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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

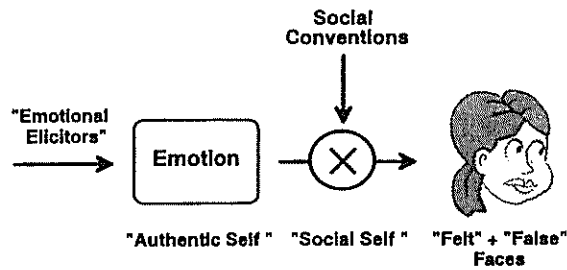


Figure 5.1. The Emotions View of facial expression.

that connote emotion that is not occurring; these reflect everyday social dissimulation such as the smile of phony politeness.

The two-factor Emotions View is also permeated by an implicit but familiar Western romanticist portrait of human nature, which draws heavily from Rousseau – which most psychologists know via Sigmund Freud's *id* and *ego*, and which I believe explains both its appeal and its persistence. I schematize this romanticist view in Table 5.1.

The Behavioral Ecology View of facial displays does not treat them as "expressions" of discrete emotional states, or the outputs of modular affect programs, or as a compromise between the opposing forces of a Janusian self. For the contemporary ethologist or the behavioral ecologist, facial displays are simply messages, which influence others' behavior because vigilance for and comprehension of signals co-evolved with the signals themselves. Early on (Fridlund, 1986), I provided this scenario:

Millions of years ago, if you crossed my turf, I might bite your head off [at some risk to me, if you decided to retaliate]. If you had advance warning, you might escape death through retreat or protective defense, and we'd both survive.

But you'd need cues to retreat or protect. I'd have to give them, and you'd have to notice them. Here's the scenario: because of a lucky gene, I adventitiously bared one tooth for ½ second before I pounced. Your lucky gene made you look at my head. I bared my tooth, and you looked in the right place, not because I wanted to display my feelings, or because you wanted to see how I felt. We both acted out of pure dumb genetic luck. That we survived our skirmish increases the chances that our lucky genes will proliferate, and that my odd tooth-baring and your odd vigilance for it will both disseminate in our progeny.

The vignette is simplistic, and the evolution it describes is genetic (cultural evolution operates similarly, but ontogenetic learning replaces phylogenetic predisposition). Nonetheless, its message is that displays

Table 5.1. Romanticist leitmotif underlying "two-factor" theories of facial expression

Aspect of expression	"Emotional" expressions	"Social" expressions
Creature domain	Animal (savage)	Human (noble)
Context of occurrence	Natural (private)	Civil (public)
Type of issuance	Released	Rule-governed
Quality of expression	Reflexive	Instrumental
Veridicality	Authentic	Deceptive
Governing mechanism	Endogenous "facial affect programs"	Exogenous "cultural display rules"
Neurological bases	Subcortical ("passion")	Neocortical ("will", "reason")

co-evolve with vigilance for them. This prediction from modern evolutionary theory carries several implications. In the first place, *the co-evolution of facial displays and vigilance for them could occur only if displays provided reliable, graded, mutually beneficial signals of contingent future action.* These signals would allow interactants to proceed with reciprocation or counteraction that promoted mutual survival (Alcock, 1984; Hinde, 1985a; Smith, 1977, 1986).

Second, *the dictates of economy and privacy would select against any involuntary displays of internal state that might betray information detrimental to the displayer.* Evolution should suppress any movements – such as the "emotional expressions" of Emotions theorists – that ostensibly erupt despite one's efforts to hide them (cf. Krebs & Dawkins, 1984). In order to flourish, one must issue faces that primarily serve social motives, not any quasi-reflexive emotion (Andrew, 1963a, b, 1964, 1972; Hinde, 1985b). Indeed, instead of there being six or seven expressions of "fundamental emotions" (for example, anger), there may be any number (whether 1 or 100) "about to aggress" displays appropriate to the identities and relationship of the interactants and to the context in which the interaction occurs.² All of these factors, in turn, determine one's aims within the interaction. The topography of any "about to aggress" display would likely depend upon contextual features such as whether the interactant is dominant or nondominant, conspecific or extraspecific, and whether one is defending territory or young, contesting for access to a female, or retrieving stolen food or property. And as noted by Marler and Evans (chapter 6, this volume) and Ginsburg and Harrington (1993), the context of any interaction includes the history of previous interaction.

Third, survivors of conflicts would not only include those who produced more schematized facial behavior (technically, "ritualized" if the evolution is genetic and "conventionalized" if it is cultural) but also those with a heightened sensitivity to faces (see Nelson & de Haan, chapter 8, this volume) and who exhibited more "social cognition" (see Brothers, 1992). This "ecology" of signaling and vigilance, countersignaling and countervigilance, is analogous to the balance of resources and consumers, and predator and prey, that characterizes all natural ecosystems.

Fourth, the costs and benefits of signaling, and of emitting a particular kind of signal, would vary with the momentary social context and the animal's intentions within it. This sociality of animal signals is well documented in a number of animals and a variety of social settings (see Fridlund, 1994; and Marler & Evans, chapter 6, this volume). Human signals, like the signals of other animals, should be no less dependent upon motive and context. How, then, does the Behavioral Ecology View interpret everyday human facial expressions?

Table 5.2 compares typical facial displays as interpreted by the Emotions View and the Behavioral Ecology View. In each case, an "emotional expression" is replaced by the signification of a social motive. This isn't just a replacement of terms, for two reasons. First, "emotions" are ineffable entities about which there is no consensual definition – as the relevant chapters in this volume attest (more on this later). "Motives," on the other hand, can be deduced from behavioral observation. Second, the Behavioral Ecology interpretation disposes of the romanticized split between the "authentic" self that embodies the impulse to make a face and the social self that wants to withhold it or modify it. Thus, in contexts in which one would try to appease another, any smile one issued would tend to be labeled a "false smile" in the Emotions View, which would connote a smile that masks some other emotion with its associated facial expression. For the behavioral ecologist, the same smile would likely be labeled an "about to appease" display, and it would deliver the same message as the words, "I give in" or "Whatever you say."

