

# Nonverbal communication

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## Key points

- Definition and measurement.
- Communication models.
- Emotion expressions.
- Nonverbal behavior in dyads.
- First impressions.

## Abstract

Nonverbal behavior plays an important role for the communication of states such as emotions as well as in first impressions. The present article discusses models of nonverbal communication and then summarizes findings with regard to the nonverbal communication of emotions, via the face, voice, posture, touch and gaze. A second section describes some newer research on dyadic synchronization and a final section discusses nonverbal cues in the context of first impressions. A point is made that nonverbal behavior is embedded in a social and cultural context, which forms both the behavior and its interpretation.

## Introduction: what is nonverbal communication?

Nonverbal communication is generally defined as the aspect of communication that is not expressed in words. Under the assumption that “one cannot *not* communicate” (Watzlawick et al., 1967, p. 51) and that all movements are to some degree expressive (Wiener et al., 1972) all nonverbal behaviors are subsumed under this heading.

As this definition suggests, nonverbal communication encompasses a wide range of behaviors, some of which may not even be considered as behaviors by all. Thus, next to such more obvious nonverbal behaviors as facial, vocal and postural expressions,

touch, proxemics and gaze, we can also list physical attractiveness, facial morphology, as well as such behavioral choices as hair style, clothing, and adornment or more generally appearance. Some researchers have even included material objects which serve communicative functions within a society under this heading (for example, a parlor organ, [Ames, 1980](#)).

The scientific study of nonverbal behavior is usually traced to Darwin's seminal work "On the expressions of the emotions in man and animal" (1872/1965). Darwin's basic message was that emotion expressions are evolved and (at least at some point in the past) adaptive and he described animal and human emotionally expressive behavior in order to support this point. Other early important work in the field came from anthropology with work on kinesics, the study of body movement ([Birdwhistell, 1970](#)), and proxemics (the study of personal space, E. T. [Hall, 1963](#)). Important early overview articles were written in the early second half of the 20th century ([Duncan, 1969](#); [Miller et al., 1959](#); [Wiener et al., 1972](#)) and in 1972 a classic edited book was published by [Hinde \(1972\)](#) with chapters ranging from the communication in lower vertebrates and invertebrates ([Thorpe, 1972](#)) to cultural influences on nonverbal communication in humans ([Leach, 1972](#)).

In fact, nonverbal communication is inherently multidisciplinary and has been of interest to a variety of fields including next to psychology and linguistics also medicine, sociology, anthropology, ethology and law to name just some. As such, a wide range of studies have accumulated a rich body of literature. Research on nonverbal communication has addressed both the communication of states in humans and animals—most often emotions—and the communication of traits. The latter includes two aspects. First, the expressive features that characterize certain traits—for example, "the loud voice of extraversion" ([Scherer, 1978](#)) and second, the perceptions that yield first impressions in humans. It is, however, the case, that by and large, especially with regard to humans, this literature is heavily biased toward the study of facial expressions, and in particular facial expressions of emotions. Other research is devoted to paralinguistic aspects such as voice quality and gestures, and more recently gaze has attracted attention again. There is also some research on the contribution of hair and clothing styles to first impressions, especially with regard to job interviews and more recently in the context of wearing nose-mouth coverings in the context of the COVID-19 pandemic. The other aspects of nonverbal communication, however, have been relatively neglected.

In the present context, I will therefore emphasize research on facial expressions of emotions in humans. In what follows, I will first briefly describe how facial expressions are measured, before turning to models of nonverbal behavior and then research on the meaning of facial expressions. In this context, I discuss research on the dyadic synchronization of nonverbal behavior. A further section will be devoted to the role of nonverbal behavior in first impressions. A final section will discuss the effect of occluding parts of the face, for example, by medical face masks.

### Measurement of facial expressions

There are three primary means of measuring facial expressions. First, facial expressions can be shown to naïve judges who are asked to identify the mental state of the person. If the expressions were spontaneously shown by individuals in a social interaction, the interrater reliability for this task is usually only low to moderate and hence requires a relatively large number of judges to achieve acceptable levels of agreement. Also, judges tend to fatigue rapidly and can therefore only rate a limited number of expressions (probably not more than a 100). This implies that the logistic requirements for this method can be prohibitive ([Rosenthal, 2005](#)).

Second, facial expressions can be measured by trained coders who use a descriptive coding system such as Ekman and Friesen's Facial Action Coding System (FACS, [Ekman and Friesen, 1978](#)). This has the advantage of high reliability and precise information on the actual facial movements shown. More difficult is the task of assigning a specific meaning to the facial patterning. This procedure is also fairly time consuming (1 min of expressive behavior requires approx. 1 h of coding time). However, recent advances in computer coding of facial expressions are slowly overcoming this particular limitation (see [Sandbach et al., 2012](#)). Thus, recent research has used computer sensing algorithms to assess even subtle expressions, such as facial mimicry ([Kastendieck et al., 2022](#)).

