

Chapter 2

Recognition of Facial Expressions: Past, Present, and Future Challenges

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This chapter focuses on the recognition of basic emotions through facial expression, challenging some of the commonsense assumptions related to this research paradigm. In the first section, we review the concepts that constitute this field: “emotion”, “recognition”, “facial expression”, and “universality”. In the second section, we discuss the data and methodological challenges from the most crucial test of the universal recognition of facial expressions: field experiments in remote cultures.

Our take-home message is clear: there are still a large number of conceptual and empirical issues that must be solved before arriving at any definitive conclusion on what “recognition of emotion” means. Each concept (i.e., “emotion”, “recognition”, “facial expression”, and “universality”) is plagued with unfounded assumptions and inconclusive evidence. Furthermore, the ultimate test for a more sophisticated version of “universal recognition” (studies in remote cultures) needs more careful attention and a prominent position in researchers’ agendas.

2.1 What Do Psychologists Mean by “Recognition of Universal Facial Expressions of Emotion”?

2.1.1 *Emotion*

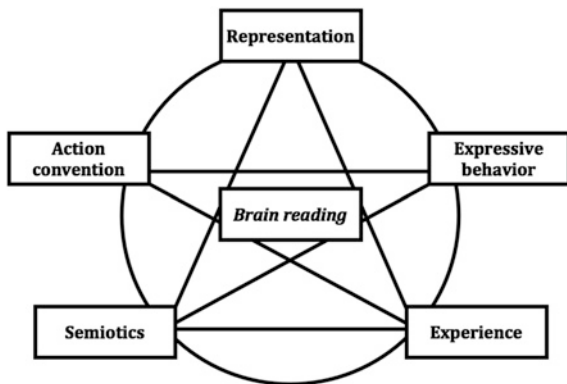
The concept of emotion is an elusive one. By using the term “emotion”, we may be covering at least six different meanings (Fig. 2.1):

1. The subjective experience of emotion.
2. The observable emotional behavior (including facial behavior).

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Fig. 2.1 Multiple referents of “emotion”. Nodes and links are self-contained referents and constitute different, albeit related, research problems



3. The cognitive representation of emotional experience.
4. The semiotic resources of a particular culture when it deals with emotion.
5. The social rules that prescribe some conventional emotions.
6. The neural mechanisms and brain systems underlying these processes.

For example, for “happiness”, we may refer to (a) a phenomenological identifiable inner experience, (b) to happy people’s observed facial behavior, (c) to the constitutive features of the concept “happy” in English, (d) to the repertoire of signs (in Peirce’s sense, icons, indexes and symbols¹) that signify *happiness* in English—as compared to other languages, (e) to the conventional forms of “happiness” in social events (see Fernández-Dols et al. 2007), and finally, (f) to inferences about the related activity of some brain systems (i.e., the dopamine pathway to the *nucleus accumbens*).

All of these phenomena, as well as the logical and empirical relationships among them, are autonomous—although not independent—research goals. If something has to be learned from the study of emotions is that there is no simple, straightforward causal link between any of Fig. 2.1’s nodes. For example, there is no automatic, two-way relationship between emotional experience and cognitive representation. Bilinguals tend to switch languages depending on the emotion they want to communicate (Fields 2012). Additionally, there is no simple relationship between cognitive representation and emotional experience, making bilinguals to experience higher levels of emotionality when talking their first language (Caldwell-Harris and Ayçiçeği-Dinn 2009).

In Fig. 2.1, each potential connection between two or more nodes is actually a complex and fascinating research goal and we are still far away from providing convincing responses to most of them. Indeed, the apparently obvious and simple link between “primitive” emotional experiences and their corresponding basic primitive brain systems is, most likely, mediated by other complex structures (Lindquist et al. 2012).

¹ We use “sign” following Peirce’s typology of signs: icons, indices, and symbols. Icons share some quality with its object (e.g., physical resemblance of a picture of fire with its object, actual fire). Indices’ relation to their objects is a factual correspondence (e.g., smoke as an index of fire). Finally, symbols keep an arbitrary correspondence with their objects (e.g., the words “fuego”, “fire”, “kova”, etc.).

