perception of the object's state automatically activates the subject's representations of the state, situation, and object, and that activation of these representations automatically primes or generates the associated autonomic and somatic responses, unless inhibited" (p. 4). In other words, perception of distress or other negative emotions would result in associated responses that might not necessarily be identical to the ones initially perceived. The link between perception and behaviour is not direct, but instead runs through a representation of the target's observed state. This also accounts for the fact that we can generally distinguish two types of responses to another's emotions: a response *with* and a response *to* the other (see Hess & Fischer, 2013). Whereas the PAM may explain that we mimic others' emotions when we feel empathic, it does not necessarily explain when and why we mimic, because empathic responding and mimicry are not inextricably linked (e.g., Hawk, Fischer, & Van Kleef, 2011).

Embodiment theory

A third account that could explain cross-channel mimicry argues that the multi-component representation of an emotion, and not the direct

observation of its expression, serves as a basis for imitation. Embodiment theory argues that our representation of emotion concepts is not amodal, but instead is modality-specific (Barsalou, 2003), consisting of references to particular components that comprise our knowledge representation of a particular construct. Take the concept of anger, for example: Its representation not only consists of a semantic definition of what anger is, and when it takes place, but is also strongly based on recollections of anger experiences, including how we express such feelings. Anger representations are thus partial *simulations* or reenactments in perceptual, motoric, and affective modalities. When thinking of anger, our muscles become tense, our voices become louder and harsher, and we have piercing eyes and a frown on our face. These modality-specific representations are embodied recollections of our own experiences, as well as the recollections of others' displays. In other words, we construct the meaning of anger as a concept at least partially from our own prior bodily and subjective experiences of anger (see Niedenthal et al., 2005, and Niedenthal et al., Chapter 3). The crucial issue here is that these different sensory modalities are closely connected, and thus may be activated as part of the modality system. Hearing someone talking in a very angry tone may automatically activate both facial expressions of anger and tightening of the muscles in preparation for aggression. Moreover, the subjective feeling of anger can be considered as just another sensory modality, meaning that expressive behaviours and introspective states can activate one another in a dynamic fashion (Keysers & Gazzola, 2009; Niedenthal, 2007; Van der Gaag, Minderaa, & Keysers, 2007). Exposure to an emotional stimulus in any particular modality can initiate cascading simulations of other components, in order to "fill in" unperceived aspects of an original experience (Barsalou, Niedenthal, Barbey, & Ruppert, 2003). Individuals thus draw upon their own personal history of emotion expressions, subjective experiences, and eliciting contexts in order to make sense of others' emotional circumstances and to share in their joy, pain, revulsion, or anger. The "cross-talk" between modalities implies that an observer's internal and outward simulation of another's expression may extend to behaviour across several non-verbal channels.

In line with the notion of re-enacting multiple components of an emotion expression when exposed to a stimulus in a single channel, Hawk and colleagues (2012, Study 1) instructed participants to first listen to, and then repeat, vocal expressions of anger, sadness, joy, and disgust. The Facial Action Coding System was used to examine hidden camera footage of participants' expressions during both tasks. Results showed that participants performed emotion-specific facial movements when making each respective set of vocalizations, but also showed the same muscle activations when merely *listening* to

the sounds. More importantly for a simulation account, facial activity between the listening and vocalizing tasks was significantly correlated; this indicated that the stronger these actions were when participants made the sounds themselves, the more strongly they reacted with the same movements upon mere exposure to the auditory stimuli. Across studies in this research, concordant facial responses when listening to the recordings also appeared to be more frequent when participants intended to repeat the sounds (Study 1), as compared to when no vocalizing goal was present (Study 2). Thus, not only did this cross-channel mimicry appear to be based on participants' own associations between facial and vocal expressions of the same emotion, but overt intent to imitate the expression in the original channel appeared to increase the frequency of mimicry in another related modality.

Contextual view

A fourth perspective that could explain these cross-channel effects is a contextual account of emotional mimicry (Hess & Fischer, 2013), which argues that the mimicry of emotional signals depends on how the signal is interpreted and understood within a specific context. Individuals do not see a frown, or hear a sigh, but perceive "anger," or "relief," depending on how the circumstances dictate their expectations. This perspective is in line with what Soussignan and colleagues have termed the "emotional appraisal view" (Soussignan et al., 2013), also underlining the idea that we try to make sense of our emotional environment and interpret facial or other non-verbal signals as relevant for our own concerns. Soussignan and colleagues found an effect for gaze direction in interaction with the type of emotion, showing that participants only mimicked angry and happy faces when the gaze was directed towards them, reflecting self-relevant appraisals, whereas gaze direction did not have an effect on the mimicry of fearful and sad faces. The authors conclude that mimicry is an emotional and not a motor response (Soussignan et al., 2013), which is in agreement with a contextual view, because individuals interpreted anger and happiness differently depending on whether they were directed at them, and thus, an attack or an affiliative signal, or at others. A contextual view can incorporate cross-channel mimicry because it assumes that mimicry results from the interpretation of multiple expressive and situational emotional cues – whether joy is communicated through a smile or a laugh, an observer will interpret and respond to this signal in a similar way because both expressions have similar potential social consequences for him/her. Indeed, a contextual view allows for flexibility in the representation and mimicry of an

emotional expression, so long as expressions in different channels are interpreted in a similar manner.

