

STUDIES IN EMOTION AND SOCIAL INTERACTION
Second Series

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The psychology of facial expression

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Foreword

The chapters in this collection represent the best thought on the role and function of human facial behavior, and many of them address what has become central to most contemporary accounts – the link between facial expression and emotion. The arguments for and against such a link between emotion and facial behavior are represented in the following pages. It is in part a theme of this book that the belief in such a link was not always thus in the past and that it need not be thus in the future.

The current predominance of the Tomkins–Izard–Ekman account of the meaning of facial expressions and their strong dependence on emotions started some 30 years ago, and 30 years is generally the lifetime of regnant psychological theories. In recent years, a new wave of thought has emerged and the debate has been joined between those who see facial expression as a necessary accompaniment or precursor of emotional experience, and those who see facial expression as communicative, expressive, and mimetic devices, possibly remnants of an early preverbal language but not necessarily tied to emotion. I joined the wave some 20 years ago and have been delighted by the momentum and the contributors it has gathered in the intervening period – most all of them represented here.

In retrospect, it seems strange that something as palpable and measurable as facial expression should be seen to be immersed in something as vague and intellectually slippery as emotion. Since I have been in the past accused of “not believing in emotion,” let me briefly expand on this theme. In the common natural languages, we all know without much doubt what feeling emotions and being emotional is all about. It is about involuntary, strong, sometimes irrational feelings and commitments and mental and bodily reactions to significant or at least significant-seeming situations and people.

But when we come to the psychologists’ and physiologists’ emotions,

4. Facial expressions as modes of action readiness

NICO H. FRIJDA AND ANNA TCHERKASSOF

Many questions one could ask about facial expressions seem to be fixed by the use of the very word *expression*. *Facial expression*, first, refers to facial behavior that suggests emotional meaning to an outside observer. Second, the term carries the implication that that facial behavior has the function or purpose of conveying such meaning. Third, it suggests that there exists something (say, an inner feeling) independently of that behavior to which the behavior called *expression* is added as an extra.

These aspects are not necessarily all true of the same behaviors. Facial behaviors may suggest emotional meanings to observers, but that may not be their function or purpose. Receiving the epithet "expressive" in fact says nothing about the nature of the behavior concerned. "Hasty" or "greedy" behaviors, for instance, are made to arrive as fast as one can at the object of desire, and not to inform others about one's state of mind. Also, nonbehavior may on occasion be highly expressive, such as underacting in the theater and Jesus's remaining silent under accusation. And there are phenomena that are expressive by suggesting emotional meanings in which no inner feelings of whatever produced the phenomena are involved, such as joyful bird songs, angry bursts of wind, sad music, nervous lines, and solemn penguins.

Most past and current theorizing on facial expression starts from the assumption that it expresses emotional feelings and exists for the sake of doing so. The study of expression pretty much originated in the philosophical problem of the knowledge of other minds. It sought to solve the riddle of how it is possible to obtain knowledge of others' unspoken inner feelings (e.g., Bain, 1859; Berkeley, 1709; Lipps, 1905). That expressions manifest inner feelings probably is dogma to many researchers; at least it was when the first author started his work. Advance has been possible only by abandoning this dogma, recognizing that perception of

emotional meaning does not necessarily imply attribution of inner feeling. The advance was due to phenomenology (Buytendijk & Plessner, 1925; Sartre, 1939; Gestalt psychology) and Wittgenstein.

We think, therefore, that the category of *facial expression* (and other bodily expressions) should be defined as a category of *impression*. Facial expression is facial behavior that suggests emotional meaning. This leaves the relations to whatever is expressed and what "expressing" means, a matter of empirical and theoretical analysis. For simplicity, we continue to use the term *expression* to refer to the facial behavior concerned.

Questions for research on facial expression

Analysis of facial expression has to address the following major questions:

1. *What* does facial expression "express"? That is, what information do observers perceive or infer from facial expressions (the receiver question), and what psychological states or processes produce them (the sender question)? What does a smile convey to an observer, and what state or process actually underlies that smile?
2. *Why* do certain psychological states or processes lead to particular expressions? That is, what is the functional explanation of facial expression? Why do we smile when happy (if we smile when happy and if we smile when *happy*)?
3. *Why* is that content *so* expressed? Why do facial expressions look the way they do and have the temporal properties that they have? Why do we *smile* when happy (if indeed happiness is what makes us smile)? Why its temporal and topographic variations?
4. *When* is that content expressed? When do expressions occur? Do facial expressions appear whenever the expressed state occurs, or, if not, what are the conditions?

Traditional theory has simple answers to all four questions:

1. Facial expressions express emotional states, particularly feelings. Different emotions or feelings correspond to different facial expressions (at some level of categorization of "different emotions").
2. Facial expressions exist for the sake of communicating emotions to others.
3. Presumably, Darwin's (1872) three principles provide a satisfactory

account of the nature and origin of expressions. However, most contemporary theorists are silent on why expressions are as they are. Other explanatory principles (notably, those from Bühler, 1934; Dumas, 1933a, 1947; Piderit, 1867) are largely ignored, except in some ethological work.

4. Expression occurs whenever the corresponding emotional state occurs, except insofar as it is suppressed by control processes.

The basic facts of facial expression

This chapter is concerned mainly with the first question: What does facial expression express? Our answer follows from what we consider to be the basic data on facial expressions.

1. There is a clear and distinct affinity between particular facial expressions and particular categories of emotion. This affinity exists cross-culturally and probably universally.
2. Emotion categories and facial expressions do not possess more than an affinity, however. A given kind of emotion may give rise to different facial expressions or to no facial expression at all.
3. A given facial expression may be common to different kinds of emotion as well as to psychological processes that are not distinctly emotional.

"Affinity" between expressions and emotions, the first basic fact, means first of all that certain expressions form the preferred or paradigmatic representations of certain emotions, such as crying being typically linked to sadness or grief, laughter to joy, and wide open eyes, lifted brows, and dropped jaw to amazement or surprise (Ekman & Friesen, 1975). This affinity forms the substance of traditional analyses of facial expression, throughout history and across cultures. These analyses are surprisingly consistent, from at least Lebrun (1667), Engel (1785), and Camper (1792) onward.¹ They also tend to be consistent with the 2,000-year-old mudras, coded facial expressions from the Indian baratha natyam dance repertoire (see, for instance, Gopal, 1951), and their equivalents in kathakali dancing. They are said to follow the rules of "rasabhinava," which means "communication of emotional states by expressions of the face" (Bonneau-Le Breton, 1994, p. 175). Analysis by FACS (Facial Action Coding System) could and should be made to verify the similarities.

