

In NONVERBAL BEHAVIOR AND COMMUNICATION, A. Siegman & S. Feldstein (eds.). New Jersey: Lawrence Erlbaum Association, 1977.

4

Facial Expression¹

Paul Ekman

University of California, San Francisco

In just a moment or two expression flashes on and off the face. Wrinkles appear where the skin was smooth, or permanent wrinkles momentarily deepen. The eyebrows, eyelids, and mouth temporarily change their shape. Are these quick changes in the face expressions of emotion? How many emotions are shown on the face? Are these expressions true indications of how a person feels, or can they be falsified? Are most people able to read accurately facial expressions? What are the clues to emotion in the face; how is each feeling registered in the wrinkles and features of the face? Are the facial expressions of emotion the same for all people, or do they vary with culture, language, age, sex, and personality?

Literally hundreds of experiments have attempted to answer these questions, dating back to 1914. The type of research that has been conducted and the answers obtained to each question are described in this chapter. The conclusion describes a new set of questions about facial expression that are just now becoming the focus of research.

WHICH EMOTIONS DOES THE FACE SHOW?

Does the face tell us only whether someone feels pleasant or unpleasant, or does it provide more precise information, conveying which unpleasant emotion is experienced? If the latter, how many of these specific emotions does the face show—6, 8, 12, or what number? The typical method used to determine just

¹ This material is based in large part on a chapter from *Unmasking the Face* by Ekman and Friesen (1975). The research was supported by a grant from NIMH MH 11976 and from ARPA AF-AFOSR-1229. A more thorough discussion of most of the material presented here can be found in *Emotion in the Human Face*, by Ekman, Friesen, and Ellsworth (1972).

which emotions can be read from the face has been to show photographs of facial expressions to observers, who are asked to say what emotion they see in each face. The observers may be given a predetermined list of emotion words to choose from, or left to their own resources to reply with whatever emotion word comes to mind. The investigator analyzes the answers of the different observers to determine what emotions they agree about in describing particular faces. He might find, for example, that 80% of the observers agree in describing a particular face with the word "afraid." They might not agree about a word to describe some other face; for example, a face called "disinterest" by some observers might be called other emotions by other observers. On the basis of such results, the investigator reaches a conclusion about which emotions the face can convey.

The six emotions that are the subject of this chapter—happiness, sadness, surprise, fear, anger, and disgust—were found by every investigator in the last 30 years who sought to determine what emotions can be shown by facial expressions. These studies are reviewed in Ekman, Friesen, and Ellsworth (1972, Chapter 13). There are probably other emotions conveyed by the face—shame, interest, and excitement, for example, but these have not yet been as firmly established.

ARE JUDGMENTS OF EMOTION ACCURATE?

It is not enough to determine what emotions are read from facial expressions. It is also crucial to discover whether the interpretations of the observers are correct or not. When people look at someone's face and think that person is afraid, are they right or wrong? Are facial expressions an accurate reflection of emotional experience? Or, are the impressions gained from facial expression merely stereotypes—all agree about it, but they are wrong? To study this question the investigator must find some people whom he knows to be having a particular emotional experience. He must take some photographs, films or videotapes of these people, and then show them to observers. If the observers' judgments of the facial expression fit with the investigator's knowledge of the emotional experience of the persons being judged, then accuracy is established.

In our analysis of all the experiments conducted over the last 50 years, we found consistent and conclusive evidence that accurate judgments of facial expression can be made. Some of these studies were conducted in our own laboratory. In one experiment (Ekman & Bressler, 1964) photographs were taken of psychiatric patients when they were admitted to a mental hospital and again when they were less upset and ready for discharge. Untrained observers were shown these photographs and asked whether each facial expression was shown at time of admission or at time of discharge. The judgments were accurate. These same photographs were shown to another group of observers who were not told they were seeing photographs of psychiatric patients but

instead were asked to judge whether the emotion shown was pleasant or unpleasant. Again accuracy was proven (Ekman & Rose, 1965) since the facial expressions shown at admission were judged as more unpleasant than those shown at discharge from the hospital. In another study (Ekman, 1965) other observers were asked to judge how pleasant or unpleasant the facial expressions were, but the faces shown to them were of psychiatric trainees undergoing a stress interview. Without knowing which was which, the observers judged the facial expressions during stress as more unpleasant than the facial expressions drawn from a nonstressful part of the interview. In still another experiment (Ekman, 1972) observers were shown films of college students, taken when they had been watching a very unpleasant film of surgery and when they had been watching a pleasant travelogue film. The observers accurately judged which film the college students were watching from their facial expressions.