Note from Table 5.2 that I have not depicted prototype faces for each category. This is because, *contra* the Emotions View, the Behavioral Ecology View does not require them. Rather, because displays exert their influence in the particular context of their issuance, they may only be interpretable within that context. By analogy with language, I may use the word *pen* to denote a writing implement in one context and a holding area in another, and there is no requirement that the writing *pen* be pronounced any differently than the cattle *pen* – the context determines

Table 5.2. Emotions and Behavioral Ecology interpretations of common human facial displays

Emotions view ["facial expressions of emotion"]	Behavioral Ecology view [signification of intent]
"Felt" ("Duchenne") smile (Expression of happiness)	Readiness to play or affiliate ("Let's play [keep playing]," or "Let's be friends")
"False" smile (Feigned happiness)	Readiness to appease ("Whatever you say," or "I give in")
"Sad" face	Recruitment of succor ("Take care of me," or "Hold me")
"Anger" face	Readiness to attack ("Back off or I'll attack")
"Leaked" anger (Inhibited anger)	Conflict about attacking ("I want to attack and I don't want to attack")
"Fear" face	Readiness to submit or escape ("Don't hurt me!")
"Contentment" face	Readiness to continue current interaction ("Everything [you're doing] is just fine")
"Contempt" face	Declaration of superiority ("I can't even bother with you")
"Poker" face (Suppressed emotion)	Declaration of neutrality ("I'm taking no position [on what you're doing or saying]")

the word's signification. Similarly, I may smile both when I am giving a gift and when I am exacting revenge. The context determines whether the smiles signify "I like you" or "Gotcha," and the faces needn't be different. The evidence supports this: For example, a face interpreted as "contemptuous" in one context may be interpreted as "exasperated" or even "constipated" in another (Russell, chapter 13, this volume, and 1994). And needless to say, because displays are specific to intent and context, the practice within the Emotions View of simultaneously proposing a small set of fundamental affects, and then invoking "blends" of them to explain the range of everyday displays, is considered procrustean, tautological, and self-confirming (see Ortony & Turner, 1990, for a lexical critique of theories of "basic emotions").

Fifth, because facial displays are the results of a formalized co-evolution with vigilance for them, they are not readouts but "social tools" (Smith, 1977) that aid the negotiation of social encounters. Displays are declarations that signify

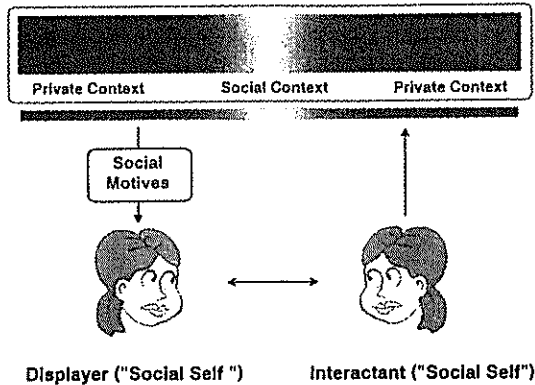


Figure 5.2. The Behavioral Ecology View of facial displays.

our trajectory in a given social interaction (i.e., what we will do in the current context, or what we would like the other to do). And this "context" depends considerably not only on the structural features of the situation but on the succession of interactants' displays and their responses to them.

I have depicted my conception of the Behavioral Ecology View in Figure 5.2. In Figure 5.2, the "facial expressions of emotion" of the Emotions View (cf. Figure 5.1) actually serve the social motives of the displayer. No distinction is made between "felt" and "false" displays issued by "authentic" and "social" selves; instead, *all* displays are considered to arise out of social interaction, thus there is *only* a social self. Finally, displays are deployed and interpreted within the context of the interaction ("social context" in the figure). This context is formed from both its structural features (e.g., the setting as well as the relations of the interactants) and, as the Ginsburg and Harrington quote suggests, the accreted "common ground" that arises from any previous interactions. Finally, the "private context" of the participants consists of that set of expectations, needs, and so on, that each brings to the interaction, and these in turn result in great part from one's prior interactions. For this reason, the figure depicts the interactants' private contexts as melding with their shared social context.

Shortcomings of the Emotions View

The previous summary focused on how the behavioral ecologist understands human facial expressions. As I mentioned earlier, I came to adopt

this view not only because of its solid biological grounding but because of insurmountable problems I encountered in trying to make an Emotions View of facial expression "work." I now discuss some of the difficulties I encountered, and I indicate the resolutions suggested by the Behavioral Ecology View.

The Emotions View neglects the costs of automatic expression.

Signals do not evolve to provide information detrimental to the signaler. Displayers must not signal automatically but only when it is beneficial to do so (i.e., when such signaling serves its aims within an interaction). Automatic readouts or spillovers of drive or emotion states (for example, "facial expressions of emotion") would thus be extinguished early in phylogeny in the service of deception, economy, and privacy. What about those cases in which people can be seen trying to "hide their emotions"? For the behavioral ecologist, these cases represent not incomplete suppression of automatic, emotional expression ("leakage") but simple conflict behavior. For example, an individual who momentarily shows a pursed lip on an otherwise impassive face is not showing leakage of anger but conflicting intentions (cf. Tinbergen, 1953) (e.g., probably to show stolidity *and* to threaten).

The Emotions View omits the recipient's co-evolutionary role in the origin and persistence of display.

The recipient is indispensable in the process of formalization. Signals that are not received and then acted upon cannot be selected. Recipients of displays should only attend to cues that provide predictions about the future *behavior* of the displayer, regardless of how the displayer "feels." This does not imply that recipients can *only* use formalized cues; everyday behavior in a given context also allows prediction of the others' next moves (Argyle, 1972; Kendon, 1981). Nonetheless, only those cues to which recipients reliably attend *can* evolve (whether genetically or culturally). Behavioral intentions must therefore drive displays.