"Affinity" also refers to the fact that these same expressions are con-

sistently assigned to six or so major emotion categories when judges are forced to choose from among those six or so (Ekman, 1982; Izard, 1977). Such assignments are not usually made with 100% consistency, and major confusions occur repeatedly (Russell, 1994); still, agreement generally is way above chance and tends to occur across cultures (Ekman, 1982; Russell, 1994). The affinity also appears from indications that the paradigmatic expressions actually tend to occur under the expected emotional conditions, and again cross-culturally so. For laughter, smiling, and crying, there need hardly be discussion on this point. Subtler indications came, for instance, from Darwin's (1872) observations and from the questionnaires he sent to about threescore missionaries. For instance, the facial expression of surprise, as described earlier, was made by the inhabitants of Tierra del Fuego "when the Beagle fired some rockets" (Darwin, 1872).

Each of these three sources of evidence is open to valid criticisms (Fridlund, 1994; Russell, 1994). However, together they constitute a solid body of indications, sufficient to establish an emotion-expression affinity as a basic fact that expression theory has to explain.

Yet there is no more than an affinity. The second basic fact of facial expression is that the expressions actually shown in emotional conditions often differ drastically from the paradigmatic ones. Crying in happiness and nervous giggling provide obvious examples. It is true that such crying or giggling is usually taken as evidence that the system is upset, but deviations from what theory expects are also common under normal conditions. For instance, in a study of the ecology of facial expression (Frijda, 1953), a large number of emotional and other reactions were provoked in two women in a conversational setting. Their facial expressions were filmed, their introspections were obtained after each segment, and detailed recordings made of each eliciting event. Very many expressions differed from those one would theoretically expect, given the eliciting event. For instance, a self-reported incident of deep happiness was accompanied only by concentrated staring into space, and one of anger led only to looking away. Wagner, MacDonald, and Manstead (1986), too, found a high proportion of nonparadigmatic expressions under natural conditions. Fernández-Dols and Ruiz-Belda (chapter 11, this volume) present observations along the same line.

Emotions may be accompanied by no facial expression at all, or not by characteristic ones (Fridlund, 1994; Frijda, 1986; Izard, 1977). This applies even to very strong emotions, and not only because of self-control. The expression researcher Dumas (1933a) reproduced photographs of

victims of the Chinese torture called "fragmentation into a thousand fragments." Victims' faces were bland, or showed merely gasping. And ever since antiquity, philosophers have discussed the story of the Egyptian king Psammenitus, related by Herodotus (*Histories*, III, 14). When taken prisoner by Cambyses of Persia, Psammenitus was forced to watch his daughter passing by dressed as a slave, and his son on his way to execution. The king was observed to keep a bland, unmoved face. However, he burst out weeping when noticing a friend reduced to a beggar. When questioned by Cambyses, Psammenitus answered that some griefs are too great for tears, an interpretation accepted by Cambyses and by later philosophers.

The third basic fact is that expressions tend to be common to several states, emotional as well as nonemotional. This fact is suggested by the range of emotion interpretations given to almost every expression in recognition experiments, and by the range of conditions under which any given expression actually occurs.

It is rare to find an expression in a recognition experiment that is interpreted by the subjects in one sole way (Russell, 1994). For instance, the expressions described by Ekman and Friesen (1975) as expressions of surprise were considered to be fear expressions by a nonnegligible proportion of the subjects in several studies. Also, providing the subjects with more labels to choose from than the seven emotion names increases the range of interpretations (Russell, 1994). Yet the choices do not become random. These data have led to the conclusion that facial expressions do not correspond to particular emotions, but to regions in a two- or three-dimensional emotion plot (Russell, 1980; Woodworth & Schlosberg, 1954) or to relatively broad emotion classes (Ekman, 1993; Russell & Bullock, 1986; Woodworth, 1938). In experiments that leave the subject entirely free in what interpretations to make, ranges are still larger. In one such experiment (Frijda, 1953), most interpretations of a given expression could indeed be viewed as falling within an emotion region or class that also contained the emotion label considered "correct" (that is, the one given by the filmed subject or the filming experimenter). However, a sizable number of the interpretations could not easily be seen as belonging to such a region or class. They did not refer to emotions but to cognitive or instrumental responses, such as "deep thought" for a startle response, and "water is splashed in her face" for the reaction to a gruesome story. The reverse also occurred: Expressions of physical effort or concentration were often interpreted as expressions of emotion (e.g., pulling a rope as aversion and deep thought as distress).

Interestingly, the "errors" in interpretation usually appear quite reasonable. Although some of them appeared to be due to neglect of some subtle feature of the stimulus pattern, in most cases the expressions might very well have come from the states to which the subjects attributed them. Startle, distress, and deep thought may well on occasion present the same frown, bent head, and forcefully closed eyes. We can conclude that the same or similar facial expressions can occur with different states, emotional as well as nonemotional.

Certain facial expressions occur under conversational rather than emotional conditions. They are the more voluntarily produced conversational signals called *emblems* by Ekman and Friesen (1969) and *mimiques* by Dumas (1933b, 1947). Distinctions between voluntary and less voluntarily produced expressions are perhaps hard to make on a neurological basis (Fridlund, 1994); in actual practice, they seem to be made smoothly. We leave emblems or *mimiques* out of our discussion.

What is inferred from facial expressions?

The three basic facts discussed lead us to a paradox. On the one hand, there are reasons to doubt a strict correlation between particular emotions and particular expressions. On the other hand, there is a general tendency to attribute emotions to other people on the basis of their facial expressions.

But is that tendency indeed so general? Do people indeed attribute emotions to other people whenever such others show facial expressions? Is "attribution of emotion" the best way to characterize what people do under such circumstances? Data on the process whereby people assess the meaning of expressions suggest otherwise.

Not many studies have looked at process. Standard expression recognition experiments do not allow us to do so because they force the subjects to select an emotion label; subjects cannot respond in other ways. Some information does come from experiments that allow subjects to respond freely, as in the experiment by Frijda (1953). In that experiment, subjects were presented with the film segments of spontaneous expressions described earlier, and with slides taken from those films. They were asked to describe "what might be going on in the person shown or what might have happened to her." Responses were recorded verbatim, or nearly so. Various conclusions could be drawn.

First, quite often the subjects mentioned no emotion label. Fitting an emotion label to a perceived expression is clearly not an ubiquitous el-

ement when interpreting expressions. When an emotion label was mentioned, it often was not the first and most direct step in the response process. It usually followed and was an inference from other kinds of response.

Second, the most direct response was often to imagine and describe an emotionally charged situation that appeared to fit the perceived expression. For instance, one film clip showed the target person waiting for an electric shock with manifest tenseness, anxious attention, and trying to brace herself. One subject described it as follows: "As if she is looking at something with fixed attention, a game or something tense, two cars which almost get into collision, but nothing happens" (Frijda, 1953, p. 314). One of the slides showed the target person dreamily thinking of her work (painting). It was given the interpretation: "She looks the way you look at a small child playing." A film clip of the target's head when pulling a rope: "Just like she sees something very nasty." Sometimes an emotion label was added that was felt to fit the target's response to the imagined situation. "Something of contempt in it, a bit tense" was the label given for the response to the almost-collision situation (Frijda, 1953, p. 312).