All of these studies were concerned with spontaneous facial expressions that naturally occur when a person does not deliberately try to show an emotion in his face. But what of those situations in which a person deliberately tries to show an emotion, to look happy or angry, and so forth? Many studies have found that observers can accurately judge which emotion is intended when a person deliberately tries to convey an emotion through facial expression (Drag & Shaw, 1967; Dusenbury & Knower, 1938; Kanner, 1931; Kozel & Gitter, 1968; Levitt, 1964; Osgood, 1966; Thompson & Meltzer, 1964).

ARE THERE UNIVERSAL FACIAL EXPRESSIONS OF EMOTION?

Are facial expressions of emotion the same for people everywhere, no matter what their background? When someone is angry, will we see the same expression on his face regardless of his race, culture, or language? Or, are facial expressions a language, the meaning of which we must learn anew for each culture, just as we need to learn verbal language? A little more than 100 years ago, Charles Darwin (1872) wrote that facial expressions of emotion are universal, not learned differently in each culture. They are biologically determined, Darwin said, the product of man's evolution. Since Darwin's time many writers have emphatically disagreed. Klineberg (1940) wrote that the evidence was in favor of the "hypothesis of cultural or social determination of emotional expression [p. 180]." LaBarre (1947) reviewed many anthropological reports and concluded, "there is no 'natural' language of emotional gesture [p. 55]." Most recently, Birdwhistell (1963) has said, ". . . this search for universals was culture bound. . . There are probably no universal symbols of emotional state. . . We can expect them to be learned and patterned according to the particular structures of particular societies [p. 126]."

Neither Darwin nor those who opposed him had much definitive evidence. Their arguments were based on logic, buttressed by bits and pieces of evidence, usually collected incidentally by investigators who were not primarily studying

facial expression. It is only recently that a number of scientists from different disciplines have focused their attention on the question of whether there are some facial expressions which are universal.

Many studies have examined facial expressions of young infants who have had little opportunity to learn facial expression, and of blind children who could not learn by imitating others (cf. review of these studies by Charlesworth & Kreutzer, 1973). Many studies have examined the facial expressions of other primates evaluating Darwin's claim that human facial expression had evolved from other species (cf. review of this research by Chevalier-Skolnikoff, 1973). Both psychologists and ethologists have studied facial expression in more than a dozen cultures, some literate and some preliterate (cf. review of this work by Ekman, 1973). The evidence is now remarkably broad in scope, consistent in findings, and conclusive in showing that there are at least some emotions for which the facial expression is universal. As we will explain later, there are also cultural differences in regard to when these universal facial expressions are shown.

Research conducted in our laboratory played a role in settling the dispute over whether facial expressions are universal or specific to each culture. In one experiment (Ekman, 1972), stress-inducing films were shown to college students in the United States and to college students in Japan. Part of the time each person watched the film alone and part of the time the person watched while talking about the experience with a research assistant from the person's own culture. Measurements of the actual facial muscle movements, captured on videotapes, showed that, when they were alone, the Japanese and Americans had virtually identical facial expressions (see Fig. 1). When in the presence of another person, however, where cultural rules about the management of facial appearance (*display rules*) would be applied, there was little correspondence between Japanese and American facial expressions. The Japanese masked their facial expressions of unpleasant feelings more than did the Americans. This study was particularly important in demonstrating what about facial expression is universal and what differs for each culture. The universal feature is the distinctive appearance of the face for each of the primary emotions. But people in various cultures differ in what they have been taught about managing or controlling their facial expressions of emotion.

In another experiment (Ekman, 1972; Ekman, Sorenson, & Friesen, 1969) we showed photographs of the different emotion expressions to observers in the United States, Japan, Chile, Argentina, and Brazil. The observers in these different cultures had to choose one of the six emotion words for each photograph they saw. If facial expressions were a language that differs from culture to culture, then a facial expression said to be *angry* by Americans might be called *disgust* or *fear* by people in Brazil, or might not mean anything to them. Just the opposite was found. The same facial expressions were judged as showing the same emotions in all these countries, regardless of language or culture (see Fig.



FIG. 1. Video frames of facial behavior scored as showing disgust; a Japanese subject on the left and an American subject on the right. (Copyright © 1972 by Paul Ekman.)

2). Essentially the same experiment was carried out independently at the same time by Carroll Izard (1971) with observers in eight different cultures, and the same evidence of universality was found.

While we wished to interpret our findings as evidence that some facial expressions are universal, one loophole remained. All of the people studied had some shared visual contact, usually not directly but through the mass media. It was still possible that facial expressions might really differ in all the cultures studied, but the people might have learned, through movies, television, and picture magazines, what each other's facial expressions of emotion looked like. Or, facial expressions of emotion might be similar in all the cultures we studied precisely because the people have all learned how to show emotion on their face by watching the same actors in the movies or television and imitating their facial expressions. We had not eliminated the possibility that among people who did not have the opportunity to view mass media portrayals of facial expressions of emotion, emotions would be shown by entirely different facial muscular movements. The only way to settle this question was to study visually isolated people who had no contact with the mass media and little if any contact with the outside world.