The emotion of disgust is illustrative of the complexities that researchers will face when studying the links of Fig. 2.1 nodes. Widen and Russell (2013) questioned the apparent monolithic, biological “basicness” of emotions, such as disgust. For example, disgust is absent in nonhuman primates, and it could be based on a functional response (i.e., distaste) that lacks emotional meaning (Rozin et al. 2000). Thus, if the emotion of disgust is a cultural evolution of a nonemotional behavior—the distaste response, it makes the disgust expression a cultural demonstration of a highly abstract and ideational emotion. Consequently, disgust would not be a constituent of a mere basic affect program (Ekman 2003), but the result of a complex process related to a Western cultural development that has adopted the expression of distaste (a nonemotional facial reaction like the startle reaction) as an expression of moral rejection. Therefore, there may be different kinds of disgust faces linked to nonemotional and emotional elicitors (Rozin et al. 1994).

The research on the development of emotion concepts and expression recognition supports Rozin et al.’s (1994) claims. For example, children up to 7 years tend to associate the prototypical “disgust face” (AU 9, and AU 10, see Ekman and Friesen 1978) with anger (Widen and Russell 2008, 2010). Additionally, the so-called sick face (AU 6, AU 7, AU 10, and AU 26, see Ekman and Friesen 1978) seems to be a better prototype for disgust than the “disgust face” (Widen et al. 2013).

In our view, recognition studies’ primary location within Fig. 2.1 should be represented by the link connecting signs of emotion with the cognitive representation of emotions (i.e., participants’ concepts of emotion). A basic, preliminary problem for interpreting recognition studies’ findings is that researchers usually do not acknowledge this link. Recognition studies are typically characterized as testing the link between actual facial expression and the experience of emotion.

2.1.2 Recognition

The most influential sources of inspiration for contemporary studies on recognition (Basic Emotion Theory, BET, see Ekman 1982; Ekman and Oster 1979) assume that “recognition” means detecting a message with adaptive value for senders (and potentially for receivers). Thus, for BET, the sender’s expression launches some sort of essential and immediate connection between the sender’s and the receiver’s emotional experience. Tomkins (1982), the main inspirer of this approach, considered emotion and expression as a unitary phenomenon. In the same vein, Ekman (1997, p. 334) pointed out that:

The initial translation of an expression into some meaning (...) is likely to be so immediate that we are not aware of the process we go through (...) I think we use emotion words—anger, fear, disgust, sadness, etc.—as a shorthand, an abbreviated way to refer to the various events and processes which comprise the phenomenon of emotion.

Recognition studies are based on two incompatible hypotheses (see Fernández-Dols 2013). On the one hand, recognition studies are aimed at showing that some facial expressions are, for evolutionary reasons, universal adaptations shared with

other primates since at least six million years ago. On the other hand, recognition studies assume that these primitive facial expressions have specific meanings (i.e., a precise correspondence with some concepts of emotion and the words that refer to these concepts).

By supporting the above-mentioned assumptions (i.e., recognition has preverbal and evolutionary roots allowing us to apply specific verbal referents to expressions) we would be falling into a theoretical hindsight bias. We would be assuming that, six million years ago, hominids with preverbal brains were already capable of segmenting their facial behavior into a precise set of fixed facial expressions, foretelling—several million years later—*Homo sapiens*' categories of emotion such as contempt (Ekman and Friesen 1988; Izard and Hayes 1988) or shame (Tracy and Matsumoto 2008).

We propose two ways for overcoming such hindsight bias and its corresponding illogical conclusions:

1. A first possibility would be to assume that facial expressions are remains of our primate ancestors' tools for animal communication. As a consequence, facial expressions, as any other kind of animal communication resources, are just instances of social influence with no precise, stable, and univocal meaning (Dawkins and Krebs 1978). Following a classic principle in animal ethology, the "recognition" of emotions (i.e., attribution of meaning to facial expressions) only makes sense when the signal is perceived within a specific context. Thus, this position may be summarized in Smith's equation for animal communication: message + context = meaning (Smith 1965, 1977).
2. A second possibility would be to assume that hominids' facial behavior underwent a process of coevolution with language, connecting the two phenomena—facial behavior and language. In such a case, facial expressions do not necessarily keep any homology with other primates' facial behavior. Accordingly, the recognition of facial expressions may be characterized by the cognitive processes involved in language and conceptualization (Lindquist and Gendron 2013; Lindquist et al. 2014).

