

Facial Expression and Emotion

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Cross-cultural research on facial expression and the developments of methods to measure facial expression are briefly summarized. What has been learned about emotion from this work on the face is then elucidated. Four questions about facial expression and emotion are discussed: What information does an expression typically convey? Can there be emotion without facial expression? Can there be a facial expression of emotion without emotion? How do individuals differ in their facial expressions of emotion?

In 1965 when I began to study facial expression,¹ few thought there was much to be learned. Goldstein (1981) pointed out that a number of famous psychologists—F. and G. Allport, Brunswik, Hull, Lindzey, Maslow, Os-good, Titchner—did only one facial study, which was not what earned them their reputations. Harold Schlosberg was an exception, but he was more interested in how to represent the information derived by those who observed the face than in expression itself.² The face was considered a meager source of mostly inaccurate, culture-specific, stereotypical information (Bruner & Tagiuri, 1954). That this contradicted what every layman knew made it all the more attractive. Psychology had exposed the falseness of a folk belief, a counterintuitive finding.

The late Silvan Tomkins (1963) was virtually the only contrary voice. He convinced me to extend my studies of nonverbal behavior from body movement to the face, helping me design my initial cross-cultural studies. Tomkins also advised Carroll Izard in the design of similar studies at the same time. He did not tell either of us about the other, which helped the science because it provided independent replications but was an unwelcome surprise when we learned that we had not been alone in our discoveries.

We each found high agreement across members of diverse Western and Eastern literate cultures in selecting emotion terms that fit facial expressions. Izard (1971) added evidence that cross-cultural agreement was preserved for most emotions when subjects were allowed to choose their own words to describe the feelings shown in the expressions. We (Ekman & Friesen, 1971) extended the findings to a preliterate culture in New Guinea, whose members could not have learned the meaning of expressions from exposure to media depictions of emotion. We also found agreement about which expressions fit with different social situations, such as the death of a child, a fight, and seeing friends.

Friesen and I (Ekman, 1972; Friesen, 1972) also extended the findings of how people interpret expressions to the study of how and when people show expressions.

We found evidence of universality in spontaneous expressions and in expressions that were deliberately posed. We postulated *display rules*—culture-specific prescriptions about who can show which emotions, to whom, and when—to explain how cultural differences may conceal universals in expression, and in an experiment we showed how that could occur.

In the last five years, there have been a few challenges to the evidence of universals, particularly from anthropologists (see review by Lutz & White, 1986). There is, however, no quantitative data to support the claim that expressions are culture specific. The accounts are more anecdotal, without control for the possibility of observer bias and without evidence of interobserver reliability. There have been recent challenges also from psychologists (J. A. Russell, personal communication, June 1992) who study how words are used to judge photographs of facial expression. However, no one to date has obtained strong evidence of cross-cultural disagreement about the interpretation of fear, anger, disgust, sadness, or enjoyment expressions. There is no instance in which 70% or more of the people in one cultural group judged a picture as showing one of these emotions and a similar percentage of the people in another cultural group judged the same expression as showing a different one of these emotions. (See Ekman, 1989, for a review of the evidence on uni-

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¹ In some of my earliest writing, I avoided the term *expression* and instead used the more awkward phrase *facial behavior* to avoid the implication that an inner state is being manifested externally. I have reverted to *facial expression* because it is more felicitous, although it should be clear that in my view (Ekman, 1977) expression is a central feature of emotion, not simply an outer manifestation of an internal phenomena.

² Schlosberg told me that to avoid bias he had never looked at the faces he asked his subjects to judge.

versality; see also Brown, 1991, for an analysis of the wider issues and arguments about universals of any kind.)

This evidence of universality both required and justified nearly a decade of work to develop methods for measuring the movements of the face. We (Ekman & Friesen, 1976, 1978) developed the Facial Action Coding System, which was the first, and still is the only, comprehensive technique for scoring all visually distinctive, observable facial movements. A few years later, Izard (1979) published his own technique for selectively measuring those facial movements that he thought were relevant to emotion. A number of investigators have also measured electrical activity in the facial muscles (see Ekman, 1982, for a review on facial measurement).