Third, the expressions were perceived as parts of the target person's interaction with her environment. The slides and films showed only the target person's head and shoulders; yet she was perceived in a situation. She was perceived not as "displaying a facial expression" that signaled some emotional state "within" her but as a person actively responding to an event in her environment or her thoughts, attending to something or as explicitly *not* attending to something. She was seen as shielding herself from something, withdrawing from something, accepting or not accepting something, opening up to it or closing off from it, or some combination of these. In brief, the target persons were seen as interacting with their environment, and the facial expressions were seen as behaviors that were part of the interaction. The behavioral and interactive nature of the expressions was particularly evident in the film clips, where it contributed to the accuracy of interpretations (accuracy scores for the films were 50% higher than for the slides; Frijda, 1953, p. 306).

Fourth, it should be strongly emphasized that what the expressions convey is essentially emotional, even if the information grasped from them is not best represented by emotion labels. The situations were imagined for their emotional significance: as suspenseful, frightening, nasty, or endearing situations, to fit the expressions. An expression evidently suggests a situation with a particular emotional content. It would be

erroneous to regard the free descriptions as the results of recalling situations that had been linked to the expressions in the past, as Fridlund (1994, pp. 276–277) seems to suggest. The facial expressions did not remind the subjects of situations in which they had seen them before. They invented or imagined the situations, as several subjects made clear (see also Ruckmick, 1921, for similar observations). They creatively imagined situations that fit the expressions' apparent emotional implications.

Recognizing expressive information

The fact that subjects imagined situations that they felt fit the expressions has an important implication. It means that the expressions contain information. Terms like *attribution* or *inference* obscure the fact that expressions possess a meaning that the subject perceives or deciphers *in* them rather than adds *to* them. Indeed, that meanings are inherent in expressive phenomena has been the accepted view in earlier discussions of perceiving such phenomena; Gestalt psychologists coined the term *physiognomic perception* (Koffka, 1935; Köhler, 1929; Werner, 1926/1948).

Expressions dictate a Gibsonian view. There is information contained in them that can be picked up by an observer *before* interpretations or attributions are made. This raises the question of what that information is. The preceding has shown that it is not "emotions." Attributing emotions goes beyond the information that the expressions contain because emotion labels may vary with one particular expression. We think that the information contained in expression can be identified by examining what in fact is conveyed by them in daily interactions.

In such a context, it rarely is some verbal or abstract categorization, as in expression recognition experiments. People do not usually mutter something like "Lo, anger!" to themselves. Under many conditions categorization would not even be possible – for instance, when confronted with the dynamic expressions found in ballet, mime, or music. But in daily interactions, people give evidence that another person's expression is recognized or understood, be it correctly or incorrectly, in at least three nonverbal, nonabstract ways. All three can be traced in the protocols from the Frijda (1953) experiment.

Environmental expectation. Another person's facial expression may direct one's attention to a particular object and evoke an expectation about that object that fits the expression. Recognizing a fearful expression may just mean looking around for a threat or perceiving

a given object as a threat. Understanding the meaning of someone's crying may just mean that one wonders what loss occurred.

Affective response and behavioral expectation. Another person's facial expression may modify one's affective state and evoke expectations about how the other person will respond in further interactions that fit the expression. Understanding someone's angry expression often just means becoming frightened and expecting further hostile behavior. "Understanding" of this nature has been observed even in babies under 6 months (Schwartz, Izard, & Ansul, 1985).

Empathic identification response. Another person's facial expression may engender an empathic response: imitatory movement, or just the sense that one can identify the perceived expression in terms of one's own expressive repertoire. Expression empathy is best considered a nonverbal categorization or identification act. Recognizing an angry face sometimes just means sensing the contraction and nasty, pushing forward movement implied, or even involuntarily producing them by motor mimicry (see Frijda, 1953, 1956, for observations and discussion).

None of these three kinds of recognition response implies attribution of a feeling state to the perceived person nor any form of explicit categorization. Attribution and categorization, by contrast, would seem to depend upon prior nonverbal recognition of expressive meaning and to involve going beyond that meaning.

What does facial expression express? The notions of relational activity and action readiness

Identifying the information contained in expressions is of double interest. It clarifies the process of understanding expressions by an observer and of his or her making emotion attributions on that basis. And it identifies what in fact is expressed in expression – that is, what the states or processes are in a sender that most directly cause the expressions.

How do we characterize that which is expressed? The information contained in facial expressions is, we think, that which is common in raising appraisal expectations, evoking affect and behavior expectations in interactions, and empathic responses. It is, in addition, what is common to the various conditions under which a given expression arises and to the various emotional and nonemotional states that may elicit a given expression.

The data discussed lead to the hypothesis that expressions correspond to something more general than "emotions," or at a different plane of analysis – namely, the subject's "positionality" (Frijda, 1953) or "relational activity" (Frijda, 1986). Facial expressions represent the manner in which the individual at that particular moment relates (or does not relate) to the environment. They represent the position taken: accepting or refusing, moving toward (in the sense of proximity seeking), moving away, or moving against. They represent the activity or lack of activity in taking position: highly or weakly active, or inactive as in apathy or rest. They also represent the manner of that activity: whether it is being deployed freely or under restraint, inhibited as in anxiety paralysis, or lacking in direction as in nervousness.

Because of their temporal dynamics, among other things, facial expressions usually point to the motivational states that engender the relational activity. We call them *states of action readiness*. Facial expressions express states of action readiness, which we specify as states of readiness to establish, maintain, or change a particular kind of relationship with some object in the environment or in thought, or with the environment as a whole (Frijda, 1986, chapter 2). States of action readiness vary according to their aim (obtaining proximity, avoiding contact, neutralizing obstruction, etc.) and their degree and manner of activation (hyperactivation, hypoactivation, tenseness). Major modes of action readiness correspond with major modes of subject–environment interaction or major interactional goals (cf. Roseman, Wiest, & Swartz, 1994). Theoretically, only a limited number of modes of subject–environment interaction can be distinguished, and these can meaningfully be called *basic*, as all states of action readiness represent one or more of these modes.

State of action readiness implies a tendency to control behavior. That is, states of action readiness have the property of "control precedence" (Frijda, 1986). They are likely to lead to action and to interfere with ongoing actions. They are involuntary and "impulsive" or unplanned in nature. Because they are motivational states or goals, each state of action readiness may get expressed through a variety of behaviors, including mere mental actions (wishes, plans, fantasies). Therefore, although facial expressions point to states of action readiness, the reverse is not always true. They may or they may not appear in expression or in other behavior. States of action readiness can remain impulses or states of readiness and nothing more.