Finally, instead of measuring overt facial behavior it is possible to use electromyography to measure the relevant facial muscle activity ([Hess et al., 2017](#)). This approach has the advantage of providing excellent time and space resolution, thus allowing for the measurement of very subtle expressions which are not or only barely visible. The disadvantage is that only a limited number of muscles can be assessed at any one time. Also, as with behavioral coding, it is not always easy to assign specific meaning to a specific muscle reaction. However, by looking at patterns and constraining the experimental situation appropriately, this problem can be solved.

### Models of nonverbal communication

The classic model of nonverbal communication is a straight adaptation of the Communication Model by [Shannon and Weaver \(1949\)](#) according to which a message is transmitted from a sender to a receiver. There is feedback from the receiver to the sender and the message may be distorted by noise. This model makes a number of assumptions, but the most problematic for human nonverbal communication is the notion that the message sent actually matches the intended message and conversely that the understood message matches the received message. In fact, it is often the case that individuals believe to have sent a clear message when this was not the case. Humans overestimate both the intensity ([Barr and Kleck, 1995](#)) and the clarity, that is, the ease of interpretability, of their expressions ([Senécal et al., 2003](#)) as well as the extent to which they are in fact observed by others (the spotlight effect; [Gilovich and Savitsky, 1999](#)).

Conversely, stereotypes and cultural and social encoding rules, that is, the application of social knowledge to what is perceived, can bias the perception of the message, such that the same nonverbal behavior when shown by a different person will be interpreted differently (Hess et al., 2009).

Scherer (1978) proposed an adaptation of the Brunswick lens model (Brunswick, 1956), in which he distinguished between an underlying state (for example happiness) and the distal indicator cues that express such a state (for example a smile) on one hand and proximal indicator cues (what the receiver sees) and the receiver's attribution (the other is happy) on the other. Importantly, this model allows also for the possibility that a signal is sent but not received, maybe due to inattention or because it was too fleeting, and conversely the notion that a signal was not sent but was perceived, as is the case when for example the stable wrinkles in a face are perceived as a dynamic expression (Hess et al., 2012).

While more satisfactory, this model still suffers from the fact that it basically describes a one-way process from the expresser to the perceiver. Yet, in reality most communicative acts happen in a specific social context set within a given culture with its norms and rules, between two or more persons who have a specific relationship. A complete model would also have to include interpersonal and intrapersonal feedback processes. Interpersonal feedback processes are the basis for behavioral synchronization between interaction partners and include emotional contagion (the "catching" of the emotions of others, Hatfield et al., 1994) and mimicry (the imitation of the nonverbal behavior of others, Hess et al., 1999). Intrapersonal feedback processes include, for example, facial feedback (the retroaction of facial expressions to emotional states, Ekman et al., 1980). Hess et al. (1999) have proposed a model for dyadic communication, which includes the above elements (see Fig. 1). However, what even this very complex model does not include other than as a cloud above everything, is the social context of the interaction. Yet, the social context: who interacts with whom and where, can exert strong influences on what is sent as well as on what is perceived. In fact, it can be argued that social context becomes a determining factor in many everyday interactions.

### Emotion perception and social context

There are two principal strategies for decoding emotion displays (Kirouac and Hess, 1999). First, in the absence of any contextual information, the sender's expressions can be used to draw inferences regarding his or her presumed emotional state using a pattern-matching approach (Buck, 1984). However, a second strategy depends upon the knowledge that the perceiver possesses regarding both the sender and the social situation in which the interaction is taking place. This information permits the perceiver to take the perspective of the encoder and helps him or her to correctly infer the emotional state that the sender is most likely experiencing. In everyday life, emotion expressions are often weak, elusive or blended, resulting in a signal that often is ambiguous (Motley and Camden, 1988). This ambiguity itself suggests that significant interpretive work is needed. One source of relevant knowledge are