The findings on universality, the development of methods to objectively measure the face, and the many studies of facial expression that were done subsequently have taught us not just about facial expression but also about emotion. I will explain nine different contributions that the research on facial expression—in particular, the universals finding—has made to our understanding of emotion. Then I will raise four major questions about facial expression in emotion, some of the possible answers, and directions for research.

What We Have Learned About Emotion From the Face

1. *Study emotion.* The most important effect of the evidence on universals in facial expression was to contribute to reawakening interest in emotion. Dormant for many years, research on emotion now is one of the most rapidly growing areas, with activity in clinical, developmental, personality, physiological, and social psychology. Much of the current work rightfully does not focus on the face, although some investigators who focus on other matters use the face as a marker of when an emotion occurs.

2. *Consider both nature and nurture.* The findings on facial expression also encouraged some of those who became interested to view emotion as a psychobiological phenomenon, influenced by our evolutionary heritage as well as by our current circumstances. Even within the more narrow confines of expression, an explanation of what was found required consideration of the influences of both nature and nurture (Ekman, 1972, 1977, 1992a). Twenty-seven years ago, when the work on universals began, psychology was still focused nearly exclusively on what is learned, considering only nurture and largely ignoring the influence of nature. Although the findings on universals in expression were inconsistent with that frame, they did appeal to another prejudice then fashionable—to credit only that which is palpably observable.

3. *Search for emotion-specific physiology.* A focus on universals in expression was inconsistent with the then-reigning view that all that differentiates one emotion from another is our expectations about what we should be feeling. Despite failures to replicate Schacter and Singer's (1962) experiment, flaws in the design of that study, and contrary evidence, it was very influential. All that distinguished one emotion from another, they proclaimed, was

cognition about the social setting; physiological activity varied only in the extent not in the nature of the emotional arousal. But once expressions were found to be emotion specific, it made sense to reexamine the issue of whether there might also be emotion-specific physiological changes.

Although the evidence on universals in expressions could not prove that these expressions have evolved, those findings, together with the observation of similarities in some expressions between humans and some other primates, certainly increased the viability of an evolutionary perspective on emotion. Such a perspective would expect that emotion-specific changes in autonomic physiology would have evolved to serve the quite-different adaptations that are likely in emotions such as fear and anger. A new generation of investigators are examining again the possibility of emotion-specific autonomic and central nervous system activity. I have been a collaborator in some of this work, in which we use facial measures to identify when emotions occur. (For a review of current work on the biology of emotion, see Davidson & Cacioppo, 1992.)

4. *Specify the events that precede emotions.* Most controversial in our study of emotion-specific physiological activity was our discovery (Ekman, Levenson, & Friesen, 1983) that voluntarily making one of the universal facial expressions can generate the physiology and some of the subjective experience of emotion. Of course, making a face is not how emotions usually are brought forth. Emotions typically occur in response to an event, usually a social event, real, remembered, anticipated, or imagined. The findings of both universals and cultural differences in the situations in which facial expressions occur focused attention on the events that call forth emotion. There is now cross-cultural data on what people report are the antecedent events for specific emotions (Boucher, 1983; Scherer, Summerfield, & Wallbott, 1983). Observational data on the antecedents of emotion are much more limited but are growing in studies of early development and in studies of marital interaction. Measures of facial behavior are a central part of those endeavors.

Any close observer of emotional expression must develop an account that allows for both commonalities in the events that call forth an emotion and the enormous individual differences in which events call forth different emotions. Not every event calls forth an emotion, nor does an event call forth the same emotion across individuals, and yet there are some common features. Tomkins's (1963) proposal that emotional events produce changes in the density of neural firing that parallel features of the event has been regarded skeptically by neuroscientists. Other quite different accounts of how events are appraised is one of the most active current areas of theory and research (see Lazarus, 1991, for a review).

5. *Examine ontogeny.* It was consistent with an evolutionary account of universals in facial expression to expect that emotions might appear much earlier in infancy than had been previously thought. The tools for

measuring the face provided the means for identifying when emotions, or at least expressions, might be occurring. This is another very active area of research, although there is still argument about just when each emotion is first evident (Camras, Malatesta, & Izard, 1991; Izard, Huebner, Risser, McGinnes, & Dougherty, 1980; Oster, Hegley, & Nagel, 1992).

