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Facial Signs: Facts, Fantasies, and Possibilities

Paul Ekman

He looks like someone I can trust, and intelligent too. Must be about 50 years old, and I bet his family came from Norway. You can tell he's had a lot of laughs in his life, but right now he seems to be a little blue. He's a handsome fellow, and just look, he seems to be sexually interested in that woman.

Judgments like these are often made on the basis of facial appearance. Some of them may be accurate, correctly identifying something about the person. For example, gender is often accurately identified from facial appearance; accurate information may also be gleaned about a person's age, but there is more room for error. Some judgments may be based on stereotypes, with no grounding in fact. Some people may believe, for example, that a relatively large forehead indicates intelligence, or that crowsfeet wrinkles are evidence of a happy life. Some judgments may be quite idiosyncratic. There may be no shared beliefs, let alone accuracy. For example, the wrinkle that one person interprets as a sign of wisdom may be interpreted by another as a sign of dissolution.

Although some judgments have been subject to considerable study (e.g., judgments of emotion, personality, memory for faces), little is

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known about most judgments of the face. Which are accurate, which are stereotyped, and which are idiosyncratic? What facial clues does each type of judgment rely upon? Is it the wrinkles, the shape of the features, the skin texture, or the temporary movements of the skin that are the basis of judgments of age, mood, intelligence, etc.? Our research on the face¹ (Ekman and Friesen, 1969, 1971, 1975; Ekman, Sorenson, and Friesen, 1969; Ekman, 1972, 1973) has focused upon just one type of information available from the face—emotion—and just one source of that information—movements of the face (what are called the expressions). In this report I will consider many more types of information than emotion and many more sources than the facial expressions. Occasionally, research data will allow some precision in linking a type of information (e.g., emotion) to a particular facial source or sign vehicle (e.g., facial muscular contraction). Most often, only questions or hypotheses can be raised for consideration. In discussing each type of information an evaluation will be made as to whether judgments are likely to be accurate, stereotypical, or idiosyncratic. Usually these evaluations will be conjectural rather than based on data.

The sources of information, the facial sign vehicles, can be classified into four groups: static, slow, rapid, and artificial. The *static* signs listed in Table 1 are not completely immutable, but they change much less than the slow signs. There are changes in bony structure, features, and skin pigmentation with growth. And, these static signs can be modified by experience of one kind or another, but it is useful to separate them from the next two sets. The *slow* signs are the changes that occur with age, becoming pronounced in middle and old age. There is another group of slow changes, those that occur during infancy, childhood, and adolescence, which my lack of knowledge causes me to omit, although they belong in this scheme.

The third set of facial signs are the *rapid* changes, which can occur in a matter of seconds. Some of the rapid signs may be more visible than others. For example, some changes in muscle tonus may be quite subtle or not visible at all. Even if not visible, muscle tonus changes could provide information to another person through touch, or could provide information to the person himself through proprioceptive or cutaneous feedback. Temperature changes may be primarily a self-informative sign, although they are also available to others through touch.

The fourth set of facial signs are artificial in the sense that they interfere with the static and slow sign vehicles. Apart from optical glasses

Table 1. Sources (sign vehicles) for facial information

STATIC SIGNS	
Bony structure	Tone: <i>Level and pattern of electrical activity in non-mobile face.</i>
Features: <i>Size, shape, and location of eyes, brows, nose, mouth.</i>	Coloration: <i>Blushing and blanching.</i>
Skin pigmentation	Temperature
SLOW SIGNS	
Bags, sags, and pouches	Sweat
Permanent creases	Gaze direction
Blotches: <i>Color changes in specific areas.</i>	Pupil size
Texture: <i>Scaling, bumps, etc.</i>	Head positioning
Facial hair: <i>Changes in amount, distribution, and pigmentation.</i>	ARTIFICIAL SIGNS
Scalp hair: <i>Changes in amount, distribution, and pigmentation.</i>	Glasses
Fatty deposits	Facial hair: <i>Removal by permanent means or daily.</i>
Teeth	Scalp hair: <i>Additions by hair-pieces or transplant or removal.</i>
Skin pigmentation	Cosmetics: <i>To change skin coloration, cover wrinkles, redraw brow shape and location, etc.</i>
RAPID SIGNS	
Movements: <i>Muscular contractions that move skin and change shape of features.</i>	Face lifts: <i>To tighten skin, remove wrinkles, eliminate pouches and bags.</i>

used to improve vision, most of the artificial signs attempt to enhance beauty or combat signs of age, which, as we will discuss later, is often the same thing.

This listing of facial sign vehicles is not proposed as final or comprehensive, but it is useful for what we will discuss. If, for example, we were to discuss in any detail the facial signs of disease, the list of facial sign vehicles would have to be considerably elaborated.

The first four types of information that we will consider concern different aspects of a person's identity. The face identifies a particular person—"That is John walking down the street towards me." Even if we are not familiar with him, we may still judge that he looks so similar to someone we know that he might be a relative. Even if he did not look like a relative of someone we know, we may think we recognize something about his national origin—"He looks as though he comes from an

Italian background." The face also indexes race, at least in terms of such gross distinctions as Black, Caucasian, or Oriental. The unfamiliar face is informative also of whether the person is male or female. Age is another aspect of identity judged from the face, but we will consider it much later.

1. PERSONAL IDENTITY

We distinguish one person from another by their faces. It is probably the primary way we distinguish and remember each unique member of our species. This is not to suggest that there are not other signs of identity, e.g., fingerprints, or even identity signs requiring no special aids to perception, such as voice characteristics, posture, gait, etc. There is even research suggesting infants can identify particular persons from olfactory cues (Russell, 1976). I suggest that the face is the main, most commonly employed visual identity sign.²

People differ in their ability to remember faces and recall whether or not they have seen a particular face before. Memory for faces is the result of the interplay among the sex and race of the perceiver and the sex and race of the person perceived (cf. Cross, Cross, and Daly, 1971; Chance, Goldstein, and McBride, 1975; Malpass and Kravitz, 1969). A number of studies have examined the basis for the influence of race (in perceiver or perceived) in memory for faces. The amount of exposure to members of another race, one's social attitudes toward members of another race, and personality variables all seem to be relevant when the races of the perceiver and the perceived differ (cf. Galper, 1973; Lavrakas, Buri, and Mayzner, 1975; in addition to references cited above). Apart from race, faces rated as unique (Going and Read, 1974) or beautiful (Cross, Cross, and Daly, 1971) by one group of subjects tend to be better remembered by other comparable groups of subjects. Cognitive style, in particular measures of field independence-dependence, has been found to be related to memory for faces, but the results have not been consistent (Messick and Damarin, 1964; Lavrakas, Buri, and Mayzner, 1975). A more robust and consistent finding has been that people who are right-hemisphere dominant, or those having a left- rather than a right-hemispheric lesion, are better able to remember faces (see Levy, Trevarthen, and Sperry, 1972; Rizzolatti, Umiltà, and Berlucchi, 1971; Yin, 1970). It is not certain, however, whether these findings are specific to memory of human faces or general to a type of information processing.

Children can discriminate their mothers' faces from the faces of strangers by the second month (Carpenter, 1973; Maurer, 1975), but little is known about the further development of facial recognition over the first few years of life. We do not know the limits of an adult's ability to discriminate and remember faces. Just how many different faces can we retrieve and identify as having been previously known?

Probably the chief source (sign vehicle) for distinguishing identity are the features (their shape, size, and relative location), and to a lesser extent the facial contours due to the underlying bony structure. Many other factors can aid identification, if salient, and yet many of the other facial signs also can erode the ability to identify.

Anything in Table 1 could aid or become the prime source for identifying a person, but it is unlikely that the rapid signs usually function in this fashion. They usually are not constant enough to be useful for distinguishing one person from another. It is more likely that rapid muscle contractions are a source of interference, sometimes so distorting the static facial signs as to render identification temporarily impossible. A manneristic rapid facial sign that characterizes a particular person or a tic could be an identity sign, but probably not an important one. The changes with age may also interfere with recognizing identity, but we will return to this later when we discuss the facial signs of age.