Currently, most researchers have moved away from views of recognition as an automatic emotion detection process. Thus, "recognition" is regarded as a more complex inferential process with direct or indirect links to emotion (for contemporary accounts of the traditional view, see Matsumoto et al. 2013). BET advocates like Rosenberg and Ekman (1994) acknowledged "the problem of symbolic representation". Likewise, Haidt and Keltner (1999) found, in an intriguing study with American and Indian subjects, that recognition was affected by the experimental procedure (based on words or situations), the subjects' cultural or educational background, and some unknown features of expressions themselves. For these authors, expressions are best viewed as falling along a gradient of recognition, rather than as being members of a set with clear boundaries (Haidt and Keltner 1999, p. 263).

Additionally, researchers from other theoretical perspectives have provided a shift in the field when proposing new alternative accounts to the *readout view*. For example, Frijda and Tcherkassof (1997) have explored facial behaviors as expressions of action readiness indirectly linked to emotional states. Likewise, Russell

(1997, 2003) has approached facial expressions as manifestations of affect along two dimensions: pleasure and arousal.

Another group of researchers have discussed the effects of in-group advantages on emotion recognition, proposing a theory of “emotion dialects” (Elfenbein 2013; Elfenbein and Ambady 2002b; cf. Matsumoto 2002). In a meta-analysis of published and unpublished literature on emotion recognition, Elfenbein and Ambady (2002a) found that, beyond a certain consensus on the affective content of expressions of emotion, emotional meaning loses part of their connotations across cultures. These authors—relying on a robust phenomenon for those receivers who shared their cultural beliefs about emotion with the posers—suggest that research on emotional expression should take into account the “emotional dialects” in which each culture express some universal affective phenomena.

Researchers relying on mainstream recognition studies of facial expressions of *emotion* work neither with spontaneous and natural expressions nor with concepts of emotion taken from non-Western cultures. Actually, studies on the recognition of spontaneous expressions (Fernández-Dols and Ruiz-Belda 1997; Matsumoto 2006) are scarce and inconclusive—specifically if we do not consider the “spontaneous” facial expressions produced as experimental demands in laboratory settings. Likewise, recognition studies in remote cultures raise serious doubts on the apparently universal recognition of emotions through facial expression (Ekman 1972; Ekman et al. 1969; Nelson and Russell 2013; Sorenson 1975, 1976; cf. Ekman and Friesen 1971).

All in all, the conclusion that can be drawn is that recognition studies are not about actual expressions and emotional experience. Current research on the correspondence between the actual experience of emotion and the predicted standard facial expressions confirms that such correspondence is weak or nonexistent (Fernández-Dols and Crivelli 2013; Reisenzein et al. 2013).

In our view, recognition studies should consider three questions: (a) which facial behaviors should be considered as expressions, (b) how big is the magnitude of agreements, and (c) to what extent this consensus is universal. As the previous discussion suggests, researchers have not provided definitive answers to the first question, making the other two questions less decisive and important for understanding the relationship between facial behavior and emotion. Consequently, universal agreement on verbal categorization of a particular preselected face says little about its role in the experience of emotion. In this case, universal agreement means that people make similar attributions, but not that people are accurate intuitive scientists, capable of discerning which are the clearest manifestations of emotion. Psychological wisdom about people as intuitive scientists is rather pessimistic on their accuracy.