6. *Examine more than verbal behavior.* The need to measure the face (and voice) is obvious in infancy when speech is not available. However, in the older child and adult it is equally important not to rely only on the more easily obtained questionnaires, on accounts of emotion given when an emotion is not felt, or even on what people say during an emotional episode. This is not to diminish the importance of these sources of information but even what people say when they are in the midst of an emotion may not always reveal what they are actually feeling or thinking, not even what they are aware of feeling or thinking.

My research on deception has shown how convincingly people can misrepresent in their speech the emotions they are feeling. Even though many facial expressions are recruited in a lie, sometimes there is what we termed *leakage* in facial and vocal expressions of concealed feelings (Ekman, 1985; Ekman & Friesen, 1969; Ekman, Friesen, O'Sullivan, 1988; Ekman, Friesen, & Scherer, 1976). When attention is focused on these often-brief, fragmentary signs of emotional expression, they can betray a lie by contradicting the emotion the person verbally claims to be feeling.

More generally, there is an increasing trend to use multiple measures of emotional response, not only to obtain better reliability and validity but also to understand discrepancies among the different emotional responses and to examine individual differences in the extent of coherence among different emotional responses. Even when focused on expression alone, an investigator is confronted, if not overwhelmed, with the importance of individual differences; this is the last of the four major questions about the emotion process and the face that I will consider.

7. *Consider emotions as families.* Precise measurement of facial expression suggested a metaphor that may be useful in thinking about emotion. We (Ekman & Friesen, 1978) found not one expression for each emotion, but a variety of related but visually different expressions. The 60 anger expressions, for example, that we have identified share certain core configurational properties, which distinguish them from the family of fear expressions, disgust expressions, and so forth. Variations within a family of facial expressions likely reflect the intensity of the emotion, whether the emotion is controlled, whether it is simulated or spontaneous, and the specifics of the event that provoked the emotion.³

Just as it is useful to think of expressions as constituting families, I have proposed (Ekman, 1992a) that we consider each emotion as constituting a family of related affective states, which share commonalities in their expression, physiological activity, and in the types of ap-

praisal that call them forth. These shared characteristics within an emotion family should distinguish one emotion family from another. The anger family, for example, would include variations in intensity stretching from annoyance to rage. It should also include different forms of anger, such as resentment, which is the kind of anger in which there is a sense of grievance; indignation and outrage, which are anger about the mistreatment of someone; vengeance, the anger that retaliates against a misdeed by another; berserk, anger that appears to others to be an uncontrolled response inappropriate to any provocation; and so on.

The characteristics shared by all members of an emotion family constitute the theme for that emotion and are most likely to reflect the contribution of nature. The different members of the family are variations around that theme, reflecting more the influence of nurture and the particulars of the occasion when the emotion occurs. Our common language of emotion words may include many or few descriptions relevant to any of the emotion families. In English, we have many terms for anger, some specifying how the person is behaving (e.g., argumentative, testy, huffy, sulky, spiteful), some that are metaphors (fed up, pissed off), and some referring to changes in physiology (hot, bristling). (See Tomkins, 1981, for a description of how language may incorporate different aspects of an emotion.)

Those studying the lexicon of emotion (Shaver, Schwartz, Kirson, & O'Connor, 1987) have proposed a similar framework, although not using the term *family*. I believe the definitive evidence on what constitutes a family, and in particular the delineation of the theme for each family, will come not from the study of emotion words but from closer examination of appraisal processes, motor responses, and ultimately what is revealed by studies of emotion-specific activity in the central nervous system.

8. *Consider emotions to be discrete states.* The research on facial expressions has also shown the utility of conceiving of emotions as separate discrete states, such as fear, anger, and disgust, rather than simply as positive versus negative states or even more simply as differing only in respect to arousal. Although some current emotion researchers continue the early (Woodworth & Schlosberg, 1954) conceptualization of emotions in terms of a few dimensions, that approach has not proven as useful in studies that measure facial behavior in early development or social interaction or in many of the studies of physiological changes in emotion.