We conducted a series of experiments (Ekman, 1972; Ekman & Friesen, 1971) in the Southeast highlands of New Guinea where we were able to find people who met these criteria. Because these people were in no way accustomed to taking psychological tests or participating in experiments, and because we did

FIG. 2. Examples of judgments of emotion in five literate cultures. Many more photographs were shown and similar results were found.

Percentage of agreement in how photograph was judged across cultures					
	United States (N=99)	Brazil (N=40)	Chile (N=119)	Argentina (N=168)	Japan (N=29)
	97 Happiness	95 Happiness	95 Happiness	98 Happiness	100 Happiness
	92 Disgust	97 Disgust	92 Disgust	92 Disgust	90 Disgust
	95 Surprise	87 Surprise	93 Surprise	95 Surprise	100 Surprise

FIGURE 2 (continued)

Percentage of agreement in how photograph was judged
across cultures

United States (N=99)	Brazil (N=40)	Chile (N=119)	Argentina (N=168)	Japan (N=29)
84 Sadness	59 Sadness	88 Sadness	78 Sadness	62 Sadness
67 Anger	90 Anger	94 Anger	90 Anger	90 Anger
85 Fear	67 Fear	68 Fear	54 Fear	66 Fear



not know their language but had to work through translators, we had to modify our experimental procedure. In other countries we had shown a single photograph of one or another of the facial expressions and given the observer a choice among a list of emotion words. In New Guinea, we showed the person three photographs at once, had a translator read an emotion story, such as "A person's mother died," and asked the observer to point to the photograph that fit the story. Table 1 shows that these people selected the same face for the same emotion as did people in all the other cultures we had studied. There was but one exception: the New Guineans failed to distinguish between the *fear* and *surprise* facial expressions.

In a related experiment, other New Guineans were told an emotion story and each was asked to show the emotion on his own face. Videotapes were taken of these intended emotion expressions, some examples of which are shown in Fig. 3. Analysis of these New Guineans' facial expressions showed again that the same facial expressions were produced for the same emotions as had been found in other cultures with the exception of fear and surprise, which were confused with each other. Further confirmation of the universality of facial expressions

TABLE 1
Judgments of Emotion by Observers in a
Preliterate Culture, the Fore of New Guinea^a

Emotion described in the story	Percent choice of the emotion expected that would agree with judgments by members of literate cultures	
	Adults	Children ^b
Happiness	92	92
Sadness	79	81
Anger	84	90
Disgust	81	85
Surprise	68	98
Fear from anger, disgust, or sadness	80	93
Fear from surprise	43	- ^c
Number of observers	189	130

^aFrom Ekman and Friesen (1971).

^bThe higher figures for the children probably reflect the fact that they were asked to choose from a pair of photographs rather than sets of three.

^cThrough an oversight, this discrimination was not tried with the children.



FIG. 3. Video frames of attempts to pose emotion by subjects from the Fore of New Guinea. The instruction for the top left photograph was "your friend has come and you are happy"; for the top right "your child has died"; for the bottom left "you are angry and about to fight"; and for the bottom right "you see a dead pig that has been lying there for a long time." Copyright © 1972 by Paul Ekman.

was obtained by a study of another culture in Western Iranian, the western portion of the island of New Guinea. Karl Heider and Eleanor Rosch, who were skeptical of our evidence of universality, conducted the same experiments with people even more visually isolated than those we had studied, and they also obtained evidence of universality.

Taken together, our studies, those of Izard, the Heider-Rosch study and evidence from Eibl-Eibesfeldt (1970) (an ethologist using very different methods), the evidence quite conclusively shows that Darwin was correct in claiming that there are universal facial expressions of emotion.

While the appearance of the face for each of the primary emotions is common to all peoples, facial expressions do vary across cultures in at least two respects. What elicits or calls forth an emotion usually differs; people may become

disgusted or afraid in response to different things in different cultures. Also, cultures differ in the conventions people follow about attempting to control or manage the appearance of their face in given social situations. People in two different cultures may feel sadness at the death of a loved one, but one culture may prescribe that the chief mourners must mask their facial expression with a mildly happy countenance.

HOW DOES EACH EMOTION APPEAR ON THE FACE?