Different modes of action readiness correspond to the 6 to 10 dimensions derived from theory (Frijda, 1986) and from questionnaire research

(Davitz, 1969; Frijda, Kuipers, & Terschure, 1989). The notion of states of action readiness thus allows for more differentiation than the two or three dimensions of expression posited by Schlosberg (1954) and Russell (1980). This is as it should be. The information contained in facial expressions is richer than variation along two or three dimensions. This appears from several studies. In one study, ratings were made on 22 bipolar scales of 30 posed facial expressions. Factor analysis of the ratings yielded four orthogonal factors when average ratings per photograph were used (Frijda & Philipszoon, 1963), and six when the individual ratings were used: pleasantness, activation, attentional activity, spontaneity-reactivity, surprise, and simple-complex (Frijda, 1969). Almost the same factors appeared in a second study with posed photographs of a different target person (Frijda, 1969). In a third study, subjects were asked to check which of 110 emotion adjectives applied to each of 62 posed expressions of an actress and 68 posed expressions of an actor. Factor analysis of the frequencies of co-occurrence of the adjectives yielded 17 or 18 unipolar factors with over 1% contribution to variance; the factors from both sets were rather similar. Other subjects rated the same photographs on 40 bipolar 7-point scales, which resulted in seven bipolar factors. Cluster analyses yielded similar differentiation (Frijda, 1970, 1973).

Most of these factors, if not all, do not just represent the semantics of emotion words. In Frijda (1969), significant correlations were obtained between the factor scores and ratings of various simple and complex facial feature measures (e.g., smiling, frowning, approach-avoidance score, tenseness) for both target persons.

Expressions and action readiness: Empirical support

If facial expressions correspond to states of action readiness, subjects should have little trouble associating particular states of action readiness with particular facial expressions. Support for this prediction was obtained in a preliminary experiment (Tcherkassof, in preparation). Subjects were presented with 28 facial expression slides from Matsumoto and Ekman's (1989) series, four for each of the seven emotion categories. They rated each expression on 34 action readiness items. The items came from the questionnaire used by Frijda et al. (1989), with slight adaptations, and were presented as 3-point scales (*not applicable*, *somewhat applicable*, and *very much applicable*). Items for *crying* and *laughing* were included. In a second round, subjects rated each slide on seven 3-point

Table 4.1. Action readiness ratings: Percentages of "somewhat applicable" and "very much applicable" ratings (entries of 60% or over)

Action readiness mode	Facial expression group						
	Anger	Sadness	Disgust	Fear	Contempt	Surprise	Joy
Approach							81
Being with							76
Protect oneself			74	77			
Avoid			75	81			
Attending	81	69	72	90	77	95	76
Keep distance	70		83	81			
Reject			95	92		81	
Boil inwardly	89						
Agonistic	92		90.5	71.5			
Reactant	88						
Interrupt				71.5		90.5	
In command					72.5		82
Submitting		69					
Helplessness		92		93		84.5	
Tensely contracted ^a	93	83	94	100			
Open					65.5	64	96
Crying		80					
Laughing							92

^aThe phrase "tensely contracted" translates the French "crispation." The latter has a defensive, inhibitory overtone that the English designation does not have.

emotion items representing the Matsumoto and Ekman (1989) emotion labels.

Table 4.1 gives the percentages of subjects who checked the action readiness items for each group of slides meant to represent a given emotion category. (Scores for the four slides in a group are combined, as are ratings of "somewhat applicable" and "very much applicable"; the "very much" scores alone give almost the same picture. To save space, only the items showing variation over the seven groups are included in the table.)

The subjects clearly found the task meaningful. A large majority agreed upon at least one of the action readiness items for each slide group; for all but the *contempt* slides, at least one item was checked by over 90% of the subjects for the four slides in the group together. The subjects showed unanimity on at least one item for 21 of the 28 individual slides. All but two of the slides (both from the *contempt* group) showed at least one action readiness item with 90% agreement or over.

One would predict that those action readiness items in particular will be checked that figure prominently in the semantics of the emotion label of the slide group concerned. Specific predictions were derived from questionnaire data on action readiness ratings for emotion incidents (Frijda et al., 1989). For *contempt*, no predictions could be derived. The predicted entries have been underlined in Table 4.1. All of them were checked by 77% of the subjects or more. A number of nonpredicted high scores also emerged, however.

We hypothesized that emotion attributions are inferences from assessments of states of action readiness. This implies that expressions labeled differently probably differ in terms of action readiness. The present experiment gives clear cues that this might indeed be the case. Discriminant analysis (using all 34 items), with the emotion group labels as the criterion, yields 74.8% correct assignments. Our hypothesis further implies that agreement on action readiness assignments to expressions should be at least as high as on emotion attributions (Table 4.2), provided that all expressions given the same emotion label contain the same mode of action readiness. This latter condition was not fulfilled, however. For instance, two of the *sadness* photographs were rated as distinctly agonistic, while the other two were not. The prediction could also not be rigorously tested because the number of action readiness items was about five times that of emotion items. Yet it is interesting to compare the two types of ratings. Two results are worthy of note. First, the highest percentages in comparable columns of Tables 4.1 and 4.2 do not differ much, and as already mentioned, almost all individual slides showed such a high percentage on at least one action readiness item. Second, similar confusion patterns occur for both rating types. Expressions meant to depict *contempt* do less well than those from other groups in both rating types, while the similarity in action readiness patterns of the *sadness*, *fear*, and *disgust* groups in Table 4.1 (and as evident in the discriminant analysis) is reflected in the off-diagonal elements in Table 4.2.

The behavioral context

To view expressions as forms of relational activity is strengthened by examining the behavioral context in which facial expressions usually appear. Facial expression literature curiously neglects that context. The expressions are generally treated as if they stand on their own. This neglect most probably is a mistake. Facial expressions tend to appear in a context of head and body orientations, gross body movements, posture changes,

Table 4.2. Emotion ratings: percentages of "somewhat applicable" and "very much applicable" ratings (entries of 60% or over)

Checked emotion	Facial expression group						
	Anger	Sadness	Disgust	Fear	Contempt	Surprise	Joy
Anger	87						
Sadness		97		62			
Disgust		62	98.5	60			
Fear		(57)		97			
Contempt			84		68		
Surprise				92		98.5	
Joy							93.5

and other object-related actions with a similar relational sense. One would expect a frightened face made when confronting a material event to be at least accompanied by withdrawal movements of head and shoulders, if it is not accompanied by crouching or flight. During anger, the facial expression is often accompanied by general muscular tensing, fist clenching, and forward bending or stiffly erect posture. A relaxed smile tends to be accompanied by a slowing down of respiration (Dumas, 1948). In fact, respiration changes accompany facial expressions that are adopted voluntarily, and they are probably responsible for the autonomic changes observed by Ekman, Levenson, and Friesen (1983) (Boiten, 1996).

Although little or no research exists on this issue, there are scattered descriptions, mostly of emotional expressions of mentally ill people (e.g., Darwin, 1872; Dumas, 1933a) and of children (Bonneau-Le Breton, 1994), that support the suppositions of behavioral context with a similar sense, and so does available work on posture (e.g., De Meijer, 1991). Recognition studies show that the information conveyed by posture and gross body movement primarily concerns action readiness in the most literal sense, approach-address versus withdrawal-avoidance and dominance-submission, and activation control (tenseness) (Riskind, 1984; see De Meijer, 1991, for review and empirical data).