9. *Consider expression in determining how many emotions there are.* If our definition of emotion were to require a distinctive expression so that conspecifics can know instantly from a glance how a person is feeling, then we need look only to the evidence on how many

³ It is the core expressions that have been studied in the cross-cultural judgment studies of facial pictures. We do not know how many of the other expressions for each emotion would be judged in a similar fashion across cultures.

emotions have distinctive expressions to determine the number of emotions. Distinctive universal expressions have been identified for anger, fear, disgust, sadness, and enjoyment. Even adding contempt, surprise, and interest, about which the evidence is far less certain, the list of emotions that have a universal facial expression is far shorter than the number of emotions most theorists have proposed, far smaller indeed than the various words for emotion. How are we to deal with this discrepancy?

Perhaps there are emotions that have distinctive vocal expressions but no facial expressions; however, none have been uncovered so far. Grouping emotions into families may provide a better fit between the list of emotions that have an expression and the number of emotions proposed by various theorists. Another part of the answer is suggested by our findings that a number of positive emotions—amusement, relief, pride, sensory pleasure, exhilaration—share but one facial expression, a particular form of smiling (Ekman, 1992b). One could argue that these are all members of one emotion family, but I expect that research on appraisal and physiology will show they are distinctive states that share a signal.

The evidence may require that we postulate emotions that do not have a distinctive universal signal—no distinctive facial, vocal, or bodily action that provides information to those who observe it. I will return to this when I discuss the question of whether there can be emotions without expression. There is a prior question, however. My discussion so far has assumed that the information conveyed by an expression is best captured by words such as anger or fear, but is that what most people typically derive when they see a universal facial expression?

What Information Does an Expression Typically Convey?

We know virtually nothing about the type of information people typically derive from a facial expression when they see the expression in situ, accompanied as it usually is by speech, gestural, and postural behaviors, and when the person observing the face has the usual array of expectations about what may be most likely to occur in that situation. The studies that determined the information observers obtain from facial expressions when they are seen out of context—disembodied—answers the question of what the face *can* signal, not what information it typically *does* signal.

Consider the messages that might be conveyed by the expression shown in Figure 1, a photograph that I took 25 years ago of a member of a preliterate, visually isolated culture in Papua, New Guinea. The message conveyed may be about an antecedent event that led to the expression, for example, "someone must have insulted her." Or the inference drawn may be about what the person is feeling or thinking at that moment; for example, "she must feel very tense" or "she must be planning how to get revenge." The observer may interpret the expression in terms of what the person is likely to do next, such as "she's going to hit me." Still another possible message

Figure 1
Scene of Villagers' Response to an Outsider in the Highlands of New Guinea, 1967



Note. From *Face of Man: Universal Expression in a New Guinea Village* (p. 34, plate 17) by Paul Ekman, 1980, New York: Garland. Copyright 1980 by Paul Ekman. Reprinted by permission.

would refer to an emotional state, using a metaphor such as "she is boiling." Or, the message could be an emotion word, either a specific one, such as "she is mad," or a more general one, such as "she doesn't feel good." (See Ekman, 1977, for a more complete account of the different messages provided by an expression.)

I expect that we could find better-than-chance agreement within a cultural group about each of these emotion-related messages—antecedents, simultaneous behaviors, metaphors, and consequent events—just as we have found agreement about specific emotion terms. Lakoff (1987) found similar emotion metaphors in English and Hungarian, but they only examined anger. The question remains as to how much cross-cultural agreement there might be about each type of message for each emotion. It is also not known which type of message par-

ticipants in a social interaction typically derive and whether this varies with the social context in which the expression occurs, the demographic characteristics of the expresser and the observer, or the personality of these individuals.

If a language has no words for an emotion, as has been reported by some anthropologists (Lutz & Abu-Lughod, 1990), it does not mean that the emotion does not occur in that culture, only that it is not represented by single terms in the lexicon. Levy (1984) argued that although the Tahitians have no word for *sadness*, he saw sad expressions in people who had experienced a loss. Unfortunately, Levy did not determine whether the Tahitians would have selected a sad expression if he had asked them to identify which face was that of a person who had experienced some loss, such as their child dying. Such studies have not been done in any of the language groups that, reportedly, do not have single terms for some emotions.