There is to date no research that explicitly examines contextual cues as a basis of cross-channel emotional mimicry, and thus we can only speculate based on some examples. For instance, hearing someone laugh may lead to smiling, as much as smiling itself evokes smiling. The question is whether contextual cues that would suggest an appropriate or inappropriate reason for smiling would have a different impact on cross-channel mimicry versus uni-channel mimicry. For example, would individuals mimic smiling or laughing behaviour more strongly if they thought a target was responding to an amusing film, as opposed to enjoying watching another person being physically harmed? And, would this facial mimicry interact with whether individuals see or hear this laughter? If mimicry would be equally strong in both contexts, a contextual view would not have additional explanatory value to an embodiment view as outlined above. However, the aforementioned finding that individuals show increased smiling in response to in-group laughter compared to out-group laughter (Platow et al., 2005) raises intriguing questions about how social context may serve to strengthen or weaken cross-channel mimicry responses. Similar questions could be asked in relation to the cross-channel mimicry of negative emotions, although in these cases it may crucially depend on the type of negative emotions. For example, we reported evidence that hearing vomit sounds makes people look disgusted. However, would contextual cues, such as disgust from eating cockroaches versus eating tomatoes, also result in different amounts of mimicry? And, additionally, would this be different in cross-channel versus uni-channel mimicry? These are questions that could be answered in future research and would shed more light on the nature of context effects upon emotional mimicry, more generally.

The special role of the face

Special attention needs to be paid to the role of the face in cross-channel mimicry. Almost all related research focuses on facial mimicry as a response to postural or acoustic cues. Indeed, we may suggest that the fact that we find facial reactions to emotional cues from various non-verbal channels indicates that any recognition of emotions, in whatever channel, elicits motor activity in the face. This suggestion, first of all, raises the question of whether the reverse can also be found: is there evidence of postural or vocal mimicry when we see emotional faces? To our knowledge, there is no evidence of such mimicry effects, but a confirmatory answer to this question would be in line with other findings from embodiment research, such as showing that posture aligns

with the activation of specific emotion concepts (Oosterwijk, Rotteveel, Fischer, & Hess, 2009). Whether we find cross-channel mimicry effects other than on the face may also depend on the role of the face as part of embodied emotion representations. Because faces are the most visible and explicit element in most emotions, at least in Western culture, faces may be more prominent than other modalities, such as posture, voice, gestures, or physiology. Further, vocalizations have an on/off quality that typically requires conscious and effortful activation, and usually attracts considerable attention from others. In contrast, the face and body operate in a continuous flow, to which neither the expresser nor the observer might not always consciously attend (Scherer, 1980, 1988). Additionally, the face appears capable of expressing a range of discrete emotional states than can be successfully communicated by either tone of voice (Hawk, Van Kleef, Fischer, & Van der Schalk, 2009) or bodily postures (cf. Coulson, 2004). The more subtle, emotion-specific, and analogue nature of the facial channel might make it especially suited for the rapid, moment-to-moment matching of others' states (e.g., Niedenthal, Mermillod, Maringer, & Hess, 2010), which in turn may facilitate observers' ability to process and respond to a variety of emotion signals. This could mean that the face is the most central channel in emotional mimicry and maybe the "central processor" of affective information, including (but not limited to) emotion expressions in various channels (Niedenthal et al., 2010). In other words, the facial imitation of emotion signals from other expressive channels might have adaptive value; the attention-eliciting and on/off nature of vocalization may not be as advantageous for continuous emotion processing as compared to the relatively covert, analogue, and emotion-specific facial channel. In addition, eye contact seems a crucial factor for increasing mimicry, as initially demonstrated by the work of Bavelas and colleagues (1986), and replicated for other behavioural acts (e.g., hand movements, Wang et al., 2011). However, eye contact is not a necessary condition for mimicry, as is shown in research where gaze direction, and thus eye contact, is manipulated (see also Niedenthal et al., Chapter 3).

Conclusion

We have reviewed and discussed evidence for cross-channel mimicry of emotions in this chapter. The crucial question with which we started our review regarded the boundary conditions under which emotional mimicry operates. Can we stretch the definition of mimicry to encompass actions that are similar, but not identical, to what we have perceived? Or, should we abandon the term "mimicry" altogether, and just refer to an emotional response that can either be similar or dissimilar to an

observed expression? We have discussed different theoretical perspectives that give different answers to these questions, and most theories seem to agree that we should not restrict the term "emotional mimicry" to the exact copying of emotional expressive cues. Across several theories, there appears to be consensus that individuals process emotional information on the basis of more abstract representations, and thus the mimicry of an emotional expression should be based on such representations. This would explain the phenomenon of cross-channel mimicry. How exactly the perception of different modal cues is integrated, how this leads to the production of a mimicry response, and whether the role of the face is special in comparison with that of the voice or the body is still unclear. These questions should provide ample inspiration for future studies on the nature, ubiquity, and functions of emotional mimicry.

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