As we began to find evidence that there are some facial expressions of emotion that are universal, and before all of the studies were completed, we began to investigate just what these universal facial expressions of emotion look like. We sought to construct a tool for measuring the face, which would depict photographically each of the universal facial expressions of emotion. Our first step was to study what others had said about the appearance of the face for each of the primary emotions. Some writers had described which muscles were contracted in particular emotions, while others concerned themselves only with the appearance of the surface of the face. None had systematically considered all of the muscles nor all of the consequent changes in the surface appearance of the face for the six primary emotions.

Putting together what was written by Darwin, Duchenne (1862), a French anatomist whom Darwin had quoted extensively, Huber (1931), an American anatomist writing over 40 years ago, and Plutchik (1962), an American psychologist concerned with emotion, we saw part of the picture emerge. We constructed a table that listed all of the facial muscles and the six emotions, entering into the table what these men had written about which muscles were involved in what way for each emotion. There were, however, many gaps, where no one had said anything about the involvement of a particular muscle in a particular emotion. Working with Silvan Tomkins (1962), we filled in those gaps with information from our cross-cultural studies, and our shared impressions.

The next step was to photograph models who were instructed to move particular facial muscles listed in the table. We separately photographed the three areas of the face that are capable of independent movement: the brow/forehead; the eyes/lids and root of the nose; and the lower face, including the cheeks, mouth, most of the nose, and chin. The Facial Affect Scoring Technique (FAST) (Ekman, Friesen, & Tomkins, 1971) consists of a series of photographs of these three different areas of the face, each photograph keyed to one of the six emotions. As might well be expected, for each of the emotions there is more than one FAST photograph for at least one facial area. For example, for surprise there is one brow/forehead, one eyes/lids/root of nose, but four different FAST photographs of the lower face.

The next obvious question was whether FAST is correct. Are the six emotions—happiness, sadness, anger, fear, disgust, and surprise—in actuality com-

posed of the facial appearances listed in FAST? Or, does the FAST appearance of disgust actually occur with anger, and so forth? We have conducted four experiments on the validity of FAST. Two of the experiments attempted to prove the validity of FAST by showing that measurements of the face with FAST corresponded with other evidence of the subjective emotional experience of the persons whose faces were measured. These experiments investigated the experiential validity of FAST.

The other two experiments investigated the social validity of FAST. Rather than attempting to prove that FAST measurements correspond to the person's experience, these studies investigated whether FAST measurements can predict what observers think a person is feeling when they look at his face. Although experiential and social validity should be related, they need not necessarily be so. We may not look to others how we actually feel, at least all of the time. Thus, it was necessary to study both experiential and social validity.

The studies of experiential validity drew from materials gathered in one of the cross-cultural studies of facial expressions described earlier (Ekman, 1972). College students in Japan and in the United States had individually watched pleasant and unpleasant movies while we videotaped their facial expressions. From their answers to questionnaires after the experiment, it was clear that they experienced very different emotions while watching the two types of films. In describing their reactions to the travelogue, the subjects had said it was interesting and pleasant, and caused them to feel moderate happiness. In describing their reactions to the surgical film, the subjects said they had unpleasant, disgusted, pained, fearful, sad, and surprised feelings. If FAST is valid, then measurements based on it should be able to distinguish between the facial expressions shown when these two different sets of emotions were experienced.

All of the facial muscular movements visible on the videotapes were isolated, their duration was measured, and they were classified in terms of FAST. This measurement procedure was done in slow motion, with the measurements made separately for the three areas of the face, by three separate technicians. Such precise measurement required about five hours for each minute of videotaped facial behavior. The results were very clear-cut. Measurements with FAST clearly distinguished the two emotional conditions, whether subjects had been watching a stressful film or a travelogue. And, FAST was equally successful with the facial expressions of Japanese subjects and with Americans, as it should be, since it was built to show the universal facial expressions of emotion. One limitation of this experiment, however, is that it didn't determine whether FAST correctly depicts the facial appearances for each of the six emotions. It only shows that FAST is correct in distinguishing between unpleasant and pleasant experiences.

The second experiential validity study (Ekman, Malmstrom & Friesen, 1971) provided a partial remedy to this limitation. Recent research on the physiology of emotions suggests that there are markedly different patterns of heart rate acceleration and deceleration with the emotions of surprise and disgust. Measures of heart rate and skin conductance had been gathered on the Japanese and

American subjects when they were watching the pleasant and stressful films. If FAST is correct in what it says a surprise face and a disgust face look like, then when FAST says such facial expressions occurred, there should be a different pattern of heart rate for each. When we examined the changes in heart rate which coincided with facial expressions FAST had designated as either surprise or disgust, the results showed the predicted difference.

Although this second study does provide evidence of the validity of FAST for surprise and disgust, it doesn't show that FAST is necessarily valid in what it says about the other emotions—anger, happiness, sadness, fear. Since FAST was derived by the same method for all six emotions, this evidence on surprise and disgust is encouraging about the likelihood that similar evidence could be obtained for the other emotions.