2. KINSHIP

Presumably, the very factors that permit identification of a person allow identification of his kin. The static facial sign vehicles are in part the product of heredity, and similarities in facial appearance among close relatives may be recognized. We do not know if this is possible throughout life. It is often said that infants show less individuality than do adults, suggesting the *possibility* that some facial identifiers may only emerge as the infant's face grows and differentiates. Are family resemblances evident at birth? Might these only become evident after certain growth? My hunch is that the answer depends on just how unusual the particular facial features are, but more of that line of speculation when we discuss facial age signs.

Not much is known about kin recognition from facial signs. There is no clear evidence that it is actually possible and not just a folk belief, but it seems obvious that at least some kinship recognition is possible

from the face. How far does kinship recognition extend; to first cousins, second cousins, etc.? Popular belief is that not only can kin be recognized, but people who come from the same region (presumably because of inbreeding) have a particular facial appearance. To wit, the supposed difference in permanent facial signs for the southern European, the Nordic, etc.

If kinship recognition does occur with any degree of accuracy, inherited similarities in the static signs in the face are only one possible basis. It might be that people who live together develop the same facial habits. They may learn to show similar facial muscle actions or a similar pattern of muscle tone in the face at rest. (Birdwhistell [1970] has speculated along these lines; and Seaford [1975] has found similarity in the smiling faces in yearbook photographs among people from a particular geographical area.) Imitation of rapid signs not inheritance of static signs might be responsible for kinship recognition, if there is indeed kinship recognition. It would be interesting to determine whether the belief that husbands and wives have similar facial appearances is actually so. Can observers match spouses on the basis of their faces; is this possible early in their relationship, or only after they have lived together for some years?

3. RACE

Race is commonly recognized from the face, primarily by skin pigmentation, and probably to a much lesser extent by underlying bony structure and racial differences in the features. No one that I know of has followed Huber's (1931) suggestion of racial differences in the musculature, which, if true, could allow racial identification from either the rapid facial movements or differences in the appearance of the still face.

4. GENDER

Gender is also identified from the face, although obviously it can be identified from other sources. Facial hair is an obvious source for distinguishing the hairier, adult male from the female, although the extent of sex difference in facial hair varies among racial groups. It is curious that a dimorphic sign would be marked in only some racial groups and not be general to the species.

Various means can and often are used by males to eliminate facial hair and by females who have heavy or dark facial hair. Pelligrini (1973) found that young adult males were judged as more masculine, mature, dominant, courageous, liberal, nonconformist, industrious, and old when their faces were full-bearded than when their faces were clean-shaven. Pelligrini recognized the need to investigate the generality of his findings for older males and among various people who judge the faces. Some judgments (e.g., liberal) are likely to be quite specific to a particular point in time in the customs of a particular culture. The judgment of age on the other hand, is obviously biologically based. What about dominance—would any generality over time and across cultures be found in the attribution of dominance to bearded faces? It is interesting to note that female rulers in ancient Egypt attached goatees to their faces in ceremonial appearances to signify their power.

Scalp hair can also be used to distinguish gender. The length and styling of scalp hair for males and females has varied through history. Custom has usually prescribed a difference between what males and females wear. Recent styles, the so-called unisex, show this need not be so.

Males have proportionately bigger heads than females, but the overlap is considerable. The brow ridge is more prominent in males, but I do not know if there are other sex differences in bony structure that influence facial appearance. Are there sex differences in features, their size, shape, and relative placement? Liggett (1974) claims that the female nose is smaller than the male, and shaped differently than the male, more like the shape of the child's nose. He also claims that in females the mouth is smaller, the eyes larger, the features finer, and the skin more transparent. Unfortunately, Liggett neither cites the work of others nor provides any data of his own to support these assertions.

Cosmetics are employed by females to enhance or create marked sex identifiers in the face. It would be interesting to look at the use of cosmetics by males and females historically as well as cross-culturally. I know of only one such study, in regard to outlining the eye, which is not sex-specific (Coss, 1974).

Do the faces of males and females age differently? Can we tell gender from any of the slow signs listed in Table 1? Females have smoother skin than do males because of estrogen. What about the rapid signals—

e.g., do females characteristically blush more than do males? Freedman (1974) suggests that during infancy females smile more than do males, and he does not attribute this to different child-rearing. Korner (1969) reported that newborn females smiled almost three times as often as did males. If there are such sex differences in the rapid signal system, they probably are not the usual means by which people identify gender from the face.

It is not clear when gender facial signs become most pronounced. It is commonly believed that it is difficult to tell male from female infants from the face alone. In adolescence, when many other gender changes occur, it might be expected that the facial gender signs become most pronounced. It would be interesting to determine whether there is also a decline in the clarity of the facial gender signs later in life when sexual fertility declines.³

5. TEMPERAMENT, 6. PERSONALITY

There is much less argument about whether someone is male or female, Black or White, than about a person's temperament, personality, or moral character. Yet, through many periods of history people have believed that they could derive such information from the face, usually claiming that variations in the features show temperament or personality. In the eighteenth and nineteenth centuries physiognomy was scientifically respectable. While no longer credited by the scientific community, this idea has not died out: a number of recent books have told how to read moral character or personality from a mixture of static and slow facial signs (Jordan, 1969; Lefas, 1975; Mar, 1974).

It seems unlikely that static facial signs are actually related to temperament or personality. One would have to assume that temperament and personality are in some part inherited (more probable for the former than for the latter) and that there is some linkage between their inheritance and the inheritance of static facial signs. Such a linkage between temperament or personality and body type is maintained by some (Sheldon, 1954). A link between static facial signs and personality cannot be ruled out without better empirical study. No serious research has been done on this topic for forty years. Although the early studies obtained negative results, they suffered from serious flaws in sampling of faces or measurements of either the face or temperament and personality.

Quite apart from the question of whether the face provides accurate information about personality or temperament is the issue of whether people share beliefs that faces do so. Here, there has been considerable research, mostly by Secord and his associates in 1954 (see Secord [1958]). In their experiments they accumulated unquestionable evidence that people share a variety of beliefs about the personality characteristics associated with facial appearance. The amount of consensus amazed these investigators. Recently, Hochberg and Galper (1974) have found that people agree not just in trait judgments but also in attributing interpersonal intentions to particular faces. Shoemaker, South, and Lowe (1973) have found that people also share beliefs about the faces associated with different crimes, and about whether a person is innocent or guilty of a crime.

There has been much less progress in specifying the basis, the facial sign vehicles, for judgments of traits, intentions, crime, etc. Secord's work is all that is available, and while strong in questions asked, data analysis, and theoretical interpretation, it was remarkably weak in number of faces studied (only 24) and in the facial signs measured (ratings of just some aspects of facial appearance confounding in the same rating scale static with rapid signs). Secord's work was an important beginning in specifying facial signs relevant to the judgment of personality, although virtually no one has followed. To give a taste of his findings, consider the traits associated with young faces without forehead wrinkles (energetic, conscientious, warmhearted, friendly, intelligent, expressive, air of responsibility, easygoing) as compared to older faces with average forehead wrinkles (meek, studious, air of refinement). Now that new methods have been developed to measure static facial signs directly (for example, profilometrics described by Peck and Peck) and rapid facial signs (for example, The Facial Action Coding System developed by Ekman and Friesen), Secord's work should be redone with a much larger and more representative sample of faces.

Secord provided a very useful discussion of the possible bases for consensus about the facial appearance associated with different personality traits. One possible explanation, of course, is that these are accurate judgments not stereotypes, based on some biological link between facial appearance and personality. While Secord thought this unlikely he acknowledged the need for better study of this possibility. Pertinent here would be a determination of whether there are uniformi-

tics among different cultural groups in the way they associate appearance with personality. With the dispersion of mass media presentations of the visual appearance of different heroes and villains, such work had better be done quickly while uninfluenced groups still remain. Secord noted that media influence might explain his finding that dark complexioned, oily skinned faces were associated with negative traits (hostile, boorish, conceited, etc.), citing Berelson and Salter's (1946) finding that in fiction villains are dark and swarthy while heroes tend to be blond and fair.

Another explanation for consensus in judgment of personality from faces offered by Secord is what he termed temporal extension. If you see a smiling face you assume smiling might be an enduring or frequent occurrence and so judge the person to be friendly. A related idea is our hypothesis that permanent facial signs that resemble the rapid facial signs of emotion tend to give an impression related to that emotion. For example, a person with brows placed quite low, with inner corners close together and with lids covering the top part of the iris, may tend to appear stern, unfriendly, or even hostile. Such a stereotype might occur, because in anger the muscular contractions in that region of the face temporarily lower and draw the brows together.