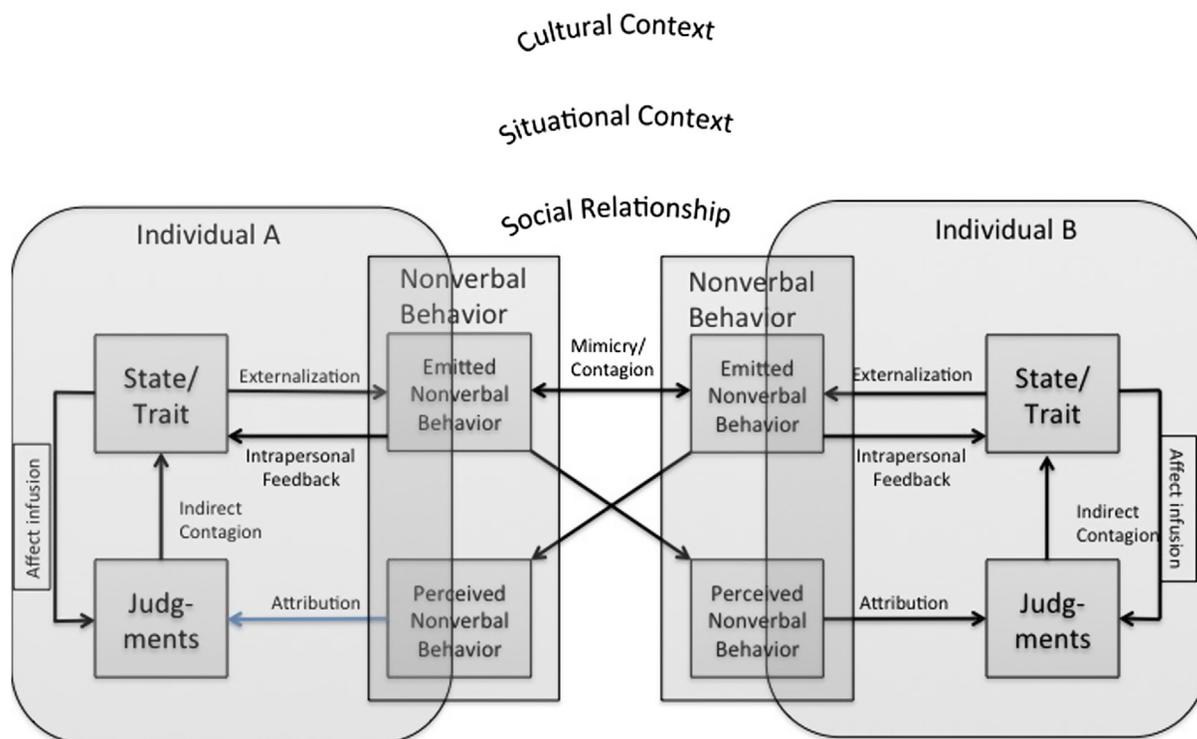


Fig. 1 Nonverbal communication as a dual stream. Adapted from Hess et al. (1999).

prior experiences with an interaction partner. But even if no firsthand knowledge about an interaction partner is available, knowledge about the social context of the interactions, the cultural rules and norms that guide the interaction, and stereotype knowledge about the interaction partner can all be sources of relevant information. Such a view of emotion communication transforms the receiver from a passive receptacle of information into an active “constructor” of information.

In recent years, the influence of context on emotion communication has been highlighted (Barrett et al., 2011; Hess and Hareli, 2015). In fact, emotional interactions always take place in a (social) context. Social context influences both communicative behavior through socio-cultural display rules (e.g., Matsumoto et al., 2008) and the decoding of the behavior via matching decoding rules (Buck, 1984). Knowledge about the social group membership of the expresser, another aspect of context, can influence the perception of emotions as well (e.g., Hugenberg and Sacco, 2008; Kirouac and Hess, 1999).

Some researchers have even gone so far as to suggest that emotional facial expressions per se do not have meaning and depend on context for sense making (Hassin et al., 2013). However, this is an overstatement. In fact, emotion expressions can actually provide information about context as well. In one study, participants were able to deduce the rules of a made-up ball game based on the facial responses of the “spectators” (Hareli et al., 2019). Thus, both context and expression contribute to the social judgment by the perceiver (Hess and Hareli, 2018).

## Emotion expressions

As mentioned above, the focus of nonverbal communication research has been the nonverbal expression of emotions. In the mental health context this includes questions regarding both the expression and recognition of emotions in general or some classes of emotions in specific by individuals suffering from a variety of psychological problems. This may include the recognition of emotions by individuals suffering from autism-spectrum disorder (see Uljarevic and Hamilton, 2013, for a review), or Parkinson’s disease (Gray and Tickle-Degnen, 2010) or impairments in emotional expressivity in schizophrenia (Mandal et al., 1998). However, what all of these studies have in common is the notion that emotion expressions reflect an internal state, and more precisely they reflect an emotional state, which may or may not be expressed and which may or may not be correctly recognized. However, this notion is not undisputed.

### What do emotion expressions express?

Darwin (1872/1965) considered emotion expressions to be just that – an expression of an underlying emotional state which in turn readies the organism for dealing with an emotional event. Whereas some processes (e.g., increased heart rate) tend to not be visible to perceivers, others (e.g., postural changes and facial expressions) are. To him there was an evolutionary advantage in the honest signaling of internal emotional states to the social environment.

Yet, Darwin’s view of emotion expressions as the visible part of an underlying emotional state was disputed and rejected by those who considered facial expressions as social or cultural signals only. Also, a number of studies in the early years of the 20th century came to the conclusion that emotions can only be recognized at chance levels, whereas other studies found good recognition rates. This disparity in findings led Bruner and Tagiuri in their 1954 *Handbook of Social Psychology* article to state that “... the evidence for the recognizability of emotional expressions is unclear” (p. 634). They concluded that, if anything, emotional facial expressions are culturally learned. This view remained basically unchanged until 1972 when Ekman, Friesen, and Ellsworth wrote a book to explicitly vindicate Darwin’s idea that emotional expressions are universal and directly associated with an underlying emotional state. This book and related research by Ekman and colleagues as well as Izard (Izard, 1971a,b) were successful in making Darwin’s view predominant in the field.

However, this view continued to be challenged over the years. Thus, according to Fridlund’s Behavioral Ecology Theory (Fridlund, 1994) for emotion expressions to be truly useful as a communicative signal they should be linked to the organism’s social motives rather than to quasi-reflexive emotions. He concludes that emotion expressions are to be considered as unrelated to an underlying emotional state and that emotional facial expressions should be viewed as communicative signals only and not as a symptom of an underlying state.