The third study examined FAST in terms of social validity. Could FAST predict how observers will interpret facial expressions? In this experiment (Ekman, Friesen, & Tomkins, 1971) photographs that had been taken by many different investigators of facial expression were obtained. These pictures were shown to observers who were asked to judge which of the six emotions was shown in each picture. Only those on which the observers had agreed about the emotion expressed in the face were further considered. If FAST correctly depicts the appearance of each of the six emotions, then measurements based on FAST ought to be able to predict the emotion seen by the observers in each of these photographs. The measurements were made separately for the three areas of the face by three separate technicians. Predictions were then made on the basis of the scoring of each area of the face. Table 2 shows that FAST measurements of each facial area did accurately predict how the total face had

TABLE 2
Comparison of Percent Correct Predictions from Each Separate Facial Area

Emotion category	Facial area measurements			
	Brows—forehead	Eyes	Lower face	All three facial areas combined
Happiness	70	90	100	100
Sadness	70	90	0	90
Surprise	70	90	90	100
Anger	80	50	100	100
Disgust	25	0	75	75
Fear	29	71	29	43
Correct predictions across all emotion categories	49	73	67	88

been judged by observers. The best predictions were made when the measurements from all three facial areas were combined.

The fourth study (Ekman & Friesen, in prep.) was much like the one just described, except that here the facial expressions examined were those produced by dental and nursing students who had been instructed to attempt to show each of the six emotions by their facial expression. The question asked of FAST was to predict for each photograph what emotion the student had been intending to show. The measurements made with FAST succeeded.

While no one of our four experiments alone would validate FAST, taken together the evidence for the validity of FAST is much more than tentative. Of course, much research remains to be done to further validate this facial measurement procedure. Our work of the past few years has been to refine the measurement procedure, based upon a study of the anatomical basis of facial expression. FAST has been replaced by another acronym, FACS, which stands for the Facial Action Coding System (Ekman & Friesen, 1976, 1977). FACS was developed to provide a tool not just for measuring facial behavior relevant to emotion, but to distinguish all visible facial behavior. We were interested in a tool which would allow study of facial movement in research unrelated to emotion; e.g., facial punctuators in conversation, facial deficits indicative of brain lesions, etc. The Facial Action Coding System is much more comprehensive than FAST, free of any theoretical bias about the possible meaning of facial behavior. It is based upon an analysis of how each muscle of the face acts to change visible appearance. The Facial Action Coding System provides the basis for scoring any observed facial movement into anatomically based minimal action units.

The Facial Action Coding System has utility in research and in a variety of practical situations. In research it can be used to measure changes in momentary emotions, measuring these changes from videotapes taken unobtrusively. To give a few examples of the range of such research applications, work is in progress using FACS to: study clinical changes in the course of a psychotic-depressive episode; evaluate childrens' response to viewing television violence; detect differences between honest and deceitful conversations. The information contained in FACS could also be useful to practitioners—doctors, nurses, lawyers, salesmen, diplomats, and so forth—who want to be more aware of how another person is feeling.

We have recently (Ekman & Friesen, 1975) written a book aimed at such practitioners. Figure 4 shows an example of how we have tried to explain facial expression. Examine each of the four pictures. Note that the top left picture looks questioning in its surprise, the top right looks dumbfounded in surprise, the bottom left, dazed in its surprise, and the bottom right is just surprised. These variations in meaning are due to how surprise is registered on the face. All of the pictures show surprise in just two areas of the face except the one on the bottom right. Each was made by combining, in the darkroom, part of the picture on the bottom right with a neutral picture of the same person. The top left



FIG. 4. Four variations on Surprise: top left, questioning surprise; top right, dumbfounded surprise; bottom left, dazed surprise; bottom right, surprise.

picture shows just the brows and eyes in surprise, with the mouth neutral; the top right shows the eyes and mouth in surprise, with the brows neutral; and the bottom left shows the brow and mouth in surprise with the eyes neutral. These are just some of the variations in how this one emotion, surprise, is registered in facial expression.

HOW ARE FACIAL EXPRESSIONS CONTROLLED?

How can we tell a real facial expression of emotion from a simulated one? When a person doesn't feel the way he looks but is attempting to mislead us about his feelings is there any way to detect his real feelings in his facial expression? In short, does the face "leak?"

We have been studying this problem for a number of years. We started with films of the facial expressions of psychiatric patients during interviews. In certain interviews we knew from subsequent events that the patients had been misleading the interviewer about their feelings. Study of these films provided the basis for a theory of nonverbal *leakage* (Ekman & Friesen, 1969), ways to tell from facial expression or body movement, feelings the person was attempting to conceal. We have been testing this theory during the last five years by studying interviews in which one person purposefully conceals from another the negative emotions experienced as a result of watching very unpleasant stressful movies. The subjects in this experiment try to convince the interviewer that the film they have seen was actually pleasant and that they enjoyed it.