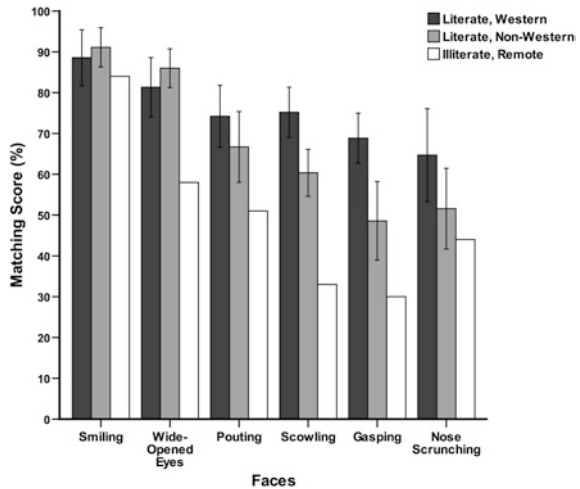
Additionally, the magnitude of this agreement and its universality has elicited a hot debate (Russell 1994, 1995; Ekman 1994, 1999; Izard 1994) and a series of methodologically oriented studies to support BET (Rosenberg and Ekman 1994; Haidt and Keltner 1999; Frank and Stennett 2001). Russell (1994) pointed out that there are no conclusive data of free-of-culture studies on verbal recognition of emotion. Verbal categorization is subject to potential methodological problems such as the use of within-subjects designs (Yik et al. 2013), the response formats (e.g., forced choice formats), or the lack of contextual information in most of the studies.

None of these problems could be decisive for questioning the internal validity of these studies, but, all together, they put their internal validity in jeopardy.

Beyond the methodological debate raised by Russell (1994, 1995; cf. Ekman 1994, 1999), empirical studies have provided new arguments for a serious reconsideration of the research on recognition of expressions. Nelson and Russell (2013) suggest that the recognition scores in standard experimental studies do not support the allegedly strength of BET claims. Agreement rates' percentages on the emotion displayed by an expression vary depending on the emotion displayed, the order of presentation, and participants' culture and language. In Nelson and Russell's review, percentages of recognition are far from consistent. Agreement rates range from 45 to 100 % for "happiness", from 43 to 94 % for "surprise", from 29 to 97 % for "sad", from 33 to 92 % for "anger", from 16 to 92 % for "fear", and from 20 to 94 % for "disgust". Figure 2.2 (adapted from Nelson and Russell 2013) represents the average recognition scores for six categories of emotion across Western literate, non-Western literate, as well as preliterate and remote cultures.

As a concluding remark, the results of a number of studies on the categorical perception of facial expressions have been used by BET advocates to claim the existence of discrete boundaries between facial expressions of *emotion* (Calder et al. 1996; Etcoff and Magee 1992). These studies included tasks in which emotion conceptualization was apparently unnecessary (for example, by asking participants to press a button if a trial face matched one of two faces; see Calder et al. 1996). Unfortunately, these studies basically dealt with the way in which our brains detect patterns on facial stimuli, but they did not test the emotional meaning of such stimuli. Currently, a growing amount of evidence suggests that these tasks require a significant amount of conceptual processing (Fugate 2013). This new evidence supports our previous remarks on how recognition is necessarily connected to language due to the coevolution of language and facial expression (Fernández-Dols 2013; Lindquist and Gendron 2013).

Fig. 2.2 Matching scores are the percentage of observers who selected the predicted label from studies published between 1992 and 2010 for six facial expressions. Error bars represent 95 % CIs. Data source: Nelson and Russell (2013)



2.1.3 Expression

The list of emotions that elicit spontaneous facial expressions is mostly linked to the historical trajectory of commonsensical and lay theories about emotion (Russell 2009). The most innovative contribution of Tomkins (1982) and his followers to contemporary psychology was not the prediction that some facial expressions were related to emotions—what was already a commonsensical assumption, but the creation of a contemporary repertoire of universal expressions of emotion (i.e., the assumption that human beings have a limited repertoire of basic and fundamental emotions that can be read out from faces). In the early 1970s, this restricted view of facial expressions as readouts of basic emotion was a powerful incentive for empirical research, making these studies less difficult to conduct (Davis 2001). The unquestioned existence of a closed list of universal emotions led psychologists to take for granted that the translations of emotion terms used as recognition criteria were always possible across cultures as far as they were restricted to those emotions within the “basic” set.