We do not know how salient facial expressions are when they contradict what a person is saying or what the observers believe to be normative in a particular situation. One could equally well argue that expressions will be ignored, overwhelmed by other sources of information, or just the opposite, that expressions will stand out because of contrast noteworthy in such circumstances. Probably both will be found to occur, depending on the emotion, the situation, and the characteristics of the observer and the expresser.

Can There Be Emotion Without Facial Expression?

"Can there be emotion without facial expression" is really two questions. First, considering just those emotions for which universal expressions have been identified, (e.g., fear and anger), do those emotions occur without any semblance of the expression? And second, are there still other emotions that have no distinctive expression, at all, ever? I think the answer to both questions is yes, but the evidence is fragmentary.

I will begin with the first question. There is evidence that people may show no change in visible facial activity even though they report feeling emotions and manifest changes in autonomic nervous system activity. In these studies those people do manifest subvisible, patterned changes in facial activity as measured with electromyography (EMG; see Tassinari & Cacioppo, 1992, for a review). That research did not determine, however, whether there might be people who show no facial activity at all, visibly or nonvisibly, when there is subjective or physiological evidence of emotion. The existence of such people would contradict Tomkins's (1963) proposal that facial activity is always part of an emotion, even when its appearance is inhibited. I will return to this matter later when I discuss the question of how individuals differ in their facial expressions.

Quite apart from the possibility that some individuals are not facially active, there may be ways of calling forth emotion that are less likely to generate a facial

expression. I suspect that facial expressions are most likely to occur when someone sees or hears a dynamic (moving) event and the beginning of the event is marked rather than very slow and gradual. Typically, the events that call forth emotion are interpersonal actions, although the actions of other animals, or natural events such as thunder, can also call forth emotions with full expression. It is not, I believe, simply a matter of the intensity of the emotional arousal. I am presuming that our expressions evolved in contexts in which action was perceived through our senses. A symbolic representation of such actions, or a frozen depiction of them in a photograph, should be less likely to call forth an expression, unless the intensity is very high or the person is very prone to a particular emotion.⁴ Consistent with this reasoning, we (Ekman, 1992b; Ekman et al., 1983) found a lower incidence of facial expressions far less when we asked people to remember and relive a past emotional event than when people responded to short motion picture films.⁵ Also, I have rarely seen much facial expression when I examined videotapes of people who were responding to the slides developed by Buck, Savin, Miller, and Caul (1972) to elicit emotion.

I turn now to the second question—whether there are emotions that never, under any circumstances, have a unique facial expression. To answer this question, I must first expand consideration of what constitutes an expression. Most research has studied the information conveyed by activity of just the facial muscles, with no other bodily activity included. Occasionally, head movement—down, back, forward, or to the side—has been included in expressions of sadness, fear, interest, or disgust. I suspect that those head movements alone would not communicate those emotions. They should add to the information, increasing agreement among those who observe the behavior, for those particular facial expressions. The hands can also be added into the picture. The clenched fist contributes information compatible with a facial expression of anger. The hand covering part of a sad expression might change that signal into shame, whereas the hand covering part of an enjoyment expression changes that signal into coyness.

There may also be other modalities of expressions for emotions that have no distinctive facial expression. The voice, posture, or bodily action of some kind may be the only source of the emotion message. The voice gains attention from someone who is not already visually attending to the expresser. Although this should be advantageous for infant-caretaker interactions, it would be a disadvantage in stalking prey or avoiding predators, inasmuch as the vocal signal reveals the expresser's location. Although it is possible that there are vocal expressions for emotions that have no facial expression, I agree with

⁴ R. J. Davidson (personal communication, July 1992) found that phobics show disgust or fear expressions in response to a still photograph of a snake, whereas nonphobics typically do not.

⁵ It may simply be that reliving emotions does not produce as intense a response; we have collected, but have not yet analyzed, data that could determine whether that is so.

Tomkins (1963) that each of the emotions that has a facial expression also has a vocal expression. Efforts to disguise emotional communication might be more or less successful on one modality or another (cf. Ekman, O'Sullivan, Friesen, & Scherer, 1991).