Our studies of these interviews are far from complete. We do know (Ekman & Friesen, 1974) that untrained observers who look at the face are fooled, they cannot tell the honest from the deceptive interactions. We have also found that people who have been trained with the Facial Action Coding System can detect deception, but the number of people who have done this is too small to place much confidence in this result. We have developed a theory (Ekman & Friesen, 1975, Chapter 12) on exactly how to detect deception in facial expression, but it will take another few years to test by measuring expression with the Facial Action Coding System.

INDIVIDUAL DIFFERENCES IN FACIAL EXPRESSION

In the last few years we have been developing theory and conducting experiments on how personality may be manifest in facial behavior. It would be premature to attempt here more than a brief description of our approach to this phenomenon. We believe that some of the individual differences in facial behavior result from idiosyncrasies in the learning of display rules. Display rules are social norms regarding facial appearance, probably learned early in life and functioning on a habitual basis. They specify which one of four management techniques is to be applied by whom to which emotion in a given circumstance. The four management techniques are 1) to intensify, 2) to deintensify, 3) to neutralize the appearance of a felt emotion, or 4) to mask it with the facial configuration of another emotion. For example, at a United States white middle-class wedding display rules specify that the groom must mask any appearance of distress or fear with a happy countenance, while the bride is not

similarly constrained. Another example of a display rule is that, in a patient-physician encounter the patient, no matter what the illness, must in the initial greeting reciprocate the physician's (also required) smile, before facially displaying negative affect relevant to the illness. We believe that psychotic-depressives fail to follow this display rule and, unlike neurotic-depressives, will not as often show the initial greeting smile. We also believe that the later appearance of the greeting smile is correlated with a sign of improvement in mental state. More generally, the psychotic-depressive patient fails to follow the usual display rules regarding the management of negative affect. It is not that psychotic-depressed patients are unique in the facial appearance they show with negative affects but in their consistently maintained negative affect across situations and their seeming inability to modulate it. Put in other terms, in the depressed patient certain negative affects are *flooded*.

We believe that, as a result of particular display rules learned within the family, individuals may in their adult life show *blocks* in facial affect expression. In the extreme, the person may be *poker-faced*, never revealing in his face how he feels. A less extreme deviation is the block in expressing a particular emotion; for example, a person may never facially show anger. A lesser deviation is the block in the expression of a particular emotion toward a particular class of people. For example, the person may never show anger toward female authority figures. From a pilot study, it appears that blocks in expression may be manifest in two rather different ways. One is that the person simply does not show the facial expression of a felt emotion. In a more complex manifestation, the expression is not blocked but the feedback is, such that the person is remarkably unaware of having shown the particular expression.

We believe it may also be possible to characterize people in terms of an extraordinary facility for showing emotional expressions in their faces. For some, this may be characteristic of all the emotions, and they may get into trouble or at least be known for showing everything in their face. The facility may, however, be more specific to a particular emotion, so that the person often looks afraid or angry, and so forth. A neighboring concept, first described by Silvan Tomkins, is that of the *frozen* affect. The frozen affect is an enduring muscular set of the face; after a particular expression, the face, instead of returning to a neutral countenance, may return to a slight version of one or another affect. Thus, the person always looks just slightly disgusted or amused or melancholy, etc.

Another manifestation of personality may be in affect blends and affect sequences. In an affect *blend*, the face shows the distinctive characteristics of two emotions simultaneously. While it is possible for any given event to elicit two emotions simultaneously, resulting in a blend expression, individuals may show a blend when only one emotion has been elicited by an external event, if they have an established habit of associating a second feeling with the elicited one. For example, when disgust is aroused, some people may characteristically

feel also afraid of being disgusted; others may feel angry; others may feel happy and so forth. This affect-about-the-affect will repetitively be manifest in either a blend or a rapid sequence of the two emotions in the face.

It should be clear that what has been said so far about individual differences in facial expressions of emotion is based on either pilot studies or hunch and still enjoys more the status of conjecture than formalized hypothesis. Yet these kinds of phenomena are now amenable to systematic investigation. Research on personality differences and facial behavior has been stymied by the lack of any systematic, quantitative procedure for measuring the spontaneous facial expressions of emotion. However, the Facial Action Coding System described earlier provides the investigator with one necessary tool for quantifying the moment-to-moment changes that may occur in facial behavior.