While I doubt that anyone will uncover evidence that the static facial signs provide accurate information about temperament or personality, it is possible that personality or temperament may be revealed in one or another rapid facial sign. Let me give some examples, bearing in mind that each is speculative and without a shred of evidence.

One aspect of what is meant by temperament is some lifelong characteristic level of responsivity to stimulation, in particular, emotional responsivity. Some people may seem rather slow to respond while others seem to be rather quick to respond to emotional stimulation. The latency of facial muscular actions might be an index of such a temperamental difference in responsivity. Of course, we must first determine if there are stable individual differences in latency of facial movement.

Another possible sign of such temperamental differences in emotional responsivity or of personality might be the pattern or level of muscle tone in the face when it is not moving but is more or less at rest. Little is known about whether people characteristically maintain a particular pattern of facial muscle tonus in the resting face, and if so whether the pattern would indicate anything relevant to personality. In recent work Schwartz, et al. (1976a, 1976b) used electromyographic

measures to study presumably nonvisible facial activity, which is relevant to what we have been describing as the muscle tone in the resting face. Schwartz found depressed patients differed from non-patients in electrical activity when instructed to think of different emotions. Work has still to be done to explore whether there is a facial set when the patient is not following an instruction to think about emotion.

Personality may be manifest also in what the face shows about the characteristic secondary emotion that closely follows the arousal of a particular emotion. Tomkins (1962) described affect about an affect, the feelings you have about a feeling. For example, when you feel angry, you may habitually feel disgusted at yourself for being angry, or afraid of your anger, or saddened that you are angry, or gleeful in your anger, etc. If these affects about affects are stable through periods of life (which Tomkins suggested), it seems reasonable to expect that they might be considered indexes of personality.

Personality *may* also be evident as a result of habits learned early in life to control rapid facial movements. We (Ekman and Friesen, 1975) have speculated that habits about managing facial movements can result in a number of chronic facial styles: people who typically inhibit the signs of certain emotional expressions or the signs of emotional expressions in general; people who typically substitute the signs of one emotional expression for another; people who almost manneristically, flash the signs of one emotion regardless of the input. If such styles do indeed exist (and as of now there is only sparse anecdotal evidence), it is likely that they would be considered signs of different personalities.

Psychopathology, in particular, severe depression or anxiety states, may be evident in another type of rapid facial sign. We have used the term *flooded-affect* to refer to a state in which the person shows the muscular actions of only one or two emotions with great frequency, often with little obvious external provocation, and seemingly in disregard of an environmental stimulus or in contradiction to the normative emotional reaction to such a stimulus. An affect is flooded if it is high in the person's response hierarchy, if it is difficult or not possible for the person to turn off or modulate once the expression has begun, and if it interferes with work, sleep, eating, etc. The evidence for flooded-affect as an index or symptom of psychopathology is clinical-anecdotal, but it seems promising to explore.

7. BEAUTY

The chief signs of beauty or ugliness in the face are probably the size, shape, and location of the facial features, and to a lesser extent surface manifestations of the underlying bony structure. There is much in the way of anecdote but little systematic study of changes in standards of beauty through history and across cultures. Just which features have been idealized as the beautiful? Is it shape, size, location, symmetry, or relationships among features that have always been considered the basis of beauty?

Many artists have described the characteristics of the beautiful face. Leonardo, Botticelli, and Dürer emphasized the relative proportion of the features, as well as particular shapes for particular features. Their ideas suggest that standards of beauty are quite variable. Presumably the advertising industry and the entertainment media today create beauty standards. We do not know how persuasive they are, or whether there are limits to what the media can inculcate about what constitutes a beautiful face. Could the media create a consensus that noses that have a large hump in the middle or very narrow lips are signs of beauty?

In our culture, facial hair, a male sign, detracts from beauty in females. Is that universal? Could the mass media create a new consensus that hairy female faces were beautiful? Should we expect that any other gender sign when manifest in the opposite sex is not beautiful? The phrase *pretty man* suggests that beauty standards can disregard sexual fit. Most of the slow signs listed in Table 1 are age symptoms and as such are the enemy of beauty, at least in Western cultures. Is that universal, or are there cultures that idealize the aged face as beautiful? Later we will briefly mention facial signs of disease. Are such signs always considered detractors from beauty? One instance where it is not was the value given to pallor in Victorian women.

I have found just a few empirical studies of facial beauty, and all of them focus on judgment of female faces. Iliffe (1960) had twelve photos of women published in British newspapers. More than 4,000 people mailed him beauty ratings. There was very high agreement about beauty regardless of the respondent's age, sex, occupation, or region of Britain. The same pictures were published in American newspapers, and Udry (1965) obtained comparable results with no difference from the British judgments. Obviously, such a study should

sample more than a dozen faces. The faces should be a representative sample, or picked according to some explicit a priori set of descriptive or theoretical principles. While Landis and Phelps (1928) made this point forcefully, pointing to the possibility that investigators may unwittingly bias their results by their personal selection of a few faces, and it has been reiterated many times by others, it is usually ignored. If the Iliffe faces had been a representative sample, it would have been important to have them judged by people from a culture more removed from Britain than that of the U.S. If one were to seek a culture where there had been little influence by mass-media portrayals of the beautiful face, the investigator would have the problem of people of one skin color judging people of another skin color, and the potential influence of social attitudes on beauty (cf. Martin, 1963).

Recent work by orthodontists on facial beauty offers a solution to this problem and a promising method for study of many different aspects of the static facial signs. Not content with the consensus among orthodontists about what constitutes a pleasing face, Peck and Peck (1970) developed a method for measuring a number of aspects of facial appearance. Proflometrics, which can be done from a still photograph, yields quantitative scores on a host of static facial signs, e.g., facial proportions, relationships among the three curves in the facial profile, angle of nose to philtrum, etc. They found very little variability in the measurements of 52 people selected to represent the beautiful (beauty queens, models, actresses). Their methods could be used to study males considered beautiful, and most important, to measure a wide range of male and female faces. This larger sample of faces could be also judged on beauty, as well as personality, temperament, intelligence, etc.

8. SEXUAL ATTRACTIVENESS

By sexual attractiveness I refer to some consensus among a group of people that a particular face is sexually appealing. This is not the same as a flirtatious, coy, or coquettish facial action. We will discuss these later under facial symbolic actions, or what we term *emblems*. Presumably, it is possible to have a facial countenance regarded as sexy without engaging in a flirtatious action, and for a person with a face not generally considered sexually attractive, to emit a facial flirtation signal. Sexual interest might also be confused with sexual attractiveness. It is not clear whether there is a facial sign of sexual interest (in general,

in the sense of availability, or sexual interest in a particular person), independent of facial signs of interest in almost anything, including sexual activity. Another unknown is whether there are any facial signs of sexual pleasure, independent of or different from facial signs of pleasure from a non-erotic source. There is some data to suggest that the face judged as sexually attractive is not identical with the face judged as beautiful (see Dillon, 1974).

What makes for sexual allure in the face? Is it the static signs or can it also involve muscle tone, or the lack of it, such as the droopy, bedroom-eyed look? Secord reported that female faces with a lot of lipstick, bowed lips, thick lips, or relaxed lips were rated as sexy. Are there other signs than these? Are sexual attractiveness signs variable through history and across cultures? Is there as much consensus about sexual attractiveness signs for males as there is for females, at different points in history and across cultures? Is there agreement between males and females about sexual attractiveness signs for male and female faces? If signs are uncovered that are in any way biologically related to gender, would sexual attractiveness signs tend to be elaborations of them? Should we expect to see the signs of sexual attractiveness in male and female faces vary and exchange back and forth between male and female over history and among cultures?

Goffman (1976) speaks of how the adult female is presented in the advertising media as childlike in a variety of ways. This fits with the observation that the cosmetic industry's presentation of the sexually attractive female is one whose face is childlike, in terms of the relative size of the eyes. I do not know whether this has been verified as truly sexually attractive or arousing, or whether such an attractiveness sign in females has been studied historically or across cultures.⁴

Hess (1975) has found that males prefer and judge most positively a female face in which the eyes have been retouched to enlarge the pupil. In discussing this finding, Hess noted that a large pupil characterizes the child's face. He also noted that pupil dilation is a sign of interest in children or adults and appears to be so judged. We will return briefly to pupil dilation when discussing signs of emotion.