What I and others have focused on can be called the *momentary* facial expressions, because the information they convey about an emotion can be captured in an instant. Typically, such expressions last a few seconds, but a single frame. A snapshot taken at any point when the expression is at its apex can easily convey the emotion message. It is the morphology, the momentary configuration produced by the contraction of a particular set of facial muscles, that provides the information about whether it is anger, fear, disgust, sadness, surprise, or enjoyment. The dynamics of the movement also contains additional information about the strength of the emotion and whether it is genuine, although that information is also signaled morphologically.

There may be another type of expression that is extended in time, during which a sequence of actions provides the signal. Keltner (1992) found preliminary evidence that embarrassment may entail the following sequence shown over a five-second period: gaze down, smile, head turn or face touch, and then lip press. Theoretically, an extended expression could be composed of just momentary facial muscular actions, occurring in a rapid sequence, conveying an emotion message different from what is conveyed by each separate expression in the sequence. However, no one has identified such an expression.

Although I am allowing for the possibility that extended expressions may occur, I am not convinced that any will be found that are uniform in their sequence and that convey with high agreement the same emotion message to observers across cultures. Certainly, an extended expression is much less efficient than a momentary expression, requiring longer transmission time. For urgent situations, such as dealing with predators, rivals, or prey, or when a caretaker must respond quickly to a problematic change in an infant's state, one would expect that a momentary expression would have evolved. But this reasoning may be expecting too much orderliness in nature.

So far, I have only considered instances in which the emotion has a distinctive expression, allowing the observer to derive information about which emotion it is from the expression itself, without needing any knowledge about the context in which the expression is shown. Earlier, I mentioned an exception, citing our findings that suggest that all of the positive emotions (amusement, sensory pleasure, pride, etc.) share a single expression, a particular type of smile (Ekman, Davidson, & Friesen, 1990). An observer distinguishes which of these positive emotions is evident, not so much from the expression itself (although the timing and intensity of the expression may provide some clues), as from the context, from knowledge of what emotion is likely in a given situation for a given person.

It seems likely that there is another such group of emotions that share a single expression that I will call the *unhappiness* emotions—disappointment, sadness over loss, remorse, shame, and guilt. I have preliminary evidence that these emotions share an expression in which the inner corners of the eyebrows are raised, the cheeks are slightly raised, and the lip corners are pulled downward. Distinguishing among the unhappiness emotions depends on contextual knowledge more than on the expression itself. As with the positive emotions, one could argue that these unhappy states are not separate emotions sharing a single facial expression but instead should be considered as different members of the same emotion family. I expect that research on appraisal and physiology would show that they are distinct emotions but that work remains to be done.

Finally, there is the possibility that there are emotions that have no signal—neither a momentary nor an extended expression; not a facial, vocal, or bodily expression; neither a shared signal nor a distinctive signal. These would be emotions that when experienced provide no information to observers about any aspect of the person's emotional experience. Even then, observers may correctly infer the emotion from past actions or expectations about what is appropriate in a given situation.

The sine qua non for emotion should not be a unique pan-cultural signal. Instead, I believe it is more sensible to establish two other criteria for when we should consider a change in state to be an emotion. Toobey and Cosmides (1990) told us that emotions impose "on the present world an interpretative landscape derived from the covariant structure of the past." Emotions, they said, deal with recurrent "adaptive situations[,] [f]ighting, falling in love, escaping predators, confronting sexual infidelity, and so on, each [of which] recurred innumerable times in evolutionary history." (pp. 407–408). This is very similar to Lazarus's (1991) felicitous comment that "emotions contain the wisdom of the ages" (p. 820).

What distinguishes emotions from other psychological phenomena is that our appraisal of a current event is influenced by our ancestral past. It is not just our ontogenetic history but our phylogenetic history that makes an emotion more readily called forth in one circumstance than in another, and yet ontogeny has an enormous effect (Mineka, Davidson, Cook, & Keir, 1984). Although this view has won some acceptance (Stein & Oatley, 1992), no one has described just what it is about our ancestral past that influences our current appraisal or the mechanism by which it occurs. Instead, a number of theorists have proposed different models of how the appraisal process operates (see review by Ellsworth, 1991).

The second criterion for considering a change in state to be an emotion will come from work yet to be done on the biology of emotion. Using the new, more precise procedures for measuring brain activity, I expect that patterns of central nervous system activity will be identified that are unique to the emotions.