This assertion, however, is also problematic. Parkinson (2005), for example, has questioned why a specific display should be linked to a specific motive, or why communicating motives should be more adaptive than communicating emotions since when such motives are feigned they can also be used to cheat. His extensive review concludes that facial expressions may well serve as both symptoms of an underlying state and communicative signals. This notion was first empirically tested by Hess et al. (1995) who showed in a partial replication of Fridlund (1991) that smiles vary both as a function of social context (and thus social motives) and of the emotional content of the stimulus. These findings were extended by Jakobs and colleagues to different contexts and emotions (Jakobs et al., 1999a,b, 2001). More recently, Scarantino (2019) has expanded this view. According to Scarantino emotion expressions have four communicative functions. Apart from information about emotional states (expressives), they signal *information about what the organism might do next*, i.e., commissives or action tendencies (Frijda, 1987; Frijda et al., 1989), *information about antecedents* implied by appraisal patterns associated with specific emotions (e.g., Fontaine et al., 2013; Roseman, 1991; Roseman et al., 1990)—declaratives—as well as *information about what the expresser wants the perceiver to do*—imperatives or appeals (Scarantino et al., in press). As such, emotion expressions are inherently poly-valent and in different interactions different communicative functions may dominate.

## Moderating factors for emotion expression and recognition

A number of influences on nonverbal communication have been studied over the years. Of foremost interest—as alluded to above—was the question of whether there are cultural differences in the nonverbal communication of emotions. Another often raised issue regards gender differences in nonverbal communication, a question that overlaps with the question regarding status differences. These two issues will be briefly outlined next.

### Culture: are emotional facial expressions universally recognized?

As mentioned above, Darwin (1872/1965) and later Ekman and colleagues (Ekman, 1972; Ekman et al., 1987) and Izard (1971) made strong claims that at least some, basic, emotions are universally recognized, based on the notion that the expressions have developed due to evolutionary constraints and hence are in a continuity across mammalian species and universal across human cultures. Ekman and colleagues in fact defined basic emotions as those for which prototypical cross-cultural expressions have been identified (happiness, sadness, fear, anger, disgust, surprise and more recently contempt). Yet, a number of discussions in leading journals took issue with the methodology employed in the studies that found support for universality (e.g., Ekman, 1994; Izard, 1997; Russell, 1991; Russell, 1994, 1995) and social constructivist approaches to emotion emphasized differences in emotion vocabularies and disputed universality on these grounds (e.g., Armon-Jones, 1985; Wierzbicka, 1992).

### Cultural dialects

About 20 years ago, strong meta-analytical evidence for an intermediate view emerged and led to the formulation of Elfenbein and Ambady (2002). They argue that the universal language of emotion expression has local dialects that differ subtly from each other. A study by Elfenbein et al. (2007) comparing expressions from Quebec and Gabon found empirical evidence for such dialects. A decoding study also reported by these investigators showed that individuals were better at decoding expressions from their own group but also showed that they were considerably better than chance accuracy for expressions from the other group. Consistent with an appraisal approach to emotional expressions, dialects may be explained by postulating subtle differences in appraisal patterns due to differences in cultural constraints, values and norms that reflect themselves as differences in facial expression (Hess et al., 2013).

In sum, the evidence to date suggests that emotion expressions are by and large universally recognized—at least with regard to emotions that have been categorized as basic. However, the evidence is also clear that many emotions are not universally expressed in exactly the same manner—albeit with enough overlap that they can be recognized well across cultures and subgroups.

### Cultural rules and norms

A more important impact on emotion expression and recognition is presented by social rules and norms. Norms may have an indirect effect because they guide attention to specific aspects of a situation. In fact, any given situation tends to contain a variety of potential emotion relevant signals. Thus, in the same situation, different people may focus on different cues, which they also may appraise differently. Appraisal theories of emotion (e.g., Frijda, 1986; Scherer, 1987) posit that an emotional state results from the appraisal of the situation according to the motivations, values and resources of the individual. As different cultures have different value systems, it should not be a surprise that the same situation may elicit different emotions in different cultural contexts.

In this sense, members of collectivist cultures tend to react more to external, socially sharable elements of a situation, whereas members of individualist cultures tend to react more to internal cues (Suh et al., 1998). This notion explains why in North America positive feelings tend to be associated with personal achievement, whereas in Asian countries they are linked to interpersonal events (Uchida et al., 2004). Another example of the indirect influence of norms, can be found in those African countries where a strong belief in witchcraft exists. There, events such as sickness and death are often perceived as immoral, unfair, and as caused by human agency and not by fate and hence elicit anger instead of sadness (Scherer, 1997).