What kinds of behavior are facial expressions?

"Expressive behavior" is not a substantive category but an impression notion, as we said earlier. One cannot, therefore, expect facial expressions to be all of a kind. States of relational action readiness are indeed re-

flected by different kinds of behavior. Even instrumental behavior like eating is expressive (of greed, for instance) when its dynamic properties show the intensity of readiness to get to the goal.

Facial behavior that carries expressive information can be subsumed under four headings (1) relational activity proper; (2) social signals; (3) activation and deactivation manifestations; and (4) inhibition manifestations.

1. *Relational activity proper* is behavior that directly modifies the individual's relationship to its environment. It is the kind of behavior from which Darwin derived his first principle, but that was discussed more elaborately by Engel (1785), Piderit (1867), and Wundt (1902). Some facial expressions are actions to decrease or increase sensory intake (e.g., opening or closing the eyes or nostrils, head aversion, mouth movements in response to aversive tasting substances; Chiva, 1985). Other expression features are parts of approach and withdrawal movements, such as wincing, and probably raising the eyebrows in surprise (Fridlund, 1994; Frijda, 1986). The surprise expression as a whole is an orienting reaction. Frowning is a curious case of relational behavior. It is relational in that it corresponds with the effort of maintaining focus upon one's goal under difficulty (Schänzle, 1939; Smith, 1989); it seems to be effective in that function (Frijda, 1986, p. 21), although it is obscure how.

Many expressive movements are intention movements, the initial stages of relational actions proper (*Handlungsinittien*, action onsets, Bühler, 1934). Readying one's jaw or fist for aggressive approach in anger is an example. Intention movements are evident states of readiness.

2. Certain facial expressions are *social signals* meant to influence the behavior of others. They are nonverbal requests or commands (Frijda, 1982, 1986), and are extensively discussed by Fridlund (1994, and chapter 5, this volume). A threat display discourages approach or persistence in whatever elicits it. Certain smiles signal willingness to establish contact without aggressive intent. Crying tends to induce succorance and probably is meant to serve that purpose.

Relational activity proper and social signals are functionally not so different. Relational activity proper serves the prevailing state of action readiness directly: It directly helps to maintain, achieve, or modify a given type of relationship. Facial social signals likewise serve that prevailing state, but they do so indirectly by invoking the activity of an interactant. The aim of aggression is to end an obstruction by neutralizing the obstructor; the aim of threat is to obtain the same end by way

of intimidating the obstructor, who has to "cooperate" by understanding the threat and responding to it (Fridlund, 1994; Frijda, 1982, 1986).

3. *Activation and deactivation manifestations*. Activation is defined as "tonic readiness to act" (Pribram & McGuiness, 1975). Activation and activation loss are equivalent to Darwin's third principle of "direct action of the nervous system" as sources of expressive movement. Activation variation was considered the major explanatory principle for expression by both Spencer and Dumas (1933a). There are different modes of activation: that involved in relational or instrumental actions, that coming from physical effort such as the face made when cracking a nut, "superfluous" activation such as characterizes much joyful behavior, and restrained activation that goes by the name of "tenseness." Deactivation is illustrated by the drooping features of relaxation, fatigue, and sadness.

4. *Inhibition* involves response blocking under activating conditions. Freezing in rodents is usually quoted as exemplifying inhibitory process, and so is generalized response blocking in anxiety (Gray, 1982); both can be understood as cautionary responses to unpredictable or aversive conditions. Facial expression features that are best explained as inhibitory features are the sagging jaw in amazement, and the rigid, drooping and bland features in anxiety and certain anger reactions (Darwin, 1872; Dumas, 1933a).

Facial expression is here given a functional analysis. Expressions are the way they are because the relational activity, social influencing, and activation implement the aims of the state of action readiness at hand. Facial expression at any given instant of time can be understood from the functions of the composing elements in protection, orientation of attention, motor realization of activation, signaling affiliative intent, and the like. This analysis clearly leads to a componential view of facial expressions, such as proposed by Scherer (1992) and Smith (1989, and chapter 10, with Scott, this volume). Individual components of expression each have their functions, either as independent bits of relational activity or as modifiers or intensifiers of other components. Scherer (1992) and Smith and Scott (chapter 10, this volume) primarily link the components to their appraisal antecedents. We link them to their action readiness sources and relational functions.

Components belonging to different modes of relational activity may coexist. For instance, protective eye closure coexists with keeping the eyes open to maintain visual contact in some fearful expressions. Each

facial expression can be read in terms of composing modes of action readiness, as in this example. Traces of relational activity can be subtle. A tinge of reserve may occur in an expression that is otherwise open and receptive; that is, some slight narrowing of the eyes, or the head being held somewhat stiffly, may occur with directed attention and forward stretching of the head. Systematic variation on facial components allows analysis of how the information content of expressions varies correspondingly. A nice example is found in a study by Garotti, Caterina, Brighetti, Giberti, & Ricci-Bitti, (1993). They systematically varied specific features in schematic drawings of smiles (e.g., eye narrowing, opening the mouth) and, submitting the drawings to subjects in a recognition experiment, obtained clearly different emotion attribution patterns for each variation.

The process of expression understanding

How is it possible to understand facial expressions, the old philosophical question with which expression study began? Understanding facial expressions becomes rather transparent from the present perspective, which may be taken as an argument in its favor (Frijda, 1956).

Usually, one of the three traditional explanations – associative learning (Berkeley, 1709), “reasoning by analogy” (Bain, 1859), and “empathy” (Lipps, 1907) – is taken for granted. None provides a satisfactory explanation. Associative learning does not because it renders novel expressions (like those in ballet dancing) unintelligible. Reasoning by analogy does not because it appears too sophisticated for, for instance, animal recognition of expressions. Empathy does not because it itself is largely an interpretative response (Frijda, 1956).

An ability to grasp the sense of relational activity and activation, however, is not a great mystery. It merely requires that movements be viewed as behavior – that is, as purposive, as movements related to the organism’s environment and as guided by aims in relation to that environment. It requires, in short, that movements are perceived from an intentional stance (Dennett, 1978), which presumably implies a process of the same elementary nature as perceiving causality (Michotte, 1950).

Recognizing action readiness in behavior requires no great step either. It just amounts to picking up the cues that tell that things may come from the things that are. From here, the three recognition modes of daily life are not so difficult to understand. Once relational activity is grasped as involving relational action readiness, the material is there from which

to generate expectations about environmental events and about possibly forthcoming behavior by the observed person, and to identify the perceived readiness in terms of one’s own felt readiness repertoire. Knowledge and imagination then help out, given the time and the inclination, to construct hypothetical representations of the viewed person’s emotion or other state, and to find a fitting label for it.