Although I am admitting the possibility of nonsignal emotions—which is a change in my previous position—

I note that there is not yet any definitive evidence that such do exist. It remains an empirical matter to establish whether there are indeed emotions without signals that share most other characteristics with the signal emotions. Allowing for extended and momentary expressions for vocal, bodily, as well as facial expressions, and for emotions that share a signal and are then further distinguished on the basis of contextual knowledge, as well as emotions that have a distinctive signal, makes the list of the likely signal emotions not very short. It probably includes amusement, anger, contentment, contempt, disgust, disappointment, embarrassment, excitement, fear, guilt, pride, relief, sadness, sensory pleasure, shame, and surprise. If each of these is considered a family of related states, then we have a very large set of emotions, one that could include most of the emotions that most emotion theorists have considered. The discrepancies, I believe, are due to the failure by some to distinguish emotions from either moods (e.g., anger from irritability), emotional traits (e.g., anger from the manifestations of a hostile character), or affective disorders (e.g., sadness from depression). (See Ekman, 1984, 1992a, 1992c, for a discussion of the boundaries of emotion.)

Can There Be a Facial Expression of Emotion Without Emotion?

Certainly, people can fabricate expressions (Ekman, 1985, 1992b) when they do not feel any emotion. In a false expression, a face is made to mislead the observer into thinking an emotion is felt when it is not. There is some evidence to suggest that false expressions can be distinguished from genuine expressions by the absence of certain facial muscular actions, which we (Ekman, Roper, & Hager, 1980) found most people cannot perform voluntarily.

The evidence on distinguishing false from genuine expressions is so far limited to enjoyment. The 19th-century French neuroanatomist Duchenne de Bologne (1862/1990) suggested that the muscle orbiting the eye (*orbicularis oculi*) would be absent from voluntary smiles but present when enjoyment was felt. This is one of the muscular actions that we (Ekman et al., 1980) found most people cannot perform voluntarily.⁶ There have been more than a dozen studies in the last decade that have supported Duchenne's observation (summarized in Ekman, Davidson, & Friesen, 1990).

Anger, fear, and sadness facial expressions also contain one or more muscular actions that most people cannot perform deliberately, in addition to muscular actions that are easy for everyone to make. I have described (Ekman, 1985) how the absence of these difficult-to-make muscular movements, which I have termed the *reliable* muscles, might distinguish the false from the genuine emotional expression for these emotions, just as it has been possible to do for enjoyment. The research to confirm this has not yet been done. (Note that there are no difficult-to-make muscular movements in either disgust or surprise facial expressions.)

Although false expressions are intended to mislead another person into thinking an emotion is felt when it is not, *referential* expressions are not intended to deceive. Referential expressions are intended to communicate that the emotion referred to is *not* being felt at the moment of expression. These expressions most often occur when people talk about past or future emotional experiences, describing feelings not now being felt. In such accounts, sometimes the emotion referred to is shown by a referential expression; it may be the only reference to the emotion, without any verbal label.

The reliable muscles should not be evident in referential expressions. Although a referential expression must resemble sufficiently an actual emotional expression for an observer to know which emotion is being referred to, it must differ sufficiently for the observer to know that the emotion is not felt at the moment of expression. This can be accomplished by one of a number of transformations. The duration of the expression may be very brief or very long or its onset or offset may be more abrupt than natural. The scope of the expression may be exaggerated, far exceeding in intensity what would be appropriate for the given context. The expression may show just one part of the usual display, for example, the horizontal stretching of the lips or the raised upper eyelid in a referential fear expression.

Mock expressions are a particular type of referential expression, which state that the person feels the opposite of the emotion shown. It is a facial equivalent of the current teenage conversational gambit of saying something followed by a "not." Exaggeration in time or scope is used to convey the negation in the mock expression. For example, when describing a situation that was found to be not at all amusing, the expresser may show an exaggerated smile, perhaps also laughing in a deliberately false fashion, underlining the point that enjoyment was not experienced.