The Emotions View erroneously presumes that infant faces are "authentic" and that maturation breeds dissimulative faces.

The most reflex-like human faces are seen in infants, and in the Emotions View they are held to reflect an "innate expression-feeling concordance"

(cf. Izard & Malatesta, 1987). In the Behavioral Ecology View, the seeming reflexiveness of infant displays just reflects the selection pressures on the infant. The late-maturing human infant's social milieu is relatively simple; the infant merely needs to garner caretaker attention, and the caretakers discern the required response. Thus, the primary selection pressures on children are to capture and hold the attention of caretakers, especially if competition originally occurred among infants of multiple caretakers. Indeed, it would be well to conceive of the infant not as an innocent but as a servomechanism cleverly shaped by natural selection to emit the displays that will optimally promote and maintain parental care (i.e., they should be intense attention grabbers).

What displays should evolution "choose" to grab adult attention? Conceivably, infants may have evolved merely to be good emulators of the requisite adult displays. Those infants who are good emulators can better exploit the extant adult signal system. Thus, by virtue of the fact that adults succor other adults who are crying, those infants who produce loud cries will receive more reliable care. Because adults are engaged when other adults smile, then babies who produce "flashbulb" social smiles will more readily engage caretakers and obtain similar advantage. Because infants who did not emit pronounced cries or smiles would have been comparatively neglected and less viable, natural selection should directly shape the production of exaggerated, plangent, canonical infant displays. (The emulation may be due to natural selection, with the infant a hard-wired emulator, and/or it may occur via early imitation of the caricatured faces that caretakers make toward neonates [Meltzoff & Moore, 1977].)

When should infants display? In the case of crying, infants should of course cry when hungry, tired, in pain or need of diapering, and so forth. The so-called distress cries of the newborn, in this account, are protolinguistic protests that mean, "Make it better!" or "Get me outta here!" These displays are "honest" (i.e., occurring when the infant needs a caretaker's direct intervention). The infant, however, cleverly shaped by natural selection, should issue additional cries, or convincingly urgent ones, periodically and unpredictably. These "deceptive" cries should be issued often enough to insure steady caretaker attention, but not so often or so needlessly that the attention extinguishes. Caretaker attention is a risky commodity, as suggested by the high rates of child abuse and infanticide worldwide, and most likely it is infants' ingratiation strategies (i.e., looking cute and issuing endearing smiles) that explain why so many thrive.

Is the displaying infant "emotional"? Prerequisite to any answer is a

consensual definition of emotion, which proponents of the Emotions View have failed to supply.³ For the behavioral ecologist, individuals of any age who show the right displays at the right time will survive, even if they are anhedonic (arguably, the psychopath fits this criterion). Displays function as manipulations, and infant cries and smiles are manipulations that merely serve to garner caretaker attention and intervention. No emotion is implied or required; whether infants are emotional when they issue displays is a separate problem whose resolution requires evidence independent of the displays.

Compared to infants, older children start showing more subtle and variegated displays. In the Emotions View, this change from plangency to subtlety reflects learned dissimulation (i.e., "socialization of emotion" [cf. Lewis & Michalson, 1982, 1985] or the internalization of "display rules" [Saarni, 1978], the effect of which is the uncoupling of the innate expression-feeling concordance [Izard & Malatesta, 1987]). In the Behavioral Ecology View, the increased subtlety of more mature displays may be due to either maturation or socialization.

Conceivably, increased variation in facial display with maturation would simply reflect normal developmental differentiation of both morphology and behavior (Baer, 1828). More likely, the increased subtlety of display is social, but it is not dissimulative. Rather, the apperception of more complex social relations leads directly to more complex social motives. Thus, the infant merely has to cry or smile to garner the attention of a caretaker who discerns how to respond. In contrast, the normal adult rarely has such an attentive, discerning caretaker. Satisfying needs requires sophisticated signals to negotiate a complex social terrain that includes one's relatedness to those present, as well as a context of interaction that may involve varying social roles, past interactions, modes of reciprocation, and moral notions of entitlement.

The Emotions View fails to account for the poor relationship between emotions and facial displays.

Adults may have "emotions" (as commonly defined), but the relation of adult display to emotion is adventitious. Displays serve social motives, which themselves may depend little upon whether, for example, people say that they are emotional. Everyday smiling is illustrative. We may be courteous, loving, amusing, or reassuring, and smile accordingly, if we are so moved – regardless of whether we feel happy, sad, angry, or fearful. I know of no evidence that we smile more when we are happy,

but if we do, it is likely so for two reasons. We may simply prefer (and report being "happier" in) situations that engender such motives. More likely, social motives served by smiles (e.g., humor, play, affiliation) may arise more frequently during those periods when we say that we're happy, and at these times, our impulse is to tell someone. This impulse may reflect personal disposition or cultural tradition about whether one "shares one's happiness" with another or simply thanks God quietly for one's blessings.

Clearly, people often do *not* show facial behavior when the Emotions theorist would predict it. When people feel immensely wounded by another, or praised overwhelmingly by an audience, their faces will remain motionless – except, perhaps, for moist eyes. In fact, it is altogether common to say that a person is especially "moved" when her face isn't! (See Fernández-Dols & Ruiz-Belda, chapter 11, this volume, for especially persuasive data.)

The multiple determinants of other prototype "emotional expressions" also vitiate the Emotions View. In emotion theories, the display characterized by wincing, down-turned mouth, and frequent tears (i.e., the "cry" face) is thought to express sadness. Nonetheless, we also cry when we would say that we are happy, angry, frightened, or relieved. From the Behavioral Ecology View, the function of the cry-face display in all cases is to signal readiness to receive attention or succor, regardless of one's emotional status. Similarly, the display comprised of a knit brow, pursed lips or retracted lip corners with bared teeth, and fixated gaze (i.e., the "about to attack" face) is held in the Emotions View to express anger. For the behavioral ecologist, making an "about to strike" face serves to repel an interactant, and acting this way can occur for many reasons and amid circumstances that could connote many emotions. Indeed, we make this face not only when we are angry, but when we are helpless, frightened ("defensive"), frustrated, exasperated, bored, or engaging in a fit of bravado.