The mainstream approach to the verbal recognition of facial expressions has pivoted on a set of posed facial expressions selected accordingly to an *a priori* criterion (Ekman 1994, p. 276). Even though Ekman claims that this *a priori* criterion has been dictated by theoretical and methodological reasons, a careful reading of BET’s first theoretical papers shows that the original references for this selection were Darwin’s intuitions (1972/1965), and the later reinterpretations of Darwin made by Allport (1924) and Tomkins (1982). These authors based their intuitions on Western modern commonsense beliefs about facial expressions. Hence, the selection and refinement of the expressions of basic emotion was grounded on judgment studies in which facial expressions were filtered and shaped up to reach high agreement rates in the attribution of emotion. Accordingly, the expressions of basic emotion were stimuli designed *a priori* to elicit high levels of consensus in verbal attributions. They were not designed as precise descriptions of people’s average facial behavior during intense emotional situations. Unfortunately, as the studies on spontaneous expressions have revealed, the role of the facial expressions of basic emotion as descriptors of such spontaneous behaviors is rather dubious (Fernández-Dols and Crivelli 2013).

The idea of a closed set of universal expressions of *emotions* is founded on a philosophical and esthetic tradition that can be traced back to the 17th century. A French painter—Charles Le Brun—proposed a set of rules (backed on drawings) for describing (and pictorially representing) the expression of passions through the face. Le Brun provided descriptions for wonder, esteem, veneration, rapture, scorn, horror, terror, love, desire, hope, fear, jealousy, hatred, sorrow, pain, joy, laughter, weeping, anger, despair, and rage. Le Brun’s method did not consist of empirically observing facial behavior, but of deducting the expressions by reasoning from a few physiological principles mostly taken from Descartes’ philosophical theories on passions (Montagu 1994). In the 19th century, Bell and Darwin’s discussions on the number and appearance of facial expressions were still founded on philosophical and esthetic traditions such as Le Brun’s. Bell and

Darwin's lists were strikingly heterogeneous, given the supposed basicness of such repertoires. They included expressions of hunger, determination, love, devotion (Darwin 1872/1965), remorse, revenge, and madness (Bell 1924). As an example of Darwin's *Zeitgeist*, physician and anthropologist Paolo Mantegazza (1883) was determined to find, among others, the facial expressions that were indexes of benevolence, religious feelings, or vanity.

Contemporary researchers providing sets of facial expressions of *emotion* also adopted such deductive and speculative approach, carrying out a disturbing and often unexplained variability in their suggested lists (see Ortony and Turner 1990). For example, Tomkins and McCarter's (1964) pioneering study on the recognition of emotion through facial expressions included eight primary affects (interest, enjoyment, surprise, distress, fear, shame, contempt, and anger) with two different levels of intensity. In Tomkins and McCarter's set, sadness was not even mentioned, and disgust was mentioned as intense contempt. The first validation of the Facial Affect Scoring Technique (FAST, Ekman et al. 1971), an observational method for describing facial behavior, included only six emotion categories (i.e., happiness, sadness, surprise, anger, disgust, and fear).

The continuity in the choice of a restricted set of exaggerated expressions, from Le Brun through Darwin to Tomkins, raises the question of whether this research tradition captures something other than emotional behavior—perhaps just human miming. For example, uniform verbal attributions of emotion to an expression might be part of an emotional program, a cultural script, or even a particularly fortunate way of providing human ideograms (in the same way that film editing has turned to be an artificial but easily understood way of representing action and movement in films).

In this line, Wierzbicka (2000) proposed that researchers should distinguish the “semantics of human faces” from the “psychology of human faces”, developing research on the semantic properties of human faces as a natural language capable of providing primitive messages. These messages should be decoded in terms of a larger and more complex code, rather than be decoded in terms of basic emotions. The code may include a larger number of affective and non-affective messages modulated by the context of the utterance.

A decisive empirical test of these assumptions consists in testing the recognition of actual expressions of emotion without of all the requirements arbitrarily imposed by the a priori typologies of prototypical expressions. Aviezer et al. (2012) conducted an experiment with isolated real positive and negative intense expressions of emotion during sport events. They found that expressions, isolated from their respective contexts, were “non-diagnostic”, only increasing their attributed meaning as a function of the context (see also Hassin et al. 2013).