The approach to the study of individual differences discussed so far has entailed the investigation of the encoding of emotion. It is also possible to study how individuals differ in their decoding of the facial expressions of others. Personality and psychopathology may be manifest, for example, not just in a patient's blocks in the facial expression of certain emotions, but in blocks in his sensitivity to or understanding of the facial expressions of others.

We have begun a series of experiments on individual differences in the decoding of facial expression of emotion. We have developed a test which we call the Brief Affect Recognition Test (BART), which measures a person's accuracy in decoding six emotions—happiness, sadness, anger, fear, disgust, and surprise. The test employs still photographs of facial expressions that, when seen for five seconds, elicit very high agreement about the presence of one or another of these emotions. In the test we present these faces in a tachistoscope, with an exposure ranging from .01 to .04 sec. Our rationale for such a brief presentation is that it approximates usual interpersonal conditions, in which a single facial expression can easily be missed. The usual facial expression lasts only 1 or 2 sec, is embedded in preceding and subsequent facial behavior, and competes for attention with body movement, voice quality, and verbal content.

Our hypothesis is not that people will differ in their total performance, that is, in their accurate recognition of all six emotions, but that they will differ in their patterns of accuracy, recognizing three or four emotions and not the others. Two studies have been completed.

One experiment (Shannon, 1970; Shannon & Ekman, 1976) compared medical patients, schizophrenics, and depressives. No difference was found in total accuracy; as predicted, depressives were less accurate on fear, whereas schizophrenics were less accurate on disgust. In the second experiment (Ekman, Jones, Friesen, & Malmstrom, 1970), we found that subjects who had ingested marijuana performed differently from those who had ingested alcohol; moreover, there was a relationship between self-reported mood and accuracy in recognizing particular emotions. We are currently attempting to replicate these findings and standardize the BART.

Other investigators have also been interested in individual differences in facial expression, relating the ability to understand emotion in others to whether or not the person typically shows emotion in his own face. The tasks used to measure understanding of emotion and expressiveness have varied across investigators, and so have the results. As yet the contradictions have not been resolved (cf. Buck, Savin, Miller, & Caul, 1972; Lanzetta & Kleck, 1970).

CONCLUSION

Progress has been made in the study of facial expressions. Some of the emotions that can be shown in the face have been identified. Evidence has been accumulated to show that it is possible to read facial expression accurately. The universality of certain aspects of facial expression has been shown. Some of the precise muscular configurations that signify particular emotions have been isolated. Also, it has been shown that facial expression can fool at least some people when deception is occurring.

Despite this progress, knowledge about facial expression is still quite limited. Little is known about the differences between felt and phony expressions. While it is clear that individuals differ in facial expressiveness and in how well they understand the facial expressions of others, little is known about how this operates and how it is related to personality.

There are a number of other aspects of facial expression not touched upon in this chapter. Little is known about the early development of facial expression in the infant. Equally sparse is the information about how facial expression is related to other physiological measures that change with emotional arousal. What of the relationship between the facial muscles and the skeletal muscles; what is the relationship between what people do with their face and body? There is no reason to leave out the voice and words, and we can ask how facial expressions of emotion relate on a moment-to-moment basis with speech. This leads directly into study of the role and function of facial expression in interaction, examining how the facial expressions of one person interrelate with the facial expressions of another. There is much work for the next decade of research on facial expression.

REFERENCES

- Birdwhistell, R. L. The kinesic level in the investigation of emotions. In P. H. Knapp (Ed.), *Expression of the emotions in man*. New York: International Universities Press, 1963.
Buck, R. W., Savin, V. J., Miller, R. E., & Caul, W. F. Communication of affect through facial expressions in humans. *Journal of Personality and Social Psychology*, 1972, 23, 362-371.