The social-motive analysis of threat displays follows that for smiles. I know of no evidence that we make threatening "attack" faces more when we are angry. If we do, it may be because when we are angry we often seek out another to provoke. We make threat faces in the process, but the faces serve the provocation rather than the anger occasioning it (again, anger is just *one* emotion that can lead us to provoke another). Moreover, our attacking another in anger may occur only if we believe that events that anger us mandate confrontation and retaliation; alternatively, our anger should occasion smiling if we believe that anger man-

dates supplication or even a sly con. These beliefs may be individual or cultural.

Displays should generally be issued when they are likeliest to benefit the displayer. In no case would they be readouts of varying states like "emotion." When is a display maximally beneficial? (Predicting such optimality mathematically is the focus of the "game-theoretic" analysis of displays in modern ethology [Caryl, 1979; Maynard Smith, 1982].) A loud bellow when conditions are *not* threatening – or, for that matter, every fifteen minutes around the clock – may alert others of one's RHP (Resource Holding Potential) and forestall predation far better than one issued contingent upon another's attack. To continue the logic: (1) one should not cry whenever one is saddest, but when succor is needed and most readily available; (2) one should not produce a "fright" display when afraid unless submission is advantageous or rescue is desired, and these conditions may hold even when one happens not to be afraid. The form and intensity of a display, and the alignment of the display with personal resources or intentions, would depend on contextual factors such as common interests, availability of resources, and presence of kin, intruders, or predators (Ricklefs, 1979).

The Emotions View takes a crypto-moralistic view of deception.

Within the Emotions View, what is "hidden" in deception is ostensibly detectable through "leakage" from unmanaged behavior (Ekman, 1981; Ekman & Friesen, 1969). The Emotions View thus makes deception something that requires some cognitive sophistication – since infants are not supposed to be able to do it, and since people must *learn* to do it by counteracting the expression of their "authentic" selves. The facts belie this.

Deception is *not* restricted to socialized humans, nor does it require learning or cognitive sophistication. Far from it. It spans the animal and botanical kingdoms. Morphological deceptions (mimicries) are common in plants and insects. Behavioral deceptions are widely reported in insects, crustaceans, fish, birds, and marsupials (see Fridlund, 1994, for review). Deception appears commonplace among mammals generally, including monkeys (Cheney & Seyfarth, 1990) and the great apes (e.g., de Waal, 1982, 1989). Given these nonhuman deceptions, it is difficult to argue that our progenitors were naive, authentic expressors of felt emotion who were forced inexorably to dissimulate as human culture developed. Nonhuman signals do not resemble the "emotional expres-

sions" of two-factor theories. Rather, nonhuman displays seem as thoroughly embedded in social relations as the faces we make ourselves (see review by Fridlund, 1994).

Various studies have claimed to show leakage of emotion in deceit (DePaulo, 1992), but these studies have found only signs of agitation or "displacement behaviors" like lip biting. True demonstrations of "leakage" require not only that the "leaked" emotion be detectable but that it be *decodable* (i.e., what one "leaks" must predict the emotion that one is attempting to hide). These demonstrations have not been forthcoming.

For the behavioral ecologist, the leakage conception is a Freudian atavism, and again, "leakage" reflects conflict among intentions (i.e., "I want to indicate X and I *don't* want to indicate X."). That many researchers have retained the view that deception *qua* deception produces leakage results from the studies they have designed, which typically required that subjects deceive by stating counterfactuals or taking morally objectionable positions. Consequently, for most subjects, *deception was confounded with conflict about deceiving*. This conflict can be moral (wanting to comply by lying versus believing that one shouldn't lie anyway) or pragmatic (wanting to comply by lying versus expecting nonetheless that there will be hell to pay). I know of only one study that included the obvious controls to rule out conflict as the source of "leakage" – the inclusion of situations contrived such that subjects both deceive *and* endorse their deception. Bavelas and colleagues devised such a situation and thereby established the importance of the conflict view (Bavelas, Black, Chovil, & Mullett, 1990). Subjects had to lie in order to keep secret a friend's surprise birthday party. They lied perfectly and showed no "leakage."

The Emotions View holds erroneously that the existence of "facial expressions of emotion" is demonstrated by the dual neurological control of facial expressions.

Within the Emotions View, one ground for claiming the existence of hard-wired, prototypical "facial expressions of emotion" depends upon neurology. The logic goes as follows: There is neurological "dual control" of the face shown in studies of neurological lesions. Damage to neocortical areas results in the loss of voluntary facial expressions but the sparing of "emotional" expressions, which are controlled by the primitive subcortex. Conversely, damage to subcortical areas results in the loss of "emotional expressions" but the sparing of voluntary ones.

This constitutes validation for the "two-factor" Emotions View of facial expression as representing a blend of "emotional" and "social" faces. In actuality, there is nothing unique about the neurology of facial expressions, because the same kinds of phenomena occur outside of the face.

There do appear to be two sets of neural controls of facial expression. The evidence comes from two phenomena in clinical neurology. The first is that of *central facial paralysis* (also, *corticobulbar palsy*), which occurs with a stroke or other brain lesion that damages the upper motor neurons emanating from the precentral motor strip. Individuals with this syndrome have intact facial reflexes and can produce normal symmetrical smiles when told jokes or tickled. When they are asked to move their lower facial muscles, however, their movements are dramatically weakened. (They are weaker on the side of the face contralateral to the lesion; symmetrical movement is retained in the upper face. The reasons are arcane and are found in the details of facial embryology [see Fridlund, 1994].)