Facial expressions and emotions

We claim, then, that facial expressions are relational activities, social signals, activation manifestations, and inhibitions, all of which flow from a state of readiness to maintain or change the relationship with the environment. Does this mean that facial expressions have nothing to do with emotions? Not at all. On the contrary. Emotions and facial expressions are intrinsically related for the simple reason that emotions are states of action readiness. More precisely, emotions are best viewed as action dispositions (Lang, 1995) or states of action readiness elicited by antecedent events as appraised and manifesting some degree of control precedence (see Arnold, 1960; Frijda, 1986; Lang, 1995; Scherer, 1984, for convergent views). Also, a change in state of action readiness is perhaps the major aspect of behavior or experience that leads to use of the word “emotion,” both to denote one’s own state and that observed in others. The word *emotion* is rarely used for mere feelings that do not involve some claim on change in action readiness.

The emotion-expression relationship is greatly clarified by the componential approach to emotions (e.g., Frijda, 1986; Lang, 1995; Lazarus, 1991; Mandler, 1984; Scherer, 1984). According to that approach, emotions are structures of moderately correlated components. Affect, appraisal, action disposition, and physiological response are the major components. Emotional feelings are considered as one’s awareness of one or more of these components. Different emotions can be viewed as structures that differ in one or more of these components. Emotion words specify such structures at a given level of specification, though not necessarily with regard to all components together.

Many emotion words specify a particular state of action readiness. In several languages there exist close links between major emotion categories and modes of action readiness (Davitz, 1969; Frijda et al., 1989; Frijda, Markam, Sato, & Wiers, 1995; Roseman et al., 1994). The links between major emotion categories and modes of action readiness parallel those between major emotion categories and facial expressions. For in-

stance, hostile or threatening impulse is one of the major semantic components of "anger" and its nearest equivalents in many other languages, and a prototypical angry expression translates a hostile or threatening action readiness. This explains Ekman's (1982, 1993; Ekman & Friesen, 1975) findings. It accounts for the affinity between particular emotions and particular expressions, the first basic fact mentioned.

Yet those links between emotions and expressions are neither necessary nor exclusive, as follows from multicomponential emotion theory. First, emotion words are generally used in fuzzy, nondeterministic fashion, to denote now this, then that of the moderately correlated components (Fehr & Russell, 1984; Russell, 1991; Shaver, Schwartz, Kirson, & O'Connor, 1987). They may primarily indicate particular appraisals rather than modes of action readiness. "Anger" is often used to denote the response to an event appraised as blameworthy, regardless of the nature of the resulting state of action readiness. That may be an impulse to break off contact rather than hostile impulse, or drastic loss of action readiness, as when paralyzed and almost fainting from anger. Other emotion words do not specify the state of action readiness at all. "Being upset" suggests that action readiness is somehow interfered with – action is interrupted – but no more. The links between emotion categories and modes of action readiness, while sometimes clear and intrinsic, thus are in no way fixed or absolute.

Second, not all states of action readiness (and thus, not all emotions) give rise to facial expression or to a very specific facial expression. The emotion of desire, understood as the impulse to get closer in order to possess, is an example. Facial expression, moreover, is only one among many kinds of action that a given state of action readiness may command. Each kind of action has its own determinants in addition to the state of action readiness. One additional determinant for facial expression is physical context: A fearfully contorted face is more likely in front of a threatening physical object than when facing failing an examination. Another determinant is prevailing activation mode. For instance, the nonsocial smile may represent "active rest" or "sense of mastery" rather than just generally pleasure or joy (Buytendijk, 1947; Frijda, 1986; Sroufe & Waters, 1976); and Ellgring (1989) notes that facial expressions in depressed patients depend more upon their initial behavioral level than upon the prevailing emotion or mood. Other determinants again are social influence and expected effectiveness, as extensively examined by Fridlund (1994). All this accounts for the second basic fact: the loose and variable relation between particular emotions and particular expressions.

Third, there is no simple relationship between action readiness and

overt behavior, including facial expression. As we mentioned, states of action readiness are not always expressed in overt behavior, and they may lead to widely divergent overt behaviors. In addition, control processes, including social display rules, obviously work to widen the split.

Moreover, there is no simple relation between the impact of an emotional event and action readiness. The event aspect that controls action readiness, or which mode of action readiness controls behavior, is not always the central aspect of the event's impact. We earlier gave the example of a target person in the Frijda (1953) experiment who was thinking with feelings of deep happiness about some work she had been doing. Her face mostly showed her concentrated attention, and not so much the happiness. Similar observations are made by Kraut (1982) and Fernández-Dols and Ruiz-Belda (chapter 11, this volume). They found that events causing important satisfaction or happiness frequently do not lead to happy expressions; the subjects smile only when facing the public. Part of the explanation may be that concentration and exhaustion after effortful feats overlay or delay actual feelings of joy or triumph.

Then both action readiness and facial expression may vanish when action appears meaningless. Brehm (1994) advances the hypothesis that the relationship between event intensity and emotional response has the shape of a sawtooth rather than being monotonic. In maximally intense emotions, response magnitude drops steeply. The hypothesis is corroborated by the Chinese torture report and the story of Psammenitus. These considerations, too, account for aspects of the second basic fact.

Fourth, relational actions, social signals, and activation manifestations need not originate in a state of action readiness. They may come just from physical exercise or represent hypotonic boredom reactions that look like dumb amazement. They may also come from voluntary intent to signal a particular event appraisal to others ("how awful is what you tell me") or to suggest a state of action readiness that is not really there. These are the conditions for *mimiques* or emblems (Dumas, 1933b; Ekman & Friesen, 1969).

Attributing emotions necessarily involves going beyond the information given by expression. One has to add that the relational action, social signal, or activation state was elicited by an appraised event, and that these actions involve a state of action readiness with control precedence. One frequently has to add hypotheses on the nature of the eliciting event and appraisal – hence, the confusions in recognition experiments. This accounts for the third basic fact, the looseness of the emotion-expression relationship.

As indicated before, the major forms of action readiness can be con-

sidered basic forms of subject–environment interaction. They form discrete categories, very much as the basic emotions in Izard's (1977) theory. Since certain emotions paradigmatically embody these forms of action readiness, and the corresponding states may paradigmatically be manifest in certain facial expressions, it makes sense to consider these emotions as basic emotions, and certain facial expressions to represent them. However, recognizing basic emotions in this sense in no way implies the lore around that notion: unitary biological predispositions, felt *qualia*, solid links between the various components, a stiff emotions hierarchy. That lore, in fact, we firmly reject.

Conclusions

Facial expressions, we propose, "express" the individual's state of relational action readiness or unreadiness. State of action readiness is the proper content of facial expressions, and that which observers infer from them in the first place. Expressions "express" it, in the sense that an action expresses its underlying intention. They implement or effectuate action readiness. That is, they do so unless they come from a different source, such as social habit, deceit, or voluntary intent.