There is another reason why the reliable muscles should be absent from referential expressions, in addition to the need for such expressions to appear sufficiently different so the observer knows the emotion is not being felt. If the reliable expression were to closely resemble the entire muscular configuration that has been found to be universal for an emotion, then the actual emotion may be generated, in which case it will no longer be a fabrication. I make this suggestion on the basis of a number of studies in which we have found that deliberately performing the entire muscular configuration for an emotion generates the physiology and often the subjective experience of emotion (summarized in Ekman, 1992b).⁷ This

⁶ Although Duchenne (1862/1990) treated *orbicularis oculi* as a single muscle, to be more exact, there are two parts of this muscle that can act independently: the medial and lateral portions. Most people can deliberately contract the medial portion but not the lateral portion, and it is the lateral portion that is most often absent in false smiles.

⁷ Although those who believe that facial feedback plays a role in determining emotional experience have interpreted our findings as supporting their view, I do not think that it is sensory feedback from the

may be one of the reasons why sometimes when people give an account of an emotional experience they unexpectedly begin to reexperience the emotion.

How Do Individuals Differ in Their Facial Expressions of Emotion?

I have mentioned one possible difference in how individuals differ in their facial expressions of emotion when I discussed the question "can there be emotion without facial expression." There may be individuals who consistently do not show any patterned facial activity, visibly or subvisibly, when there is subjective and physiological evidence of emotion. We do not actually know if those who do not show visible expressions also fail to show patterned EMG activity. We also do not know if the failure to show facial activity is a stable individual characteristic or if it is totally context dependent. If there are individuals who consistently do not show facial expressions when there is other evidence that they are experiencing emotion, we do not know whether such people are also vocally inactive or whether there is a disconnection between their subjective reports and the occurrence of physiological changes.

There are two further questions about facially inactive people, questions that also pertain to other aspects of individual differences in facial expression that I will raise. The first is the matter of *specificity*. Is this difference manifest for all emotions, just among positive or just among negative emotions, or might there be people who are facially inactive for anger but active for fear, disgust, and sadness? The second is the matter of *threshold*. Is this a difference in facial expressiveness or is that itself a product of a higher threshold for calling forth the emotion? Conceivably, there might be people who have a lower threshold for subjective experience or physiological changes than they do for facial expression.

Anyone who measures facial expression is impressed with the enormous individual differences in the intensity of muscular actions shown in facial expressions. No one yet knows whether such differences are stable personal characteristics or whether they are emotion specific or general to all emotional expressions. Furthermore, the evidence is neither consistent nor abundant (in terms of specific emotions) about how variations in the magnitude of facial responses are related to variations in the intensity of subjective experience and physiological change. Although individual differences in the intensity of muscular contractions might be attributed to threshold, it is worth noting that when the provocation for the startle response was as extreme as 135 decibels of noise, which is the limit beyond which there is danger of hearing impairment, we still found large individual differences in the magnitude of the startle facial response (Ekman, Friesen, & Simons, 1985). We are currently checking my hunch that the intensity of the startle facial response will predict individual

face that produces the changes in physiology or subjective experience. Instead, I think this is the result of direct connections among different brain areas (see Ekman, 1992b).

differences in the intensity of negative emotional expressions.

It appears that there are also large individual differences in a number of aspects of the timing of facial expression. Latency, the time between antecedent event and emotional expression, appears to differ among individuals. Similarly, the amount of time it takes for an emotional expression to decay may also differ. Once again, we do not know whether these differences are stable within individuals or if they are, whether they are emotion specific or more general. There are words to describe people who have short latencies for anger (hothead, short fused) and to describe those whose emotions appear to last longer than usual (sulker). But we do not know whether such differences in emotional experience are reflected in facial expression.

Tomkins and McCarter (1964) suggested that individuals differ also in their habitual "affect-about-affect." Some people may be afraid of their anger; others may be disgusted with themselves for being angry; others may be disappointed in themselves for being angry. There may be similar variations in the habitual affect about feeling afraid, or about feeling sad, and so forth. If this is so, either facial blends or sequences of facial expression might reveal such stable affect-about-affect. Again, the research has not been done.

Conclusion

When I began my study of facial expressions, I thought there was just one question to be answered—are they universal or culture specific. I found more than one answer; different aspects of expression are both universal and culture specific. More important, pursuit of that one question has continued to raise many new and challenging questions about expression and emotion, questions I could not imagine 27 years ago. In that sense, the research on the face and emotion has just begun.

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