The second syndrome is termed *reverse facial paralysis* (and, oftentimes, *mimetic palsy* or *amimia*). As expected, those afflicted with this syndrome can make facial movements to command, but their faces are largely immobile and almost masklike, missing the apparently spontaneous faces that occur in greeting, joking, and everyday conversation. Reverse facial paralysis occurs with an intact motor strip and upper motor neurons, and thus another brain area or areas must be damaged to account for the deficient facial behavior. What exactly is the brain locus? One of the clues derives from brain autopsies from individuals who suffered reverse facial paralysis. Another derives from the disorder of Parkinson's disease, which produces the same masklike amimia, along with the preservation of movements to command. Both seem to involve the destruction of structures such as the basal ganglia (which includes structures like the caudate nucleus, putamen, globus pallidus, and the claustrum), substantia nigra, red nucleus, thalamus, the pontine reticular formation, and an assortment of other subcortical areas that, collectively, are known as the *extrapyramidal motor system*. Wilson (1924) first proposed that the faces preserved in central facial paralysis were controlled by this system.

It is clear, then, that central and reverse paralysis form a classic two-by-two double dissociation between lesion and behavior (Teuber, 1955) – following lesions in one region but not another, certain faces are spared but others are impaired. But what do we call the faces that are spared and those that are impaired? As I mentioned, the faces spared and impaired in central versus reverse facial paralysis have often been distin-

guished as "nonemotional" and "emotional" and used to buttress a two-factor Emotions View. But evidence from two other neurological disorders argues that this interpretation is too parochial.

The first is a type of aphasia (speech disorder) known as *apraxia of speech*. Individuals with this syndrome cannot "propositionize" (to use J. Hughlings Jackson's term), or construct a speech utterance from their verbal lexicons (Head, 1926). Depending upon the severity of the syndrome, sufferers of apraxia of speech can with some effort push out words when coaxed, but most often they communicate by resorting to pantomime and other gesticulation. Curiously, some speech remains even in the most severe cases; it is usually termed *automatic speech*. What remains are utterances that require no construction; these are overlearned phrases like rhymes and songs, exclamations, prayers, the alphabet, counting, and the days of the week or months of the year. Once cued, those with apraxia of speech can usually sound off the sequence with reasonable fluency. When asked what they just uttered, they cannot verbalize their response (Martin, 1988).

The second disorder is termed *ideomotor apraxia*, and it affects non-speech limb and finger movements (e.g., Brown, 1972). As in apraxia of speech, musculoskeletal function is uncompromised, but sufferers are unable to execute even simple movements to command. For example, patients with ideomotor apraxia may be unresponsive when asked to lick their lips, purse their lips and blow, or extend one hand and turn it. And like apraxia of speech, certain movements remain. If asked to drink, they show normal lip licking after swallowing. If a lit match is held to the mouth, they will likely blow it out. If a key is pressed into the one hand and a locked padlock is presented, they can place the key in the lock and turn it.

Both apraxia of speech and ideomotor apraxia are manifest by impairments in constructing movements but the retention of overlearned, habitual speech or movements. It is reasonable, then, to wonder whether central facial paralysis should be considered a type of apraxia. The same kinds of commands that fail to produce faces in central facial paralysis fail to elicit speech-related movements in apraxia of speech and instrumental movements in ideomotor apraxia. The same kinds of routinized cues that produce automatic speech in apraxia of speech ("Recite the Lord's Prayer") and instrumental acts in ideomotor apraxia (e.g., holding a match to the lips) are duplicated in tasks designed to elicit "emotional" faces (e.g., joke telling). It thus seems unnecessary to use the "emotional" versus "nonemotional" dichotomy for faces when the results of neuro-

logical lesions can be cast in the "constructed" versus "habitual" terms of generic dual motor control.

The Emotions View neglects the sociality that is implicit even when displayers are alone.

Solitary faces do of course occur, and this fact is often touted as definitive evidence for some faces being by nature readouts or expressions of emotion rather than social, communicative displays (see Buck, 1984, 1985; Cacioppo & Tassinari, 1987). As Buck (1984) put it,

When a sender is alone . . . he or she should feel little pressure to present a proper image to others, and any emotion expression under such circumstances should be more likely to reflect an actual motivational/emotional state. (p. 20)

Ekman took the same tack when he described a study of differences in facial displays among Japanese and Americans. Ekman stated,

In private, when no display rules to mask expression were operative, we saw the biologically based, evolved, universal facial expressions of emotion. (Ekman, 1984)

The most pointed declaration of the reliance of the emotions view upon the supposed emotional nature of solitary faces was provided by Ekman, Davidson, and Friesen (1990), who stated,

Facial expressions do occur when people are alone . . . and contradict the theoretical proposals of those who view expressions solely as social signals. (p. 351)

The belief that faces observed in solitude constitute the definitive evidence for "facial expressions of emotion" is instantiated in the experiments typically conducted by proponents of the Emotions View. Experimental subjects are usually isolated in a laboratory room and presented various kinds of "emotional" elicitors. Many of these are depicted in the panels of Figure 5.3. These include panels: (A) face-to-face contact; (B) contact through a partition or laboratory wall; (C) watching television; (D) imagery tasks; and (E) viewing slides. Because subjects are physically alone in panels (B) though (E), any facial displays elicited in subjects are considered "expressions of emotion." The exception is panel (A), face-to-face contact, which is considered "social" and therefore produces a combination of both emotional and conventional faces.