Because the core of what one calls "emotions" consists, by and large, of variations in the individual's state of action readiness, facial expressions can be said to "express" emotions. Facial expressions, *when* they are contingent upon states of action readiness, are intimately bound to emotions. Emotions are expressed in facial expressions and lead to such expressions *when* additional conditions are appropriate for state of action readiness to do so. Facial expressions thereby are often fairly diagnostic for the prevailing states of action readiness and, with sufficient cues (behavior context, time course, information that there is some eliciting event) for emotion.

At the same time, from the point of view of the observer, the issue is not simple. Facial expressions represent relational activities, activation modes, social signals, and inhibitory states. Correctly recognizing emotion needs those additional "sufficient cues" just mentioned, which allow going from relational activity to action readiness to correctly assessing whether the action readiness is the response to an appraised event.

The relationship between facial expressions and emotions, as felt or as defined by eliciting event, type of appraisal, or action readiness, is variable. Manifest state of action readiness may be peripheral to what is central to experience. Occurrence of facial expression depends upon

other factors, in addition to feeling, event appraisal, and action readiness. These factors dilute the link between emotions and expressions. They do, however, in no way sever it. Although the link is neither exclusive nor necessary, it is an intrinsic one.

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Note

- 1 Lebrun was a painter, Engel a theorist of the stage, and Camper a Dutch anatomist (in fact, the founder of comparative anatomy).

References

- Arnold, M. B. (1960). *Emotion and personality* (Vols. 1 and 2). New York: Columbia University Press.
- Bain, A. (1859). *Emotions and the will*. London: Longmans and Green.
- Berkeley, G. (1709). *An essay towards a new theory of vision*. London.
- Boiten, F. A. (1996). Autonomic response patterns during voluntary facial action. *Psychophysiology*, 33, 123–131.
- Bonneau-Le Breton, C. (1994). *Expression faciale des émotions: comparaison des mimiques évoquées et provoquées, dans une perspective développementale*. Ph.D. thesis, Université de Paris-X Nanterre.
- Brehm, J. (1994). *The intensity of emotions*. Unpublished manuscript.
- Bühler, K. (1934). *Ausdruckstheorie*. Jena, Germany: Fisher.
- Buytendijk, F. J. J. (1947). *De eerste glimlach van het kind* [The infant's first smile]. Nijmegen: Dekker en van der Veet.
- Buytendijk, F. J. J., & Plessner, H. (1925). Die Deutung des mimischen Ausdrucks. *Philosophische Anzeiger*, 1, 26–48.
- Camper, P. (1792). *Redencioeringen over de Wyze om de onerscheiden Hartstochten op onze Wezens te Verbeelden* [Discourses on the manner to depict the various passions on our creatures]. Utrecht.
- Chiva, M. (1985). *Le doux et l'amer* [The sweet and the bitter]. Paris: Presses Universitaires de France.
- Darwin, C. (1872). *The expression of emotions in man and animals*. London: John Murray.
- Davitz, J. R. (1969). *The language of emotion*. New York: Academic Press.
- De Meijer, M. (1991). *Emotional meaning in large body movements*. Tilburg, Netherlands: Tilburg University Press.
- Dennett, D. C. (1978). *Brainstorms: Philosophical essays on mind and psychology*. Montgomery: Bradford Books.
- Dumas, G. (1933a). L'expression des émotions. In G. Dumas (Ed.), *Nouveau traité de psychologie*. Tome 3 (pp. 39–292). Paris: Alcan.
- Dumas, G. (1933b). Les mimiques. In G. Dumas (Ed.), *Nouveau traité de psychologie*. Tome 3 (pp. 293–360). Paris: Alcan.
- Dumas, G. (1947). *La vie affective*. Paris: Presses Universitaires de France.

- Ekman, P. (1993). Facial expression and emotion. *American Psychologist*, 48, 384–392.
- Ekman, P. (Ed). (1982). *Emotion in the human face* (2nd ed.). New York: Cambridge University Press.
- Ekman, P., & Friesen, W. V. (1969). The repertoire of nonverbal behavior: Categories, origins, usage and coding. *Semiotica*, 1, 49–98.
- Ekman, P., & Friesen, W. V. (1975). *Unmasking the face*. Englewood Cliffs, NJ: Prentice-Hall.
- Ekman, P., Levenson, R. W., & Friesen, W. V. (1983). Autonomic nervous system activity distinguishing among emotions. *Science*, 221, 1208–1210.
- Ellgring, H. (1989). *Nonverbal communication in depression*. Cambridge: Cambridge University Press.
- Engel, J. J. (1785). *Ideen zu einer Mimik*. Berlin: Mylin.
- Fehr, B., & Russell, J. A. (1984). Concept of emotion viewed from a prototype perspective. *Journal of Experimental Psychology: General* 113, 464–486.
- Fridlund, A. J. (1994). *Human facial expression: An evolutionary view*. New York: Academic Press.
- Frijda, N. H. (1953). The understanding of facial expression of emotion. *Acta Psychologica*, 9, 294–362.
- Frijda, N. H. (1956). *De betekenis van gelaatsexpressies* [The meaning of facial expressions of emotion]. Amsterdam: Van Oorschot.
- Frijda, N. H. (1969). Recognition of emotion. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 4, pp. 167–223). New York: Academic Press.
- Frijda, N. H. (1970). Emotion and recognition of emotion. In M. B. Arnold (Ed.), *Feelings and emotions: The Loyola symposium* (pp. 241–250). New York: Academic Press.
- Frijda, N. H. (1973). The relation between emotion and expression. In M. von Cranach & I. Vine (Eds.), *Social communication and movement* (pp. 325–340). New York: Academic Press.
- Frijda, N. H. (1982). The meanings of facial expression. In M. Ritchie-Kye (Ed.), *Nonverbal communication today: Current research* (pp. 103–120). The Hague: Mouton.
- Frijda, N. H. (1986). *The emotions*. Cambridge, England: Cambridge University Press.
- Frijda, N. H., Kuipers, P., & Terschure, E. (1989). Relations between emotion, appraisal, and emotional action readiness. *Journal of Personality and Social Psychology*, 57, 212–228.
- Frijda, N. H., Markam, S., Sato, K., & Wiers, R. (1995). Emotion and emotion words. In J. A. Russell, J.-M. Fernández-Dols, A. S. R. Manstead, & J. Wellenkamp (Eds.), *Everyday conceptions of emotion* (pp. 121–144). Dordrecht: Kluwer.
- Frijda, N. H., & Philipszoon, E. (1963). Dimensions of recognition of emotion. *Journal of Abnormal and Social Psychology*, 66, 45–51.
- Garotti, P. L., Caterina, R., Brighetti, G., Giberti, E., & Ricci-Bitti, P. E. (1993). Il ruolo del sorriso come indicatore di stati emotivi differenziati [The role of the smile as indicating differentiated emotional states]. *Rassegna di Psicologia*, 10, 29–53.
- Gopal, R. (1951). *Indian dancing*. London: Phoenix House.
- Gray, J. A. (1982). *The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system*. Oxford: Oxford University Press.
- Izard, C. E. (1977). *Human emotions*. New York: Plenum.