9. INTELLIGENCE

Intelligence, like personality and moral character, has long been said to be manifest in the face. The eighteenth-century physiognomists looked to the permanent facial signs, in particular the facial features,

for the smart versus dull countenance. I would be shocked if research ever found intelligence correlated with forehead expanse or nose length, or size of eyes, but no one has adequately checked. Pintner (1918) had physicians, teachers, psychologists, and laymen judge the intelligence of twelve children from photographs. He interpreted his results as negative, but the distribution of results he reported for the group of psychologists appears to me to show significant accuracy. Anderson (1921) reported that twelve college students' judgments of the intelligence of 69 faces were slightly better than chance—the correlation with I.Q. was .27. Gaskill, Fenton, and Porter (1927) reported that when 274 observers judged intelligence from facial photographs of twelve boys of the same age, the median correlation of judged intelligence with actual I.Q. was .42. Landis and Phelps (1928) correctly questioned these previous studies since the investigators may have unwittingly biased their results; instead of using random sampling they personally inspected the faces and then chose just a few. Landis and Phelps corrected this problem by selecting randomly eighty photographs from a college yearbook. Inexplicably, rather than study the ability to judge intelligence, they had their judges rate vocational success and type of vocation. Their judges failed on that task, but of course that does not tell us about intelligence. There is still no satisfactory test of the ability to judge intelligence accurately from a facial photograph.⁵ When such work is done, some care should be taken to control for clothing clues, hair styling, and the absence or presence of any rapid facial signals.

Quite apart from the issue of accurate judgments of intelligence, there is little information about the basis for consensus about what constitutes an intelligent face. Again, Secord's studies are all that are available. They do demonstrate that people agree about what is an intelligent face, but provide relatively little information about the facial signs relevant to that judgment. While there is no obvious or apparent logical basis for the development of stereotypes about what the smart face should look like, stereotypes about the dumb face might be based on some version of the static facial configuration found with mental retardates suffering from Down's syndrome. Recently, Joseph and Dawbarn (1970) have systematically measured the unique static facial signs symptomatic of this disease.

Rapid facial signs might be related to intelligence. Haviland (1975) has suggested that many of the techniques used to measure intelligence in infants rely in some part upon rather unsystematic use of rapid

facial signs of emotional expression. She suggests the importance of systematically measuring facial movement in infants and children in relation to intelligence, but she has not yet done so. In some of our recent studies in collaboration with pediatricians we have learned of their belief that mental retardation can be diagnosed not just from static facial signs, but from something about the rapid facial signs (Nyhan and Shear, pers. comm.). It would seem reasonable to explore whether the face of the mentally deficient or marginally intelligent person is characterized by: slower latency of muscular contractions for the emotion signs; less complex muscular contractions for the emotion signs; lower overall level of electrical activity in the face at rest (less muscle tone); different bony structure (which could in part, at least, result from retarded growth due to less muscular activity). If there are such indexes of low intelligence, it may be worth considering whether there are also signs of unusually high intelligence. We would suspect the rapid signals as the source.

10. DISEASE

Facial indexes of a variety of physical diseases are revealed through peculiarities in static, slow, or rapid facial signs (e.g., Goodman and Gorlin, 1970). It would take us too far afield to describe these here. It is worth noting, though, that the facial evidence of some diseases may not be an obscure signal system, interpretable only to the physician. For some diseases the facial sign that something is amiss may be evident to the person and others who view him.

11. EMOTION

Having spent all this time discussing matters which I have not studied, let me turn to something we have investigated, the facial signs of emotion. Temporary changes in feelings, emotions such as fear, surprise, anger, disgust, sadness, happiness can be signaled through the rapid contractions of the facial muscles, which move the skin about temporarily changing the shape and even the location of the features, causing wrinkles, pouches, bags and bulges to appear on the face. These facial expressions of emotions typically flash on and off the face in a matter of just a few seconds, often lasting less than one second. There is now considerable (I judge conclusive) evidence that these facial signs for

emotion—the particular muscles likely to be recruited for each of a number of emotions—have evolved and are therefore universal.⁶

This is not to suggest that when an emotional event occurs you will see the same facial expression on everyone's face within a culture or in any two cultures. There are important differences within and between cultures in what is learned about the need to control facial expression in public places. Even when people feel the same way in the same situation, they may not all show the feeling on their faces. Some may mask it with another feeling, some may inhibit it totally, some may amplify it or deamplify it. Rules about controlling facial behavior are learned so well that usually we do not know of their operation except when someone fails to follow them. There are individual differences in the rules for controlling facial expression that probably reflect personality as well as social class. Clearly there are also differences between cultures in these rules about managing the appearance of the emotion signs. One of our main studies (Ekman, 1972, 1973: 214–18; Friesen, 1972) of facial expression examined the spontaneous facial behavior of Japanese students in Tokyo and American students in Berkeley, under conditions where they would and would not be likely to mask their facial behavior. The faces of students of both cultures were videotaped without their knowledge while they individually watched stress films. In one part of the experiment they thought they were alone, and in another part of the study a research assistant talked with them as they watched the film. When alone, rules for controlling facial behavior should be less operative, and we expected the universal form of the expressions would be shown. Indeed, we found a very high correlation between the specific facial movements emitted by Japanese and Americans when watching a stress film alone. When in the presence of another, in particular a representative of "science," we expected the Japanese more than the Americans to mask with smiles negative affect aroused by the film. Measurement of the spontaneous facial behavior confirmed this prediction. There were major differences in facial behavior between Japanese and Americans in the more public situation.

Another source of differences in facial expressions of emotion within cultures and between cultures has to do with the learned triggers of emotion. While there may be some universal or nearly universal emotion triggers (e.g., death of a child), even within a culture we are not all made angry, disgusted, sad, etc., by the same events.⁷ Often we do not see the same facial sign of emotion in different people in the

same situation, or when members of different cultures are in the same situation, because the situation calls forth a different emotion.

A third way in which cultures may differ is in the extent to which facial expressions of emotion are named. Rosch and Heider in their study of the Dani in New Guinea found evidence for the universality of facial expressions, but no names in the language for some of the emotions.⁸

My discussion of emotion has argued that the linkage between facial movement (sign) and emotion (significant) is natural,⁹ with an evolutionary basis, rather than a conventional or arbitrary association. Much of the misunderstanding of this view of facial expression has been based on the assumption that if facial expressions are evolved behavior (as we claim), and if the relationship between sign and significant is natural (as we maintain), then we must also believe that facial expressions are impervious to the influence of culture. But, we have never said that facial expressions are *always* automatic or unwitting. Facial expressions of emotion are not fixed-action patterns or instincts of some kind, impervious to culture. They can be automatic, but not always or even usually.¹⁰

The facial nerve is connected to the very old and to the newer parts of the brain. Facial expressions of emotion are at times an involuntary automatic response, and at other times, a voluntary, well-managed response system. Facial expressions of emotion can be reflexlike in their speed. They also resemble reflexes because of the natural linkage between sign and significant. Facial expressions are language-like in that they often are voluntary, and the involuntary facial expressions are vulnerable to interference or modification by custom, habit, or choice of the moment. People can and often do put on false expressions to play with or seriously mislead another. Much of our current theorizing (Ekman and Friesen, 1975: chap. 11) has described the difference between simulated and felt facial expressions, and where to look for traces (what we have called leakage) of felt facial expressions that a person is attempting to conceal. While we have support for some of our ideas (Ekman and Friesen, 1974a), much of this theory is only now being subjected to empirical test.

The evidence on the universality of facial signs of emotion is limited to just the six emotions of happiness, fear, surprise, sadness, anger, and disgust. Interest is another emotion for which there may be a universal facial sign, but there are no conclusive data. We doubt that there

are many more emotions that are universal in appearance, where sign and significant are naturally linked. Cultures may well differ in the extent to which they name other emotional states and by convention assign facial configurations to them.