- Charlesworth, W. R., & Kreutzer, M. A. Facial expressions of infants and children. In P. Ekman (Ed.), *Darwin and facial expression: A century of research in review*. New York: Academic Press, 1973.
- Chevalier-Skolnikoff, S. Facial expression of emotion in nonhuman primates. In P. Ekman (Ed.), *Darwin and facial expression: A century of research in review*. New York: Academic Press, 1973.
- Darwin, C. *The Expression of the emotions in man and animals*. London: Murray, 1872.
- Drag, R. M., & Shaw, M. E. Factors influencing the communication of emotional intent by facial expressions. *Psychometric Science*, 1967, 8, 137-138.
- Duchenne, B. *Mecanisme de la physionomie humaine; ou analyse electro-physiologique de l'expression des passions*. Paris: Bailliere, 1862.
- Dusenbury, D., & Knower, F. H. Experimental studies on the symbolism of action and voice: I. A study of the specificity of meaning in facial expression. *Quarterly Journal of Speech*, 1938, 24, 424-435.
- Eibl-Eibesfeldt, I. *Ethology, the biology of behavior*. New York: Holt, Rinehart & Winston, 1970.
- Ekman, P. Communication through nonverbal behavior: A source of information about an interpersonal relationship. In S. S. Tomkins & C. Izard (Eds.), *Affect, cognition, and personality*. New York: Springer, 1965.
- Ekman, P. Universals and cultural differences in facial expression of emotion. *Nebraska Symposium on Motivation*, 1971. Lincoln: University of Nebraska Press, 1972.
- Ekman, P. Cross-cultural studies of facial expression. In P. Ekman (Ed.), *Darwin and facial expression: A century of research in review*. New York: Academic Press, 1973.
- Ekman, P., & Bressler, J. In P. Ekman, Progress report to National Institute of Mental Health, Bethesda, Maryland, 1964.
- Ekman, P., & Friesen, W. V. Nonverbal leakage and clues to deception. *Psychiatry*, 1969, 32(1), 88-105.
- Ekman, P., & Friesen, W. V. Constants across cultures in the face and emotion. *Journal of Personality and Social Psychology*, 1971, 17(2), 124-129.
- Ekman, P., & Friesen, W. V. Detecting deception from the body or face. *Journal of Personality and Social Psychology*, 1974, 29(3), 288-298.
- Ekman, P., & Friesen, W. V. *Unmasking the face*. Englewood Cliffs, New Jersey: Spectrum-Prentice Hall, 1975.
- Ekman, P., & Friesen, W. V. Measuring facial movement. *Journal of Environmental Psychology and Nonverbal Behavior*, Vol. 1,(1), 1976.
- Ekman, P., & Friesen, W. V. *Manual for the facial action coding system*. Palo Alto: Consulting Psychologists Press, 1977.
- Ekman, P., Friesen, W. V., & Ellsworth, P. *Emotion in the human face: Guidelines for research and an integration of findings*. New York: Pergamon Press, 1972.
- Ekman, P., Friesen, W. V., & Tomkins, S. S. Facial affect scoring technique (FAST): A first validity study. *Semiotica*, 1971, 3(1), 37-58.
- Ekman, P., Jones, R. T., Friesen, W. V., & Malmstrom, E. J. Psychoactive drugs and the recognition of facial expressions of emotion. Unpublished manuscript, Langley Porter Neuropsychiatric Institute, San Francisco, 1970.
- Ekman, P., Malmstrom, E. J., & Friesen, W. V. Heart rate changes with facial displays of surprise and disgust. Unpublished manuscript, University of California, San Francisco, 1971.
- Ekman, P., & Rose, D. In P. Ekman, Progress report to National Institute of Mental Health, Bethesda, Maryland, 1965.
- Ekman, P., Sorenson, E. R., & Friesen, W. V. Pan-cultural elements in facial displays of emotion. *Science*, 1969, 164,(3875), 86-88.

- Huber, E. *Evolution of facial musculature and facial expression*. Baltimore: Johns Hopkins Press, 1931.
- Izard, C. E. *The face of emotion*. New York: Appleton, 1971.
- Kanner, L. Judging emotions from facial expressions. *Psychology Monograph*, 1931, 41 (3, Whole No. 186).
- Klineberg, O. *Social Psychology*. New York: Henry Holt, 1940.
- Kozel, N. J., & Gitter, A. G. Perception of emotion: Differences in mode of presentation, sex perceiver, and role of expressor. Technical Report No. 18, Boston University, 1968.
- LaBarre, W. The cultural basis of emotions and gestures. *Journal of Personality*, 1947, 16, 49-68.
- Lanzetta, J. T., & Kleck, R. Encoding and decoding of facial affect in humans. *Journal of Personality and Social Psychology*, 1970, 16, 12-19.
- Levitt, E. A. The relationship between abilities to express emotional meaning vocally and facially. In J. R. Davitz (Ed.), *The communication of emotional meaning*. New York: McGraw-Hill, 1964.
- Osgood, C. E. Dimensionality of the semantic space for communication via facial expressions. *Scandinavian Journal of Psychology*, 1966, 7, 1-30.
- Plutchik, R. *The emotions: Facts, theories, and a new model*. New York: Random House, 1962.
- Shannon, A. M. Differences between depressives and schizophrenics in the recognition of facial expression of emotion. Unpublished doctoral dissertation. University of California, San Francisco, 1970.
- Shannon, A. M., & Ekman, P. Psychopathology and the recognition of facial expressions of emotion. Unpublished manuscript, 1976.
- Tomkins, S. S. *Affect, imagery, consciousness*. Vol. 1. *The positive affects*. New York: Springer, 1962.
- Thompson, D. F., & Meltzer, L. Communication of emotion intent by facial expression. *Journal of Abnormal and Social Psychology*, 1964, 68, 129-135.