The most direct impact of norms is posed by those social norms that directly pre- and proscribe certain emotion expressions in certain contexts. Ekman and Friesen (1971) called these norms display rules. Related notions have been expressed in the organizational literature under the heading emotional labor (Hochschild, 1983) or emotion work (Morris and Feldman, 1996) which describes the aspect of an employee's work that focuses on showing prescribed emotions (e.g., "service with a smile"). These norms are generally perceived as obligatory and their transgression is usually socially punished. They are typically learned early in the socialization process (Saarni, 1999). Importantly, these norms vary with culture. For example, in North America it is more socially acceptable to show anger to close others (friend, family) than to strangers, whereas in Japan the converse is the case (Matsumoto, 1990).

Finally, social norms do not only regulate who shows which emotion when, but also the specific form the emotion expression takes. For example, it is acceptable for women but not for men to cry when angry (Crawford et al., 1992). In this sense Warner and Shields (2007) have coined the notion of "manly" emotions to describe a type of highly controlled emotion expressions that represents a desirable expressive norm in North America.

### Gender and status

Differences in the expression and recognition of emotion expressions can also be found with regard to status and gender of both expresser and decoder. Generally speaking, women are more emotionally expressive than men (Fischer, 1993). This is best established for smiling, women smile more, and they smile more in situations where they experience negative affect. This difference emerges in childhood and gets stronger by the time the women reach adulthood (see also, Hess et al., 2002). By contrast, men are perceived, and perceive themselves as more likely to express anger. Interestingly, in experimental situations where anger is induced, this difference disappears (Fischer, 1993).

The reason for these well-established gender differences can be traced to two – nonexclusive – sources: differences in status and differences in social roles. Thus, Henley (1977, 1995) as well as LaFrance and Hecht (Hecht and LaFrance, 1998; LaFrance and Hecht, 1995) emphasize the inherent difference in status between men and women, which maintains to this day even in egalitarian cultures. Henley in particular, bases her argument on the assumption that the human smile is a homologue of the primate *silent-bared-teeth display*, which typically is used as a sign of submission. From Henley's perspective smiles also signal submission and hence women as the lower status gender tend to smile more. This model may be a bit too simplistic though. On one hand, people who smile tend to be rated as more dominant (Knutson, 1996) and there is only limited evidence linking smiling as such to status and power. In fact, there are many different forms of smiles that serve different social functions, with the submissive smile being just one (Niedenthal et al., 2010). In this vein, Brody and Hall (2000) propose a more complex model, which includes social norms regarding gender adequate behavior, social expectations, but also a stronger trend toward positive affect experience in women.

As regards anger expressions in men, status seems to be more clearly relevant. Thus, Averill (1997) considers power an “entrance requirement” for anger. The notion being that the anger display of a person who does not have power to back up the threat is less effective and in fact less legitimate. As an example, one may think of the angry temper tantrum of a child versus an angry expression of a member of a biker gang. This view concords with the position of appraisal theories of emotion which consider coping potential—the power to redress a situation—as the key appraisal for anger (Ellsworth and Scherer, 2003).

### Emotion expression in other channels

As mentioned above, even though facial expressions of emotions are the most frequently studied channel for emotion expression, emotions can also be expressed through other channels. In what follows, I will give a short overview of research on emotion expression through voice, posture, touch and gaze.

#### Voice

Research on emotion expression in the voice has been ongoing since it has become technically feasible to record voices. However, until about the turn of the millennium, the rate of studies per year in this domain remained low but has since then seen a definite increase. One important factor for this change is the relative ease with which it is now possible to record and analyze vocal stimuli. In fact, just like research on posture and touch, research on voice gained impact with the advent of affective computing and the accompanying interest in affective sensing, the automatic recognition of emotions (Schuller et al., 2011).

There are two main approaches to classifying emotional speech. On one hand, human perceivers can be asked to listen to voice excerpts and decode the emotions expressed. On the other, acoustic features of the emotional voice such as pitch, duration and intensity or voice quality features can be measured and related to the intended emotion (Juslin and Scherer, 2005). Research employing the judgment study paradigm was able to ascertain that basic emotions at least are well recognized in speech, but early attempts at acoustic analysis were not always as successful (Banse and Scherer, 1996). However, newer approaches in affective computing using more sophisticated analysis algorithms have started to make inroads in that regard (Schuller et al., 2011).

#### Posture

Darwin's (1872/1965) descriptions of emotion expressions contained many descriptions of emotional postures in both humans and animals. However, in later years emotion specific postures were rarely studied. In fact, Ekman and Friesen (1974) considered postures only indicative of the intensity of an emotion and not of its quality. Yet, even early studies by Bull and colleagues (e.g., Bull and Gidro-Frank, 1950) suggested that some basic emotions can be recognized from postures. In recent years interest in postures has blossomed again. Work on static expressions suggests that at least the basic emotions can be well recognized from postural cues alone (see Atkinson, 2013, for a review). Other work has shown that basic emotions can also be recognized from gait at levels that are comparable to facial emotion recognition and ranging up to 92% correct for sad and fearful expressions (Schneider et al., 2013). In addition, emotions such as pride and others that traditionally were not considered as basic (mainly because they are not associated with a prototypical and unique facial expression) seem by contrast to have a universal postural component (Tracy and Matsumoto, 2008). Further, there is evidence of cross-model mimicry of postures such that individuals who observe emotional postures tend to show congruent facial expressions in response (Magnée et al., 2007), suggesting that observers react to postural emotion cues in much the same way as to facial emotion cues.