Contrary to this categorization, I contend that a binary view of what

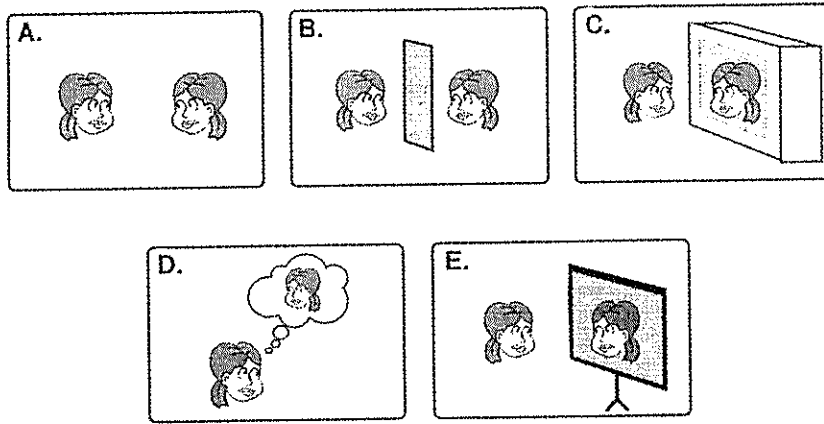


Figure 5.3. Disguised sociality in common methods of eliciting "emotional" facial expressions.

is "social" and what is "nonsocial" is too absolutist. It is much more reasonable to suggest instead that the manipulations in Figure 5.3 vary in their sociality. Everyone considers face-to-face contact (A) quite social, but does speaking through a glass or partition (B) make it nonsocial? I think not, but then what if the glass is a TV screen (C)? Asserting that watching a televised image is not social would be news to soap-opera lovers who consider the characters to be intimate acquaintances, and to sports fans who throw things at the screen. And what if the image is not on the TV but in my mind's eye (D)? Finally, what if I freeze a frame of an image and show a photo (E)? Would this make viewing a face nonsocial? Not necessarily, as sales of baby and family albums would attest; the photos in them are not mere spots of chromatic dye – they are cues to the reconstruction of interactions (i.e., panel D). In this sense, a still image of a face is a projective stimulus. When a patient examines a TAT (Thematic Apperception Test) card and begins to shake, blanch, and then burst into tears, it's not the ink on the card. Ditto for still images, but their use has nevertheless been canonized as the "slide-viewing technique" (Buck, 1979), and pictorial depictions were used in nearly all studies of "facial expressions of emotion" among different populations (see Russell, 1994).

Sociality does not conform to the all-or-none law. Instead, the varying types of "emotional elicitors" in Figure 5.3 represent simply different kinds of sociality. Even when an interactant has been physically removed

from the room, he or she may still be present psychologically. This implicit sociality view is far from novel. Even though Darwin (1872, pp. 6–8) dismissed it given his overriding interest in building a Lamarckian, reflexive model of faces as vestiges of once-serviceable habits (Fridlund, 1992, 1994; Montgomery, 1985), Wundt (1896), Piderit (1858, 1886), Gratiolet (1865), and Ribot (1897) all proposed "imaginary object" accounts of solitary faces made toward absent others.

It seems obvious to me that the physical presence of others is one of the *least* important ways of assessing the sociality of facial displays. There are several ways in which people can be structurally alone, with their facial behavior implicitly social.

First, *when we are alone we often treat ourselves as interactants*. We talk to ourselves; reward or punish ourselves; hit, touch, and stroke ourselves; and deploy facial displays in the course of these acts. Can it be said that talking to ourselves is not communicative but a "readout"? If so, what is being read out? In this sense, the faces made to oneself are as communicative as our "self-talk." That we are social interactants with ourselves at first seems absurdly solipsistic, but it is entirely consistent with views that emphasize the "private, authentic self" as a social construction (Mead, 1934) and the dialogical nature of thought as internalized speech (Bakhtin, 1981; Vygotsky, 1962; Wertsch, 1985).

Second, *we often act as if others are present when they are not*. We curse them, or utter words of love to them, or rehearse what we will say to them when we see them. In many of these acts, we deploy facial displays. Our acting as if others are there when they are not is usually done with prior knowledge of their absence (e.g., practicing for a play, talk, or interview). Occasionally, it is done without prior knowledge of others' absence, as when we speak to and make faces to a person we believe is in the next room – when the other has in fact departed and can no longer hear us. With or without prior knowledge, these faces, too, are communicative, although they are emitted when we are alone.

Third, *we often imagine that others are present when they are not*. In our imagination we engage in interactions with others who are not there (i.e., we "simulate" interaction with them). We imagine talking to them, arguing with them, making love with them, and we often deploy facial displays. As in the previous example, we usually have prior knowledge that the others are absent. However, we sometimes become lost in reverie, and we momentarily forget that the imaginary others are actually absent. The facial displays made in reverie are also communicative, both when we are lost in reverie and *believe* they are there, and when we know

that they are not. When we imagine a lover, and then smile and become sexually aroused, if we say that the smile was nonsocial, would we say that the arousal was nonsexual?

That implicit audiences mediate solitary faces has been documented in several experiments. Fridlund et al. (1990) established the role of imaginary audiences in mediating private faces. Subjects provided, and were then asked to imagine, situations that they enjoyed either alone (low-social) or with other people (high-social). We measured smiling during the imagery using facial electromyography (EMG) overlying the *zygomatic major* muscles, and we asked subjects to rate how happy they felt during the imagery. These happiness ratings were then controlled statistically. Subjects showed more EMG activity in their *zygomatic major* sites in high-social than low-social imagery, even when their happiness ratings were equalized. For Fridlund et al., this increase implied that subjects were displaying to the "people in their heads." Fridlund, Kenworthy, and Jaffey (1992) later extended these findings to dysphoric imagery using a standard imagery protocol.

Fridlund (1991b) attempted to circumvent the slipperiness of imagery manipulations by directly manipulating implicit audiences. Subjects watched an amusing videotape in one of four viewing conditions: (1) alone; (2) alone, but with the belief that a friend nearby was performing an irrelevant task; (3) alone, but with the belief that a friend nearby was viewing the same videotape in another room; and (4) when a friend was physically present. Viewers' smiles were measured using facial electromyography (EMG) over the *zygomatic major* muscles responsible for smiling. Smiling (measured using EMG) among solitary viewers who believed a friend was viewing nearby equaled that shown in the actual presence of the friend but was greater than that shown by subjects who simply viewed alone. Reported happiness did not differ among the viewing conditions, and within conditions it correlated negligibly with smiling.