Much of our work of the last few years has explored and described these rapid facial movements, which are signs of emotion. Our research and that of others suggest that people differ in their ability to interpret these emotional signs.¹¹ We have developed materials (Ekman and Friesen, 1975) to instruct people how better to recognize emotion signals. Such recognition is easy when the emotion is shown across the entire face, if the movement is held for a few seconds, without competition from words, body movements, voice tone, etc. Those conditions rarely happen. Difficulty in recognizing facial expressions of emotion occurs because the expression is usually brief and competes with other signals for attention, and because the expression is limited to one facial area, blended, or masked.

Facial expressions of emotion often are shown in just one area of the face, rather than across the entire face. This can happen early in the arousal of an emotion, or when the arousal of an emotion is slight, or when the person is attempting to control facial appearance. Emotions often occur in blends, and the face can show such blends of emotion. Sometimes each of the blended emotions registers within one facial area, such as a mouth movement that looks both fearful and surprised. Sometimes each of the blended emotions controls the muscles affecting a different facial area, so that, for example, the brows could register fear and the mouth surprise, or vice versa. The smile is shown not only when someone feels happy or wants to signal compliance or agreement, but often when a person uses it to mask the expression of a negative emotion. Determining whether these are blends or instances where the smile is a mask requires more information. It is necessary to evaluate the social context in which the expression occurs, other behavior coincident with the expression, the sequence of facial movements in the expression, etc.

We have recently developed a comprehensive system for describing and measuring the facial movements, and not just those that may be relevant to emotion (Ekman and Friesen, 1976, 1977). Much of the research on the face has been stymied by the lack of a tool for measuring facial movements. Previous attempts have catalogued a limited number of facial movements.¹² Usually there was little information

given about how the author chose the type and size of his units of measurement, or why he chose to include or exclude one or another facial behavior. The Facial Action Coding System we have devised is based on how each muscle acts to change facial appearance temporarily. The units of measurement are based on visibly distinguishable changes produced by movements of the facial muscles. The measurement procedure tells us about the variety of rapid facial muscular movements that the human can make. The Facial Action Coding System distinguishes more than 10,000 different facial actions.

I have been discussing how the rapid facial muscular movements provide information of emotion. Let me mention five other rapid facial signs of emotion. Tomkins (1962) wrote about vascular changes in the face associated with emotion. We are all familiar with blushing, blanching, and hot and cold feelings in our face. Yet to my knowledge there has been little, if any, systematic study of thermal and coloration changes. Facial sweating, either hot or cold, could also be a sign for one or another emotion, but it too has not been studied. The muscular tone of the face when it is not moving, the particular pattern and/or level of electrical activity, might also be related to specific emotions. Schwartz's work (referred to earlier) suggests that this may be a promising line of study. Hess's (1975) work on pupil dilation, discussed earlier, shows that the pupil enlarges with emotional arousal. Increased pupil dilation is a sign of interest, but it is not clear whether it is a sign of only a positive interest or if it could also be a sign of negative interest. For example, if a person is afraid, but rather than fleeing he vitally engages in coping with the source of the fear, would there be pupil dilation just as there is when the person is interested in a pleasing stimulus?

While coloration changes and sweating are visible signals, the muscle tone changes and those thermal changes that do not produce visible changes in coloration may provide a sign only to the maker not to the viewer. Pupil dilation provides information to the viewer only in blue-eyed people, and recent work discussed by Hess found that pupil dilation variations were greater among blue-eyed than brown-eyed persons.

All five of these emotion signs—changes in temperature, coloration, muscle tonus, sweating, pupil dilation—are similar to facial expressions of emotion in that the link between sign and significant is natural not conventional. Unlike facial expressions, these five signs are very difficult to control or inhibit.

12. MOOD

Mood is a close relative of emotion but refers to a more enduring state than emotion. You feel sad for a few minutes, but you are blue for half a day. You feel angry for a moment or a few minutes, but you are irritable all day. Moods may be distinguished in terms of whether the specific emotion or blend of emotions is felt continuously or intermittently. In a mood in which there is an intermittent emotion, that emotion is not always apparent but is ready to become apparent, is easy to provoke, and is high in the person's response hierarchy. While not fuming continuously in an intermittent angry mood, the person is highly ready to become angry. Little provocation (sometimes any stimulation or environmental change) calls forth his anger. The intermittent mood should be signaled by the high frequency with which a particular emotion or emotion blend is shown in rapid facial movements within a given time interval.

A continuous mood may also show a high frequency of rapid facial movements, but we expect that those muscle actions will not be maintained continuously in a high state of contraction. The person who is continuously angry for two hours may frequently show *corrugator*, *procerus*, and *depressor supercilli* muscle contractions (which lower and draw the eyebrows together), but we would not expect that he could hold those muscles in a high state of contraction continuously. Fatigue would occur. Instead, there might be a slight increase in muscle tonus in those particular muscles maintained during his angry mood. Such a slight increase in muscle tonus might or might not be visible. If it were visible, it would be very subtle.

Note that this discussion of the facial signs of mood is conjectural, since this is largely an uncharted area.

13. EMBLEMS, 14. ADAPTORS

Let us consider some other types of information that are provided by the rapid facial muscular movements. There are a limited number of symbolic gestures, or what have been termed *emblems*,¹³ shown in the face, although most such emblems involve the hands. The wink is a good example of a facial emblem. Emblems can signify anything, but the process of signification is such that the viewer believes that the maker did the movement to send him a message. You hold a person

accountable for his wink, much as you would for his word. You believe he did it to tell you something. In this way emblems are the opposite of facial *adaptors*, movements in which the person engages in a non-instrumental, self-manipulative action. Lip sucking, lip biting, pushing the tongue around the cheeks and lips, using the tongue to wipe the lips, and a variety of lip movements can be considered what we have termed adaptors.¹⁴ These are restless, nervous movements. They occur seemingly with little awareness. Individuals vary markedly in their typical rate of adaptors, but when a person becomes uncomfortable his rate of adaptors often increases above his own baseline.¹⁵ These facial adaptors may provide information to the viewer. You may infer the person is ill at ease, but the knowledge is stolen, in the sense that the viewer does not believe the maker performed the movement to tell the viewer something.

15. ILLUSTRATORS

The face is used also to illustrate spoken conversation, much as the hands do. We distinguish among the following different types of hand illustrators:

- batons*, emphasis movements that accent a word
- underliners*, movements that emphasize a phrase or a clause
- ideographs*, movements that sketch the path or flow of thought
- deictics*, movements that point to an object, place, or event
- spatials*, depictions of a spatial relationship
- rhythmics*, depictions of the rhythm of an event
- kinetographs*, movements that represent a type or sequence of actions
- pictographs*, movements that draw a picture in the air to show the shape of the referent. (Cf. Ekman and Friesen [1972] for a detailed description of these illustrator sub-types.)

There is probably less variety in facial illustrators than in hand illustrators. It is possible, for example, to use your lips in a pictographic illustrator to show the size of an opening. But consider the impossibility of using a facial movement to draw a sphere or an hourglass figure, which are easy to depict by hand pictographic illustrators. There are probably just a few kinetic illustrators in which the face performs an action talked about in the conversation. For example, you can say that you

spit the food out, and make a spitting movement with the lips. Obviously, the hands can perform many more different kinetic illustrators than can the face.

The commonest types of facial illustrators are probably the baton and the underliner, facial emphasis marks that italicize a word or a phrase, repeating in the face what is shown in the voice in loudness. The eyebrows are the most commonly used baton and underliner illustrators, most often either a raised or a lowered drawn-together brow action. Sometimes the upper eyelid is raised or the lower lid is tightened as a baton or underliner illustrator. Lip protrusions also are used seemingly as baton illustrators. Conceivably any other facial muscular action could be used as a baton or underliner illustrator, although we have not observed others.

16. REGULATORS

The face plays a role in regulating the flow of conversation. Facial signals convey whether the person is listening, understanding, or allowing the speaker to continue, or wishes to gain the floor. Dittman (1972) has studied such listener responses as specific muscular contractions (smiles), gaze direction, and head nodding. Duncan (1973) and Kendon (1973) have also detailed how these facial acts function in turn taking during conversation.

We believe that a number of facial emblems function as regulators provided by the listener to the speaker during conversation. These include, in addition to the agreement signs studied by Dittman and others, the facial emblems for exclamation, for questioning, and for incredulous disbelief. We have observed these in conversation, but we have not systematically studied their use or looked carefully for other such facial regulators.