## Touch

Despite early research suggesting a relationship between emotion and touch (Clynes, 1977), research on touch has been mostly focused on its use as a function of intimacy (Burgoon, 1991; McDaniel and Andersen, 1998) and as a cue to relative power. The latter is based on Henley's (1973) notion of a touch privilege for individuals higher in power. However, the findings in that regard remained mixed. Even though there is some evidence for differences in touching between men and women, these differences are not systematically related to power or status differences (Hall, 1996; Hall and Veccia, 1990). However, more recently, touch as an emotional signal has again been studied. Thus, touch has been found to communicate anger, fear, disgust, love, gratitude, and sympathy at better than chance levels (Hertenstein et al., 2006) even though recognition also depends on gender (Hertenstein and Keltner, 2011). There is also evidence that squeezing touch is better for communicating unpleasant and aroused emotional intention, whereas finger touch is better for communicating pleasant and relaxed emotional intention (Rantala et al., 2013).

## Gaze

Gaze direction is something not usually thought to be part of the emotional expression itself (e.g., Ellsworth and Ross, 1975; Fehr and Exline, 1987). Indeed, nearly all expression decoding studies have used stimuli where the expresser's gaze is directed at the perceiver. The general argument made concerning the effect of direct gaze is that it plays an important role in the perception of the intensity of the emotion but not in the perception of its quality (e.g., Argyle and Cook, 1976; Kleinke, 1986; Webbink, 1986). An obvious reason this might be the case is that direct gaze signals that the perceiver is the object of whatever emotion is being displayed by the expresser and thus captivates attentional resources (Cary, 1978; Ellsworth and Ross, 1975; Grumet, 1999).

By contrast, research by Adams and his colleagues (Adams et al., 2003; Adams and Kleck, 2003, 2005) support the *shared signal hypothesis*, demonstrating that the gaze direction of the expresser can affect the efficiency with which a given display is processed as well as determine the quality of the emotion that will be perceived in a blended or ambiguous expression. They argue that when different facial cues such as the specific expression and the direction of gaze share the same signal value (e.g., approach or avoidance) the shared signal facilitates overall processing efficiency. Others have reported evidence supporting perceptual integration in the processing of these cues. These studies also demonstrate that when gaze and emotion are not of relatively equal discriminability, direct gaze effects do occur (e.g., Graham and LaBar, 2007). Thus, gaze direction appears to not only influence emotion perception but to do so through the processes of direct perceptual integration and indirect attention capture.

## Nonverbal behavior in dyads

As mentioned above, research on nonverbal behavior has long focused either on the factors that influence how the expresser encodes certain traits or states or on the factors that influence how the perceiver decodes these traits or states. Yet, social interaction implies an interplay of encoding and decoding. One of the phenomena that occur in a dyadic context is behavioral synchronization. Early research on speech for example, noted that as an interaction progresses, the interaction partners converge with regard to certain characteristics of speech such as loudness and speed. The person who initially spoke louder and faster becomes softer and slower and the converse for the other person. This convergence is linked to the rapport between the interaction partners (Giles and Smith, 1979). Other research looked at behavioral synchronization and its effect on experienced or perceived rapport (Bavelas et al., 1986; Bernieri and Rosenthal, 1991). This research was taken up and made popular by Chartrand and Bargh (1999) who coined the term chameleon effect to describe the similarities of nonverbal behaviors such as foot tapping and face touching between two interaction partners. As behavioral synchronization fosters affiliation it has also been referred to as "social glue" (Lakin et al., 2003).

## Facial mimicry

A related but different phenomenon is facial or emotional mimicry which refers specifically to the imitation of emotional behavior (Hess and Fischer, 2013). Facial mimicry is usually considered a form of affective empathy or a "low road" in the empathy process (Walter, 2012). It has also been suggested that imitation is required for the understanding of the emotions of others (Lipps, 1907) a notion that resonates with mirror neuron accounts of human emotion recognition (Goldman and Sripada, 2005). There is little evidence that emotional mimicry is a necessary element of emotion recognition, however, in certain situations the blocking of mimicry can result in a reduction in decoding accuracy (see Hess and Fischer, 2013, for a review). Yet, as in these studies usually only the mouth region was blocked, this may also be mediated by the blocking of sub-vocalization.

Emotional mimicry is often conflated with other dyadic emotional phenomena such as emotional contagion and empathy. It can also be confused with other phenomena such as social referencing (see e.g., Klinnert et al., 1983) and parallel emotion elicitation, which can also result in matching facial expressions between two individuals (cf. Hess and Fischer, 2013). The main difference between the last two on one hand and contagion, mimicry and empathy on the other, is the source of the affect expression. In social referencing and parallel emotion elicitation the source is an external event. In emotional mimicry, emotional contagion, and empathy the source of the reaction is the interaction partner. Hatfield and colleagues broadly define emotional contagion as: "The tendency to automatically mimic and synchronize expressions, vocalizations, postures, and movements with those of another person and, consequently, to converge emotionally" (Hatfield et al., 1992, p. 153). They also refer to this process as the tendency to