Similar findings emerged from another study involving gradations in sociality, where Chovil (1991) visually coded the types of gestures made in different social contexts. Her subjects (here, all females) heard stories about close calls in one of four conditions: (1) alone, from an audio tape recording; (2) alone, over the telephone; (3) from another subject across a partition; and (4) talking to another subject face-to-face. When these conditions were ordered according to their "psychological presence," as determined by separate raters, Chovil's subjects exhibited facial displays – largely wincing and grimacing – that increased monotonically with

sociality, a finding that mapped nearly identically onto that provided by Fridlund (1991b).

In these sociality studies, face-to-face interaction resulted in maximal facial behavior. This should not always be the case, however, because in many contexts we do *not* issue communications to others. Friends sharing a humorous experience face-to-face should exhibit greater facial behavior than if they are separated by a partition; friends asked to play poker should make less. One important determinant of our facial behavior is our social role with respect to our potential interactants. Commuters on a subway may be within inches of each other yet pretend not to notice; if they are friends, however, their talk and facial behavior may be incessant. (There are exceptions, as when we "spill our guts" to a total stranger on a plane, and here, our faces pour out with our words.) Just this kind of finding was reported by Wagner and Smith (1991), who videotaped pairs of subjects while they "rated their emotions" to slides. The facial behavior of the subjects was more discernible if the two were friends than if they were strangers. In the Behavioral Ecology View, the subjects' faces were no more than a running commentary on the series of slides. Had they been permitted, the friends would have chatted while they made faces; and the strangers would have done neither. And it is hard to strip an experiment of the influence of such social roles. To the solitary subject, the experiment is a judge, and the subject is in temporary solitary confinement awaiting parole for "good behavior." Two male or two female subjects in the same room may make a contest out of the experiment, whereas an experiment with a (heterosexual) male-female pair may become a "blind date."

Fourth, we often forecast interaction and deploy displays appropriately, consciously or not, even though no interactant is immediately present. These displays function in the service of seeking or shunning interaction. Most species have displays that function to deter potential interactants. In both gorillas and humans, a tongue-showing display deters others (Smith, Chase, & Liebllich, 1974; Dolgin & Sabini, 1982). If we are in a bad mood, we scowl upon entering the office in the morning; the scowl discourages potential greeting. On the other hand, solicitation of interaction is omnipresent (cf. the "readiness to interact" displays described by Smith, 1977). We deploy a smile seconds before greeting a neighbor at the front door. As T. S. Eliot stated, "I must prepare a face to meet the faces that I meet." Indeed, Kraut and Johnston (1979) found that bowlers were very unlikely to smile when they had just made a spare or strike but were very likely to do so when they turned around to meet the gaze of those

in their bowling party. And like the bird who calls continuously in case a suitable mate should fly past (Smith, 1977), the human infant solving a problem deploys a "cognitive mastery" smile (Sroufe & Waters, 1976). The smile usually seduces any potential pedagogues who may encounter the infant.

This was confirmed by Sue Jones and colleagues, who developed an infant analog to Kraut and Johnston's (1979) bowling study. Infants were positioned such that they could either look at toys or at their mothers, and Jones et al. observed their facial behavior toward each. As early as 10 months of age, infant smiling was almost entirely dependent upon visual contact with the caregiver (Jones & Raag, 1989; Jones, Collins, & Hong, 1991).

Fifth, we often treat nonhumans, and animate and inanimate objects, as interactants. That we often treat nonhuman animals as humans is self-evident to any pet owner. We talk to them, confide in them, praise and curse them, and make faces and gesture to them. Most people have no difficulty according pets agency and treating them as autonomous interactants. What is more reluctantly acknowledged is the extent to which we accord agency to inanimate objects and regard them as interactants. Devotees of indoor gardening talk, gesture, and make faces to their houseplants. Children do the same to their stuffed animals, dolls, or toy soldiers. In outbursts of animism, most of us have pummeled intransigent soda machines that "stole our money" or television sets that "lost our station," or gesticulated wildly at willful, errant bowling balls, and in so doing we scolded them, called them names and, in the act, we made faces and gestures.

Is this implicit sociality account viable? In the implicit sociality view, implicit or imaginary interactants can never be excluded. Even recruiting subjects alone and leading them to believe that they are "unobserved" (e.g., using a hidden camera) do not eliminate the implicit social context. At the limit, the experimenters still constitute an implicit audience; with the wall of the laboratory – with the experimenters behind it – constituting a de facto partition condition just as in Figure 5.3 (B). The power of such an arrangement is commonly acknowledged as "experimental demand," "experimenter effects," or "evaluation apprehension" (Latané, 1981).

Subjects' thoughts will *always* be populated, I believe, by thoughts or images either of the experimenter, or the others in their lives, or even themselves; moreover, we convert inanimate objects into interactants. I call this process *restitutive interaction* (after Bleuler). Achieving pure

"aloneness" is a *reductio ad absurdum* that would require narcotization so complete that daydreaming stops, and this would terminate most overt subject behavior, not just facial movement. This fact undercuts any presumption that isolating subjects or minimizing their physical contact with others actually "purifies" their facial productions in any way. Our solitary faces may thus be just as conventional as our "social" ones. When subjects are alone versus in the presence of others, what differs is not the "amount" of sociality but its directness, or the degree to which one's social engagement is entrained to *specifiable* others (i.e., those planted in the room by the experimenter).

It might be objected that the implicit sociality view is nondisconfirmable. In fact, it probably is unfalsifiable *in extremis*, but this is no impediment to its viability as a scientific concept. This feature is shared with many useful and established theories whose limiting cases are unattainable. One clear example is superconductivity theory: Even though the temperature of absolute zero seems unattainable, potent and useful superconductivity effects can be observed as one approaches it. Likewise, implicit sociality can be studied quite easily within experimentally manipulable ranges.