The face may also provide syntax signs, although this has been studied only in conversation among deaf individuals using American Sign Language. Liddell (1975), working in Bellugi's laboratory, has found a particular facial movement that marks a relative clause. This facial action appears while the relative clause material is signed with the hands and disappears when the relative clause is over. There might be such facial syntax signs among hearing people as well. My experience when consulting with Bellugi's group on how to measure facial syntax signs suggests it will be very complex, requiring detailed and

precise measurement to disentangle the various facial rapid movements that occur during conversation with deaf or hearing persons. During speech (or during ASL signing) some facial movements are emotional expressions, some are illustrators, some are regulators, some are emblems, and some may be syntax signs.

17. AGE

The face changes with age. The most rapid changes occur in the first few years of life, but changes occur throughout life. In Table 1 I have listed only those slow signs that index the changes in middle and older age. Individuals differ in the onset of these indexes of increasing age and in the particular pattern of signs that become permanently part of their face. We do not all develop the same set of permanent creases in the face or the same bags or sags. I do not know whether there are sex or racial differences in the amount or type of slow signs of old age. Anecdotal, it appears to Westerners that the Japanese do not show these age clues. It is difficult for Westerners to read age from a Japanese face; is it difficult for fellow Japanese?

What is responsible for the differences between people within the same culture in the slow facial signs of old age? I suspect that hereditary factors play the largest role. Some of the slow facial signs of age may result from the type of bony structure and the location and shape of the facial muscles. Skin elasticity, or the loss of it, may play an important role as well, and this may be influenced in part by heredity. Heredity also determines the pattern of fibers in the skin that may cause it to be more elastic when pulled in one direction than when pulled in another direction. Dermatologists and plastic surgeons say that exposure to the sun and wind decreases overall skin elasticity and facilitates permanent creases and bags. Nutritional factors are probably also relevant to skin elasticity, the shrinkage of the facial muscles, and the occurrence of blotching or textural changes in the skin. Usage of the muscles is another variable, but I will discuss it below, in relation to the notion that the face may show the emotional history of the person.

We believe that we can recognize the person across age changes, but can we? To what extent do the slow signs of age degrade the identity signal? If we divide life into the epochs of infancy, childhood, adolescence, young adult, mid-life, and old age, it is sensible to expect

that identity can be recognized between adjacent epochs. To my knowledge no one has studied just how far identity signs can skip across developmental epochs.¹⁶ I suspect that the answer will vary in part with how unusual a particular feature is and the likelihood that it will survive the appearance changes due to the ravages of time.

Quite separate from the matter of recognizing the same person over his life-span, is the issue of estimating a person's actual age from his face. Pittenger and Shaw (1975) found age estimates can be made with some accuracy when the ages of the persons whose faces are being judged ranged from 12 to 19. Age estimates were easiest around the years when physical changes are most rapid due to puberty. They were not able to determine the relative contribution of rapid, slow, and static¹⁷ signs to the judgment of age, although their data suggested that all three types of facial signs may be relevant to age judgments.

In discussing beauty earlier, age signs were said to be the enemy of beauty in Western society. The goal of plastic surgery, cosmetics, and even exercise programs is to eliminate the appearance of the slow facial signs that inform about true age, in an attempt to appear younger. In the 1950s, adolescents and young adults in the United States would attempt to look older. Of course their purpose was not to appear middle aged. I have the impression that currently it is not as popular among adolescents to use cosmetics to try to look older, but this too has not been studied.

18. PREVIOUS EMOTIONAL LIFE

The notion of holding a man responsible for the appearance of his face after the age of thirty is attributed to Lincoln. The face is considered a tabula rasa on which is etched a person's emotional history, which is evident in the slow signs of middle age. Young women are sometimes cautioned not to frown or to smile too much, in order to avoid certain permanent facial creases.

I know of no research that has attempted to verify whether usage of the muscles affects in any substantial way the extent or type of facial signs of middle or old age. Certainly, the muscular contractions of the face occur not just for emotion. People move their facial muscles for a wide variety of reasons having nothing to do with emotion. Thus, it is unlikely that emotional life *per se* would determine the age signs, although usage might. Facial muscles, like other muscles, atrophy from

disuse. It is possible that some of the sagging that does occur results from lack of muscle usage. It is also possible that non-isometric usage of particular muscles may increase the likelihood that certain permanent creases will develop. If someone has a particular facial style, a habitual set to the muscle tone maintained in his face in repose, or a particular facial movement that he habitually flashes in a manneristic fashion, then it is possible that the particular usage of his facial muscles might lead to some particular pattern in his face in old age. Yet, I suspect that heredity, climatic, and nutritional factors together play a larger role than usage in what happens to the face with age.

CONCLUSION

I have discussed eighteen types of information shown in the face. This is not a final list, nor is it the only list. There would be other ways to combine some of the categories I listed, or to subdivide them. No doubt the reader has already thought of a nineteenth or twentieth type of information revealed by the face.

My purpose has been to show how complex the face is as a vehicle for so many different types of information. Table 2 is a matrix indicating the relationships between facial sources and types of information. The pluses indicate knowledge, the minuses indicate that either evidence or logic suggests no relationship, the question marks show where possibilities seem worthy of study, and the blanks mean that I do not know what to think.

The matrix is my message. Consider how many blanks and question marks we have about our own faces.

NOTES

1. Friesen and I have collaborated for eleven years in our joint studies of facial expression and body movement.
2. I realize there is ambiguity in what is meant by "main" identity sign. Some of what I mean could be answered by research that determined whether people in general do better, are more accurate, at greater distance from the face than from other identity signs; or whether people tend to select the face as the source for identification when in a situation where there is free but limited choice.
3. Since writing this report, I have learned of research by Haviland and Lewis (in press) that has found that females have higher brows than do males,

Table 2

STATIC	Identity	Kin	Race	Gender	Temperament	Personality	Beauty	Sexual attractiveness	Intelligence	Disease	Emotion	Mood	Emblems	Adaptors	Illustrators	Regulators	Age	Previous emotional life
Bony structure	p	p	p	p	p	-	-	p	p	p	+	-	-	-	-	-	-	-
Features	p	p	+	p	-	-	+	p	-	+	-	-	-	-	-	-	-	-
Skin pigmentation	p	+	+	-	-	-	+	p	-	+	-	-	-	-	-	-	-	-
SLOW																		
Bags, sags, and pouches					-	-	p	p	-	-	-	-	-	-	-	-	-	p
Creases					-	-	p	p	-	-	-	-	-	-	-	-	-	p
Blotches					-	-	p		-	+	-	-	-	-	-	-	-	p
Texture				+	-	-	p	p	-	+	-	-	-	-	-	-	-	p
Facial hair	p	p	+	+	-	-	p		-	+	-	-	-	-	-	-	-	p
Scalp hair	p	p	+	+	-	-	p		-	+	-	-	-	-	-	-	-	p
Fatty deposits	p	p	p		-	-	p		-	+	-	-	-	-	-	-	-	p
Teeth					-	-	p		-	+	-	-	-	-	-	-	-	p
Skin pigmentation					-	-	p		-	+	-	-	-	-	-	-	-	p
RAPID																		
Movements	-	p		p	p	p		p	p	+	+	p	+	+	+	+	+	p
Tone	-	p	-		p	p	p	p	p	+	+	p	-	-	-	-	-	p
Coloration	-	-	+	p	p	p				p	p	p	-	-	-	-	-	
Temperature	-	-	-	-	p	p		p		+	p	p	-	-	-	-	-	
Sweat	-	-	-	-		p				+	p	p	-	-	-	-	-	
Gaze direction	-	-	-	+	p	p		p		p	p	+	+	+	+	+	+	-
Pupil size	-	-	-	-				p	p	+	+	p			-	-	-	
Head position	-	-	-	-		p		p	p	+	+	p	+	+	+	+	+	

and that their eyes are set wider apart than are males', and that these differences increase from infancy to adulthood. O'Sullivan (1976), in a study generated by this report, has found that untrained observers can accurately (83% correct) identify gender when judging photographs of college-age students in which facial hair has been eliminated. Guthrie (1976) has recently written many interesting and some far-fetched phylogenetic interpretations of facial static and slow signals, with particular reference to gender, beauty, sexual attractiveness, and age.