“catch” another person’s emotions. That is, Hatfield and colleagues include mimicry in their definition and also refer to mimicry as “primitive emotional contagion” and one of the routes via which we “catch” others’ emotions. In this view, mimicry would be one causal route to contagion. However, the relationship between the two is not as simple as that. There are not many studies that assess both mimicry and contagion in the same experiment, but those that did, found evidence for both, but not always for the same emotions or in a tight mediation (Hess and Blairy, 2001; Lundqvist and Dimberg, 1995). However, a more recent study which used a longer expressive sequence than is usually found in mimicry research, found some evidence of linkage (Olszanowski et al., 2020). Wróbel and Imbir (2019) suggest that other processes such as social appraisal (Manstead and Fischer, 2001) may also elicit contagion. The exact boundary conditions between these two processes are, however, as of yet not established.

Affective empathy has been defined as a process during which the perception of another’s emotional state generates a matching state in the perceiver (see e.g., de Waal, 2008). Both emotional mimicry and contagion have been considered as forms of affective empathy (Hoffman, 1984). Yet, empathy on the one hand and mimicry on the other should be distinguished because empathy does not necessarily require congruent emotional states or emotional displays, which is a defining characteristic of mimicry and contagion, respectively. In fact, it can be argued that in many situations it would be counterproductive for an empathic person desiring to help someone in distress to experience the same debilitating emotion as the person that requires the help.

Another difference relates to our awareness of the source of the affect. Specifically, Lamm et al. (2007) conclude that for a subjective experience to be labeled empathy, the observer must recognize that the felt emotion is a response to the observed other. This is not the case for mimicry or contagion, which are generally considered automatic processes which operate largely outside of consciousness, even though they are in principle accessible.

### **The social regulatory function of mimicry**

Emotional mimicry seems to serve a social regulatory function in dyads (see Hess and Fischer, 2013) and depends on the relationship between interaction partners and more generally on the goals and intentions of the expresser. Thus, whether the relationship with the other is cooperative or competitive (Lanzetta and Englis, 1989; Weyers et al., 2009), or whether one identifies with the expresser as a member of a specific group (Bourgeois and Hess, 2008) moderates mimicry. In a competitive or hostile interaction, facial reactions are also more likely to be a reaction *to* rather than *with* the emotion displayed by the other person. These relationships inhibit mimicry (Lanzetta and Englis, 1989; Weyers et al., 2009) or may even elicit facial displays that are incongruent with the observed expression, such as smiling when seeing the pain or fear display of a competitor or a disliked out-group member (Lanzetta and Englis, 1989). More generally, a negative attitude toward the target tends to inhibit emotional mimicry and increases the interpretation of the emotional signal as hostile (e.g., Hutchings and Haddock, 2008). Interestingly, Likowski et al. (2008) demonstrated that this is the case even when attitudes are newly formed by narratives about a specific character. In line with affiliation at the individual level, affiliation at the group level also fosters mimicry. Thus, individuals are more likely to mimic the emotional reactions of in-group members than those of out-group members (Bourgeois and Hess, 2008; Van der Schalk et al., 2011).

More recently, there has been an increased interest in top-down processes, such as social judgments, that can influence perception-action coupling, including mimicry (Cracco et al., 2022). Overall, evidence for such processes is stronger for social behaviors such as mimicry than for the more cognitive imitation-inhibition task (Brass et al., 2000) in which the execution of a voluntary hand gesture is affected by the automatic imitation of another hand making the same or a different gesture. In particular, social judgments about the appropriateness of an emotion expression influence emotional mimicry such that expressions that are considered to be inappropriate are mimicked less or not at all (Kastendieck et al., 2020; Mauersberger et al., *in press*). This effect is mediated by a perception of social distance toward someone who does not adhere to emotion norms.

In sum, emotional mimicry has relational implications: emotionally mimicking others can create 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 (Hess, 2021).

### **First impressions**

In an early chapter on human nonverbal communication, Argyle (1972) listed appearance as one domain of study, with the notion that appearance can be modified for self-representational goals. In fact, people rapidly and spontaneously make judgments about the personality of others based on appearance cues (see e.g., Kenny, 2004; Todorov and Uleman, 2002, 2003). One classic study found that varying one aspect only of a photo (for example, adding glasses) impacts on the perceived personality of the depicted person (Thornton, 1943). But appearance also sends signals regarding the social group membership of the person, including such aspects as gender, age, ethnicity, but also status (Bjornsdottir and Rule, 2017).

Often, correct judgments of personality characteristics can be made based on very “thin slices” of behavior, that is, extremely short exposures to what may appear to be minimal information (Ambady et al., 1995; Ambady and Rosenthal, 1992), including static photos of only the eye region (Rule et al., 2009). One important source of such judgments is facial appearance (Zebrowitz, 1997). One line of research, which has a long history, has focused on physical attractiveness and on the stereotype and halo effects that associate attractiveness with other desirable traits leading to the “what is beautiful is good” stereotype (Felson, 1979; Reis et al., 1990).