- Koffka, K. (1935). *Principles of Gestalt psychology*. New York: Harcourt Brace.
- Köhler, W. (1929). *Gestalt psychology*. New York: Liveright.
- Kraut, R. E. (1982). Social presence, social feedback, and emotion. *Journal of Personality and Social Psychology*, 42, 853–863.
- Lang, P. J. (1995). The emotion probe. *American Psychologist*, 50, 372–385.
- Lazarus, R. S. (1991). *Emotion and adaptation*. New York: Oxford University Press.
- Lebrun, C. (1677). *Conférences sur l'expression des différents caractères des passions* [Lectures on the expression of the different passions]. Paris.
- Lipps, T. (1905). Die Erkenntnis from fremden Ichen [The knowledge of other minds]. *Psychologische Untersuchungen*, 1, 1–53.
- Lipps, T. (1907). Zur Einfühlung [On empathy]. *Psychologische Untersuchungen II*, 73–102.
- Mandler, G. (1984). *Mind and body: The psychology of emotion and stress*. New York: Norton.
- Matsumoto, D., & Ekman, P. (1989). American-Japanese cultural differences in intensity ratings of facial expressions of emotion. *Motivation and Emotion*, 13, 143–157.
- Michotte, A. E. (1950). The emotions as functional connections. In M. Reymert (Ed.), *Feelings and emotions* (pp. 114–126). New York: McGraw-Hill.
- Piderit, T. (1867). *Mimik und Physiognomik*. Detmoldt: Meyer.
- Pribram, K. H., & McGuiness, D. (1975). Arousal, activation, and effort in the control of attention. *Psychological Review*, 82, 116–149.
- Riskind, J. H. (1984). They stoop to conquer: Guiding and self-regulatory functions of physical posture after success and failure. *Journal of Personality and Social Psychology*, 47, 479–493.
- Roseman, I. J., Wiest, C., & Swartz, T. S. (1994). Phenomenology, behaviors, and goals differentiate discrete emotions. *Journal of Personality and Social Psychology*, 67, 206–221.
- Ruckmick, C. A. (1921). A preliminary study of the emotions. *Psychological Monographs*, 30.
- Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*, 39, 1161–1178.
- Russell, J. A. (1991). In defense of a prototype approach to emotion concepts. *Journal of Personality and Social Psychology*, 60, 425–438.
- Russell, J. A. (1994). Is there universal recognition of emotion from facial expression? A review of the cross-cultural studies. *Psychological Bulletin*, 115, 102–141.
- Russell, J. A., & Bullock, M. (1986). Fuzzy concepts and the perception of emotions in facial expression. *Social Cognition*, 4, 309–341.
- Sartre, J. P. (1939). *Esquisse d'une theorie phenomenologique des emotions*. Paris: Hermann (The Emotions, New York, Philosophical Library, 1948).
- Schänzle, J. (1939). *Der mimische Ausdruck des Denkens* [The facial expression of thinking]. Berlin: Grafe.
- Scherer, K. R. (1984). On the nature and function of emotion: A component process approach. In K. R. Scherer & P. Ekman (Eds.), *Approaches to emotion* (pp. 293–317). Hillsdale, NJ: Erlbaum.
- Scherer, K. R. (1992). What does facial expression express? In K. T. Strongman (Ed.), *International review of studies of emotion* (Vol. 2, pp. 139–165). New York: Wiley.
- Schlosberg, H. (1954). Three dimensions of emotion. *Psychological Review*, 61, 81–88.
- Schwartz, G. M., Izard, C. E., & Ansul, S. E. (1985). The 5-month-old's ability to

- discriminate facial expressions of emotion. *Infant Behavior and Development*, 8, 65–77.
- Shaver, P., Schwartz, J., Kirson, D., & O'Connor, C. (1987). Emotion knowledge: Further exploration of a prototype approach. *Journal of Personality and Social Behavior*, 52, 1061–1086.
- Smith, C. A. (1989). Dimensions of appraisal and physiological response to emotion. *Journal of Personality and Social Psychology*, 56, 339–353.
- Sroufe, L. A., & Waters, E. (1976). The ontogenesis of smiling and laughter: A perspective on the organization of development in infancy. *Psychological Review*, 83, 173–189.
- Tcherkassof, A. (in preparation). *La perception des expressions émotionnelles faciales*. Unpublished doctoral dissertation, Université de Paris-X Nanterre.
- Wagner, H. L., MacDonald, C. J., & Manstead, A. S. R. (1986). Communication of individual emotions by spontaneous facial expression. *Journal of Personality and Social Psychology*, 50, 737–743.
- Werner, H. (1948). *Comparative psychology of mental development*. New York: Science Editions. (Original work published 1926)
- Woodworth, R. S. (1938). *Experimental psychology*. New York: Holt.
- Woodworth, R. S., & Schlosberg, H. (1954). *Experimental psychology* (rev. ed.). New York: Holt.
- Wundt, W. (1902). *Grundzüge der physiologischen Psychologie* (Vol. 3). Leipzig: Engelmann, 5th. Ausgabe.

5. The new ethology of human facial expressions

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Historically, researchers on facial expressions have tried to forge links between movements of the face and those ineffable states called “emotions” (e.g., Mandler, 1984). The advocates of this “Emotions View” are not homogeneous in all their axioms and precepts, but they share the belief in the centrality of emotion in explaining facial movements. I myself worked within this tradition for many years (e.g., Ekman & Fridlund, 1987; Fridlund, Ekman, & Oster, 1987; Fridlund & Izard, 1983; Fridlund, Schwartz, & Fowler, 1984; Matsumoto, Ekman, & Fridlund, 1990) but began to be troubled by certain insurmountable problems with the approach. My apostasy led to a search for a better way to understand our facial expressions.

I have proposed an alternative (e.g., Fridlund, 1991a, 1994), termed the *Behavioral Ecology View*, because it derives from modern accounts of the evolution – both genetic and cultural – of signaling behavior.¹ This account, based on work by biologists like Maynard Smith, Hinde, Smith, Krebs, Davies, and Marler, contrasts with the Emotions View of faces (see Izard; Frijda & Tcherkassof; Smith & Scott; chapters 3, 4, and 10, respectively, this volume) in its view of how facial expressions evolved, what they signify, and how they function in our everyday lives. This chapter presents the fundamentals of the Behavioral Ecology View, followed by the reasons why it may afford the better understanding of human facial expressions.

The Behavioral Ecology View of faces

Most theorists within the Emotions View essentially espouse a two-factor model, depicted in Figure 5.1, that posits two basic kinds of faces. First are the innate reflex-like faces that read out ongoing emotion; these are “facial expressions of emotion.” Second are learned, instrumental faces