4. See Guthrie (1976) for another discussion of the childlike basis of beautiful facial appearance in women, although he also describes more "masculine" beautiful female faces.

5. A student of Dane Archer's, Michael Beller, recently found that observers could accurately judge I.Q. scores from photographs of the faces of children. This finding has not been replicated, was limited to ten children and there was no determination of whether the cues for intelligence were rapid, slow, or static signs.

6. The evidence regarding the universality of the morphology of facial expressions of emotion and their evolutionary basis comes from many sources. These include studies by psychologists, ethologists, and anthropologists of infants, children, people in different cultures, blind children, and nonhuman primates. Much of this work is reviewed in different chapters of Ekman (1973); also see Eibl-Eibesfeldt (1970) and Izard (1971).

7. In this way I disagree with Eibl-Eibesfeldt (1970), who believes that there are many stimuli that universally trigger specific facial expressions of emotion. Boucher (1975) has been studying cultural differences in what people say about the elicitors of emotion, and has found to his surprise more evidence of similarity than of difference if elicitors are classified in abstract terms rather than with regard to their specifics. Our current view (Ekman, 1977) emphasizes both the variability in specifics and commonality in the general characteristics of the emotion elicitors. For example, what is a disgusting taste, smell, or social act depends upon experience, but more generally disgust elicitors share the characteristics of being repulsive or distasteful rather than provocative or harmful.

8. Rosch and Heider's study has not been published, but is reported in Ekman (1972).

9. I use the term *natural* as it has been discussed and defined by Sebeok (1975). It is important not to misread my use of the terminology of semiotics as an implication that the facial signs are a linguistic system.

10. An expanded discussion of these theoretical issues can be found in "Biological and Cultural Contributions to Body and Facial Movement" (Ekman, 1977). Our formulation has been greatly influenced by Tomkins (1962).

11. Some of those studying differences in the ability to interpret facial expressions are Buck, Miller, and Caul (1974), Ekman and Friesen (1974b), Lanzetta and Kleck (1970), Shannon (1970), Zuckerman et al. (1975).

12. Many people have now proposed catalogues that list in words differ-

ent facial features, but most are based on the earlier ones presented by Birdwhistell (1970), Blurton Jones (1971), Brannigan and Humphries (1972), Grant (1969), or McGrew (1972). Some of these approaches were reviewed in comparison with other measurement techniques in Ekman, Friesen, and Ellsworth (1972:chap. 7) and are compared point by point in Ekman and Friesen (forthcoming).

13. Efron in 1942 (1972) first proposed the use of the term emblem to deal with a specific class of body movements. We have elaborated upon his distinction and conducted studies of emblems in a number of cultures (see Ekman, 1976; Ekman and Friesen, 1972; Johnson, Ekman and Friesen, 1976).

14. The distinction between emblems, adaptors, and illustrators was proposed on the basis of their origins, usage, and coding, although the hands, not the face, were considered (Ekman and Friesen, 1969, 1972).

15. Almost all the research on adaptors or emblems has studied the hands. The interpretations given here about facial adaptors is extrapolated from the evidence on hand adaptors (for evidence on hand adaptors see Ekman and Friesen, 1974).

16. O'Sullivan (1976) is currently analyzing data from a study that began to explore this question. If you know a person as an adult, you can accurately identify his baby pictures, but that is not so if you are just exposed to a photograph of a person as an adult and asked to identify his baby pictures.

17. It may seem peculiar that a static sign could be an age clue, yet recall that we included such very slow changing characteristics as facial shape and contours due to the bony structure as a static sign. As explained earlier, while such signs are not truly static since there are changes with growth, they are much slower than what we labeled as the slow signs.

REFERENCES

- Anderson, L. D. 1921. "Estimating Intelligence by Means of Printed Photographs." *Journal of Applied Psychology* 5:152-55.
- Birdwhistell, R. L. 1970. *Kinesics and Context*. Philadelphia: University of Pennsylvania Press.
- Blurton Jones, N. G. 1971. "Criteria for Use in Describing Facial Expressions in Children." *Human Biology* 41:365-413.
- Boucher, J. 1975. Personal communication.
- Brannigan, C. R., and Humphries, D. A. 1972. "Human Non-verbal Behaviour, a Means of Communication." In *Ethological Studies of Child Behavior*, N. Blurton-Jones, ed. London: Cambridge University Press.
- Buck, R.; Miller, R. E.; and Caul, W. F. 1974. "Sex, Personality and Physiological Variables in the Communication of Affect via Facial Expression." *Journal of Personality and Social Psychology* 30:587-96.
- Carpenter, G. C. 1973. "Mother-Stranger Discrimination in the Early Weeks of Life." Paper presented at the Biennial Meeting of the Society for Research in Child Development, Philadelphia.

- Chance, J.; Goldstein, A. G.; and McBride, L. 1975. "Differential Experience and Recognition Memory for Faces." *The Journal of Social Psychology* 97:243-53.
- Cross, R. 1974. "Reflections on the Evil Eye." *Human Behavior* 3(10):16-22.
- Cross, J. F.; Cross, J.; and Daly, J. 1971. "Sex, Race, Age and Beauty as Factors in Recognition of Faces." *Perception and Psychophysics* 10(6):393-96.
- Dillon, S. 1974. "Nonverbal Cues and Sex Role Stereotypes: Differential Perceptions of Masculinity, Femininity, Attractiveness, and Intelligence." Paper delivered at the meeting of the California State Psychological Association, Fresno.
- Dittman, A. T. 1972. "Developmental Factors in Conversational Behavior." *Journal of Communication* 22(4):404-23.
- Duncan, S. 1973. "Toward a Grammar for Dyadic Conversation." *Semiotica* 9(1):29-46.
- Efron, D. 1942. *Gesture and Environment*. New York: King's Crown. Rev. ed., *Gesture, Race and Culture* (The Hague: Mouton, 1972).
- Eibl-Eibesfeldt, I. 1970. *Ethology, the Biology of Behavior*. New York: Holt, Rinehart and Winston.
- Ekman, P. 1972. "Universals and Cultural Differences in Facial Expressions of Emotion." In *Nebraska Symposium on Motivation, 1971*, J. Cole, ed. Lincoln: University of Nebraska Press.
- . 1973. "Cross Cultural Studies of Facial Expression." In *Darwin and Facial Expression: A Century of Research in Review*, P. Ekman, ed. New York: Academic Press.
- . 1976. "Movements with Precise Meaning." *Journal of Communication* 26(3):14-26.
- . 1977. "Biological and Cultural Contributions of Body and Facial Movement." In *Anthropology of the Body*, J. Blacking, ed. New York: Academic Press.
- Ekman, P., and Friesen, W. V. 1969. "The Repertoire of Nonverbal Behavior: Categories, Origins, Usage, and Coding." *Semiotica* 1(1):49-98.
- . 1971. "Constants across Cultures in the Face and Emotion." *Journal of Personality and Social Psychology* 17:124-29.
- . 1972. "Hand Movements." *Journal of Communication* 22(4):353-74.
- . 1974a. "Detecting Deception from the Body or Face." *Journal of Personality and Social Psychology* 29(3):288-98.
- . 1974b. "Nonverbal Behavior and Psychopathology." In *The Psychology of Depression: Contemporary Theory and Research*, R. J. Friedman and M. M. Katz, eds. Washington, D.C.: Winston & Sons.
- . 1975. *Unmasking the Face*. Englewood Cliffs, N.J.: Prentice-Hall.
- . 1976. "Measuring Facial Movement." *Environmental Psychology and Nonverbal Behavior* 1(1):56-75.
- . 1977. *The Facial Action Coding System: A Manual for the Measurement of Facial Movement*. Palo Alto, Ca.: Consulting Psychologists' Press.
- . Forthcoming. *Analyzing Facial Action*.