Another line of research has focused on the static aspects of facial and bodily appearance cues that can signal general dispositions and behavioral intentions. For example, a square jaw, high forehead, or heavy eyebrows cross-culturally connote social dominance

(Keating et al., 1981a,b; Senior et al., 1999). On the other hand, a rounded face with large eyes, thin eyebrows, and low facial features—a babyface—connotes approachability (e.g., Berry and McArthur, 1985).

These behavioral dispositions are of central importance for our interactions with others as they allow us to judge vital social characteristics of an individual we may interact with. In hierarchical primate societies, for example, highly dominant individuals pose a certain threat insofar as they can claim territory or possessions (food, sexual partners, etc.) from lower status group members (Menzel, 1973). Hence the presence of a perceived dominant other should lead to increased vigilance and a preparedness for withdrawal (Coussi-Korbel, 1994). In contrast, an affiliation motive is associated with nurturing, supportive behaviors and should lead to approach when the other is perceived to be high on this disposition.

Interestingly, the same information that is transmitted by relatively static morphological cues can also be transmitted by movement behaviors, including facial expressions. Of these, anger, happiness, and fear displays have been shown to be associated with perceived dominance and affiliation. Accordingly, drawing the eyebrows together in anger leads to increased attributions of dominance, whereas smiling leads to increased attributions of affiliation (Hess et al., 2000; Knutson, 1996). At the same time, anger expressions are perceived as threatening (e.g., Aronoff et al., 1992), whereas smiles are perceived as warm, friendly, and welcoming (see e.g., Hess et al., 2002). Similarly, it has been argued that fear expressions elicit affiliative reactions in conspecifics (Bauer and Gariépy, 2001; Marsh et al., 2005). This notion of a perceptual overlap between emotion expressions and certain trait markers, which then influences emotion communication, has been taken up by Zebrowitz (see Zebrowitz and Montepare, 2006) as well as Hess et al. (2007, 2008, 2009). Derived from this is the notion that emotional expressions can be used to infer behavioral intentions (Hareli and Hess, 2010) and that the resemblance of certain facial features to emotion expressions drives the attribution of behavioral intentions to some types of faces (Zebrowitz et al., 2003). That appearance cues can have lasting effects on individuals was shown for example by Mueller and Mazur (1996) who found the perceived dominance of West Point cadets, based on photos alone, to be a predictor of later military rank. Face-based first impressions—even those based on a still photograph—can be persistent even when pertinent behavioral information is also available (Gunaydin et al., 2017).

### Obscuring the face

With the advent of the COVID-19 pandemic, and the wide-spread mask mandates that followed, the question of whether and how facial masks hinder emotion communication and affect first impressions has attracted considerable research interest.

Specifically, masks cover the mouth region which is an important source of emotional information (Boucher and Ekman, 1975). As such, emotion expressions in faces covered with surgical masks tend to be recognized less well than when the face is uncovered in both adults (Carbon, 2020; Grundmann et al., 2020; see Calbi et al., 2021, for an exception) and children (Ruba and Pollak, 2020). In studies that assessed the intensity of the perceived expression, masked expressions were rated as less emotionally intense (Kas-tendieck et al., 2022; Tsantani et al., 2022). By contrast, the perceived intensity of secondary emotions increased (Tsantani et al., 2022), suggesting that the resulting emotion signal is more noisy. There is evidence that exposure to masks in social interactions changes the use of emotion cues, such that more eye region cues are processed (Barrick et al., 2021).

Yet, masks are also nonverbal social signals in their own right. Pre-pandemic data suggest that face masks can have ambivalent social consequences. Surgical mask wearers were perceived as competent but unemotional, and their emotions as less intense than when similarly covered with scarfs or niqabs (Hareli et al., 2013). Moreover, medical doctors who wore surgical masks during consultations were perceived by patients as less relationally empathic (Wong et al., 2013). Peri-pandemic findings show a somewhat different effect on person perception. For example, surgical mask wearers were more likely to be perceived as ill but also as more trustworthy and socially adequate (Olivera-La Rosa et al., 2020) as well as approachable (Guo et al., 2022). Hence, overall, in the context of the recent pandemic, wearing masks seems to result in more positive appraisals. However, this is not always the case. Malik and colleagues found a reduction in of trust in advice given by someone wearing a mask, this effect is stronger among those whose who experienced economic risks due to COVID-19 and those with below-average normative beliefs about mask wearing.

Interestingly, facial masks seem to also increase facial attractiveness (Parada-Fernández et al., 2022). Even though the general effect of showing only the upper face on attractiveness is not mask specific (Pazhoochi and Kingstone, 2022), the effect is strongest for medical masks (Hies and Lewis, 2022), suggesting a social signal value effect for attractiveness as well. Thus, face masks, like those common in the pandemic, are likely to serve as social signals for person perception. The precise meaning of the signal likely depends on the perceivers' own stance toward mask wearing.

### Summary

Nonverbal behavior plays an important role for the communication of states such as emotions as well as in first impressions. Nonverbal communication is imbedded in a social context, which influences how expressions are perceived and interpreted. This context is defined through the relevant cultural rules and norms but also by the social group membership of the interaction partners.

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