The strict falsifiability objection is also instructive in that it reveals the extent to which we view most animals (especially humans) atomistically instead of as components of, and agents within, an encompassing web of social relations – even when alone (see Mead, 1934). Indeed, "solitude" – not implicit sociality – may be the odder concept.

Summary

In the Behavioral Ecology View, facial expressions are not readouts of "emotional state," nor are they the compromise formations of an "authentic" self inhibited by a "social" one. Displays evolve, phylogenetically or culturally, in particulate fashion in response to specific selection pressures, and they necessarily co-evolve with others' responsivity to them. Displays have meanings specifiable only in their context of occurrence, and they are issued to serve one's social motives in that context. These motives bear no necessary relation to *emotion* as the term is commonly used, and indeed, a range of "emotions" can co-occur with any social motive. As manipulations serving intent, displays are issued when they will optimally enhance cultural or genetic inclusive fitness. The faces made in solitude are no more or less "social" than those observed in public, because people are always implicitly social even when sche-

matically alone. Experimental methods that isolate subjects in order to observe "emotional expressions" merely disguise the sociality that governs them.

Is the Behavioral Ecology View antagonistic to *emotion*? Not in the slightest. It simply regards the term as unnecessary to understand how our facial expressions both evolved and operate in modern life. Perhaps what I stated in *Human Facial Expression* (Fridlund, 1994) offers the best coda:

I suggest that facial displays can be understood without recourse to emotions or emotion terms, and I show that certain tenets of the Emotions View are improbable or unworkable. What cannot be done is to show that emotions have no role in facial displays, because excluding emotion would require a definition that allowed it. At present, arguing against "emotion" in any form is shadow-boxing.

In the end, emotion may be to the face as Ryle's "ghost" (Ryle, 1949) was to the machine. "Emotions" and homuncular "ghosts" may both be constructions borne of a transcendentalist wish for something more than function or mechanism. If psychology's "Cognitive Revolution" dispatched the need for a managerial homunculus in the nervous system, so then we must finally dispatch the notion that the face mirrors the passions of the soul. But this conclusion may be premature. For the time being, the only rejoinder to those who question whether any facial display might be related to emotion is, "What do you mean by emotion"? (p. 186)

Acknowledgment

Portions of this chapter are from Fridlund (1994), reprinted with permission.

Notes

- 1 "Behavioral ecology" is, technically, the branch of zoology in which behavior is examined for the ways that it contributes to reproductive success (see Krebs & Davies, 1987). Behavioral ecologists thus study how behavior emerges within an animal's "ecology" – that is, within its social organization and its environmental niche. Because it conceives of expressive movements and receptivity for them as highly interdependent, the terms *interactional* or *communicative* could easily be substituted. (See Chovil, chapter 14, this volume, for a linguistically based and compatible communicative account.)
- 2 There are constraints on the number of displays within any species or for any motive. For example, the added specificity of separate displays for, say, exasperation versus constipation (Russell, 1994) would create an extra perceptual burden for recipients. Moreover, little such evolution would occur if the displays were needlessly specific because the context carried the necessary information (e.g., the contexts for exasperation and constipation are wholly different). Tallying the numbers of displays is complicated in any case, since display taxonomies can be structural or functional, and the functional taxonomies must also tabulate the contexts in which displays are deployed.
- 3 Throughout this chapter, I use the word *emotion* only as a prop, because the

proponents of the Emotions View all use the term but mean different things by it. This is evident in the contributions to this volume by Izard and by Frijda and Tcherkassof. Despite their excellent defenses of two variations on the Emotions View, both illustrate the difficulties inherent in trying to retain "emotion" as an explanation for human facial expression. The pivotal question to ask of each is, "When should facial expressions occur and when should they not?"

For Izard (see chapter 3, this volume), "facial expression . . . is conceived as an evolved, genetically influenced but highly modifiable and dissociable component of emotion," but he then states that "observable expression is not viewed as a necessary component of emotion." Thus, emotion can include facial expression, but it can occur without an expression, and furthermore, expression can occur without emotion. What are the conditions of linkage and dissociation that would produce each? Izard is unclear. He appends the term *motivational* to *emotional* to describe states that might elicit facial expressions, while also suggesting that emotion can occur without occasioning motives, after having stated earlier that "emotions motivate and organize perception, cognition, and action." When, then, should a facial expression occur: When emotion motivates, when it does not, or doesn't it matter? This I cannot glean from Izard's chapter.

The chapter by Frijda and Tcherkassof contains a corresponding set of semantic tangles. After a quite literate introduction to the problems faced by a traditional Emotions View of facial expression, the authors conclude that facial expressions are not adequately described in terms of "emotion." Instead, facial expressions usually point to a motivational state . . . which we call the individual's *states of action readiness*. Facial expressions express states of action readiness. After these declarations, do the authors forsake emotion? Far from it, because emotions are states of action readiness. In fact, they constitute the "core" of emotions. Here this theory parallels Izard's on emotion and motivation. Emotion can engender action readiness, but action readiness is only one of the moderately correlated components of emotion, and can occur without emotion. On the question of when a facial expression occurs, Frijda and Tcherkassof logically concluded, where Izard demurred, that facial expressions of emotion occur if and only if the emotion is accompanied by a state of action readiness. In taking this step, the authors remove emotion from the direct causal chain, since action readiness is only one moderately correlated component of emotion, and since many factors other than emotion can occasion action readiness.

What is also notable from the two chapters – and is frankly pandemic among expositors of the Emotions View – is that the differences in how they use the term *emotion* indicate that they are talking about two different constructs. Neither offers a proper technical definition of emotion, one which would stipulate criteria – independent of facial expression – for when emotion is occurring (an inclusion criterion) and when it is not (an exclusion criterion). How can we entertain a theory whose critical term cannot be defined concretely and consensually?

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