- Ekman, P.; Friesen, W. V.; and Ellsworth, P. 1972. *Emotion in the Human Face*. Elmsford, N.Y.: Pergamon Publishing Co.
- Ekman, P.; Sorenson, E. R.; and Friesen, W. V. 1969. "Pan-cultural Elements in Facial Displays of Emotions." *Science* 164(3875):86-88.
- Freedman, D. G. 1974. *Human Infancy: An Evolutionary Perspective*. Hillsdale, N.J.: Lawrence Erlbaum Assoc.
- Friesen, W. V. 1972. "Cultural Differences in Facial Expressions in a Social Situation: An Experimental Test of the Concept of Display Rules." Unpublished doctoral dissertation, University of California, San Francisco.
- Galper, R. E. 1973. "'Functional Race Membership' and Recognition of Faces." *Perceptual and Motor Skills* 37:455-62.
- Gaskill, P. C., Fenton, N., and Porter, J. P. 1927. "Judging the Intelligence of Boys from their Photographs." *Journal of Applied Psychology* 11:394-404.
- Goffman, E. 1976. "Gender Display." *Visual Anthropology*, in press.
- Going, M., and Read, J. D. 1974. "Effects of Uniqueness, Sex of Subject and Sex of Photograph on Facial Recognition." *Perceptual and Motor Skills* 39:109-10.
- Goodman, R. M., and Gorlin, R. J. 1970. *The Face in Genetic Disorders*. St. Louis: C. V. Mosby.
- Grant, N. G. 1969. "Human Facial Expression." *Man* 4:525-36.
- Guthrie, R. D. 1976. *Body Hot Spots*. New York: Van Nostrand Reinhold.
- Haviland, J. 1975. "Looking Smart: The Relationship between Affect and Intelligence in Infancy." In *Origins of Infant Intelligence*, M. Lewis, ed. New York: Plenum.
- Haviland, J. M., and Lewis, M. In preparation. "Sex Differences in Presentation of the Face."
- Hess, E. H. 1975. "The Role of Pupil Size in Communication." *Scientific American* Nov.: 110-19.
- Hochberg, J., and Galper, R. E. 1974. "Attribution of Intention as a Function of Physiognomy." *Memory and Cognition* 2(1A):39-42.
- Huber, E. 1931. *Evolution of Facial Musculature and Facial Expression*. Baltimore: Johns Hopkins University Press.
- Iliffe, A. H. 1960. "A Study of Preferences in Feminine Beauty." *British Journal of Psychology* 51:267-73.
- Izard, C. 1971. *The Face of Emotion*. New York: Appleton-Century-Crofts.
- Johnson, H. G.; Ekman, P.; and Friesen, W. V. 1976. "Communicative Body Movements: American Emblems." *Semiotica* 15(4):335-53.
- Jordan, R. U. 1969. *Faces*. Emporia, Kansas: R. U. Jordan, Box 138.
- Joseph, M., and Dawbarn, C. 1970. *Measurement of the Faces*. Spastics International Medical Publications Research Monograph, 3. Surrey: Wm. Heinemann Medical Books.
- Kendon, A. 1973. "The Role of Visible Behavior in the Organization of Social Interaction." In *Social Communication and Movement*, M. Cranach and I. Vine, eds. New York: Academic Press.
- Korner, A. F. 1969. "Neonatal Startles, Smiles, Erections, and Reflex Sucks

- as Related to State, Sex, and Individuality." *Child Development* 40:1039-53.
- Landis, C., and Phelps, L. W. 1928. "The Prediction from Photographs of Success and Vocational Aptitude." *Journal of Experimental Psychology* 11:313-24.
- Lanzetta, J. T., and Kleck, R. E. 1970. "Encoding and Decoding of Non-verbal Affects in Humans." *Journal of Personality and Social Psychology* 16:12-19.
- Lavrakas, P. J.; Buri, J. R.; and Mayzner, M. 1975. "The Effects of Training and Individual Differences on the Recognition of Other-Race Faces." Paper presented at the Convention of the American Psychological Association.
- Lefas, J. 1975. *Physiognomy: The Art of Reading Faces*. Barcelona: Ariane.
- Levy, J.; Trevarthen, C.; and Sperry, R. W. 1972. "Perception of Bilateral Chimeric Figures Following Hemispheric Deconnexion." *Brain* 95:61-78.
- Liddell, S. K. 1975. "Restrictive Relative Clauses in American Sign Language." Unpublished mimeo., Salk Institute.
- Liggett, J. 1974. *The Human Face*. New York: Stein & Day.
- McGrew, W. C. 1972. *An Ethological Study of Children's Behavior*. New York: Academic Press.
- Malpass, R. S., and Kravitz, J. 1969. "Recognition of Faces of Own and Other Race." *Journal of Personality and Social Psychology* 13:330-34.
- Mar, T. T. 1974. *Face Reading: The Chinese Art of Physiognomy*. New York: Dodd, Mead & Co.
- Martin, J. G. 1963. "Racial Ethnocentrism and Judgment of Beauty." *Journal of Social Psychology* 63(59).
- Maurer, D. 1975. "Developmental Changes in the Scanning of Faces by Infants." Paper presented at the Biennial Meeting of the Society for Research in Child Development, Denver.
- Messick, S., and Damarin, F. 1964. "Cognitive Styles and Memory for Faces." *Journal of Abnormal and Social Psychology* 69(3):313-18.
- Nyhan, W., and Shear, C. 1975. Personal communication.
- O'Sullivan, M. 1976. Personal communication.
- Peck, H., and Peck, S. 1970. "A Concept of Facial Aesthetics." *Angle Orthodontist* 40:284-317.
- Pelligrini, R. J. 1973. "Impressions of the Male Personality as a Function of Beardedness." *Psychology* 10:29-33.
- Pintner, R. 1918. "Intelligence as Estimated from Photographs." *Psychological Review* 25:286-98.
- Pittenger, J. B., and Shaw, R. E. 1975. "Perception of Relative and Absolute Age in Facial Photographs." *Perception and Psychophysics* 18(2):137-43.
- Rizzolatti, G.; Umiltà, C.; and Berlucchi, C. 1971. "Opposite Superiorities of the Right and Left Cerebral Hemispheres in Discriminative Reaction Time to Physiognomical and Alphabetical Material." *Brain* 94:431-42.
- Russell, M. 1976. "Human Olfactory Communication." *Nature* 260(5551):520-22.

- Schwartz, G. E.; Fair, P. L.; Salt, P.; Mandel, M. R.; and Klerman, G. I. 1976a. "Facial Muscle Patterning to Affective Imagery in Depressed and Non-depressed Subjects." *Signs* 192:489-91.
- . 1976b. "Facial Expression and Imagery in Depression: An Electromyographic Study." *Psychosomatic Medicine*, in press.
- Seaford, H. W., Jr. 1975. "Facial Expression Dialect: An Example." In *Organization of Behavior in Face-to-face Interaction*, A. Kendon, R. M. Harris, and M. Ritchie Key, eds. Mouton: The Hague.
- Sebeok, T. A. 1975. "Six Species of Signs: Some Propositions and Strictures." *Semiotica* 13(3):233-60.
- Secord, P. F. 1958. "Facial Features and Inference Processes in Interpersonal Perception." In *Person Perception and Interpersonal Behavior*, R. Taguiri and L. Petrullo, eds. Stanford: Stanford University Press.
- Secord, P. F.; Dukes, W. F.; and Bevan, W. 1954. "Personalities in Faces: An Experiment in Social Perceiving." *Genetic Psychology Monograph* 49: 231-79.
- Shannon, A. M. 1970. "Differences between Depressive and Schizophrenics in the Recognition of Facial Expression of Emotion." Unpublished doctoral dissertation, University of California, San Francisco.
- Sheldon, W. H. 1954. *Atlas of Man: A Guide for Somatotyping the Adult Male at All Ages*. New York: Harper & Row.
- Shoemaker, D. J.; South, D. R.; and Lowe, J. 1973. "Facial Stereotypes of Deviants and Judgments of Guilt or Innocence." *Social Forces*, 51:427-33.
- Tomkins, S. S. 1962. *Affect, Imagery, Consciousness*, vol. 1. New York: Springer Publishing Co.
- Udry, J. R. 1965. "Structural Correlates of Feminine Beauty Preferences in Britain and the United States: A Comparison." *Sociological and Social Research* 49:330.
- Yin, R. K. 1970. "Face Recognition by Brain Injured Patients: A Dissociable Ability?" *Neuropsychologia* 8:395-402.
- Zuckerman, M.; Lipets, M. S.; Koivumaki, J. H.; and Rosenthal, R. 1975. "Encoding and Decoding Nonverbal Cues of Emotion." *Journal of Personality and Social Psychology* 32:1068-76.