2.1.4 Universality

The concept of a universal expression is generally used as a synonym of “true” signal of emotion, opposing it to “false” and learned displays that people produce for

social convenience (e.g., following display rules). For decades, researchers have considered that social displays are voluntary, whereas “true” expressions are universal and involuntary readouts of innate basic emotion programs (Matsumoto et al. 2008).

The concept of true universal expression also implies a number of important methodological prescriptions. Buck’s (1982, pp. 32–33) summary of such prescriptions includes three points: (a) “the subject must be made to experience a real emotion”, (b) “[the subject] must be observed as unobtrusively as possible”, and (c) “it is preferable that the subjects not to be in a social situation and that if they are in a social situation they should not be engaged in conversation”. Since the late 1970s and early 1980s, the concept of “expression” has kept this prescriptive asocial feature, becoming increasingly more accentuated as time went by. True universal expressions have been characterized not just as private and involuntary, but as impossible to feign, visible only within a short temporal window (four seconds), and—through supposed microexpressions—impossible to conceal (Ekman 2001, 2003).

One of the obvious methodological consequences of these prevalent views was that laboratory studies were considered the only legitimate way for studying universal facial expressions of *emotion*. The more artificial the experimental setting, the truer the elicited expression. However, the search for true expressions following such premises has been inconclusive. Reviews on available experimental evidence (Fernández-Dols and Ruiz-Belda 1997; Reisenzein et al. 2013) conclude that there is no support for the popular assumption of a consistent causal link between the experience of a basic emotion and its predicted prototypical facial expression. According to Reisenzein et al. (2013), the only feeling that seems to elicit a consistent expressive pattern—a non-Duchenne smile—is amusement. However, amusement is not a clear example of a positive basic emotion and it cannot be equated with happiness or enjoyment.

This uncertain state of affairs probably cannot be solved if researchers insist on looking for universal expressions exclusively in the laboratory. Even if prototypical expressions existed, researchers would be looking for such expressions at the wrong place. Besides the sometimes insurmountable methodological problems posed by laboratory studies (e.g., the practical and ethical impossibility to elicit intense emotions), the concept of universal expression is basically flawed from a conceptual point of view.

The definition of universal expression as an asocial readout that can be elicited by extremely artificial stimuli is probably throwing the baby out with the bath water. Such approach ignores some basic warnings about universal psychological processes. In a thorough review on the concept of universality, Norenzayan and Heine (2005, p. 772) pointed out that psychologists “rarely encounter psychological processes at the more abstract, universal level directly”. Indeed, as Norenzayan and Heine (2005, p. 771) suggested, “naturally selected psychological processes do not preclude the possibility that such adaptations are expressed in different forms”, because they are contingent on ecological variations. This observation implies that “universal” is a nearly empty concept without a test of cross-situational functional and causal robustness.

If we extrapolate Norenzayan and Heine’s (2005) analyses on cognitive processes to the study of facial expressions of basic emotion, BET assumptions revealed

theoretically ungrounded. The weakest version of universal expressions' claim—*existential universality*—states merely that all human beings can display some facial movements. A more demanding claim would characterize universal facial expressions as *functional universals* (does the same tool have the same use? Is a specific facial expression always aimed at transmitting sender's specific emotional state?), and *accessibility universals* (how big are the effect sizes of the relationships between prototypical expressions and basic emotions independently of content and context?).

The approach to expression as an asocial readout produced by a limited set of artificial stimuli excludes any feasible test of *functional* and *accessibility universals*. Even if studies on prototypical facial expressions would be able to find a consistent pattern of expression in laboratory settings—what clearly is not the case (Reisenzein et al. 2013)—such findings would just confirm the existence of such coherence for responses elicited in very artificial contexts. In other words, researchers conducting studies in laboratory settings could find occasions in which the emotion and its hypothesized facial expression co-occur, but such findings would not test whether emotion causes the facial expression or how often the two co-occur in nature. Such tests require very stringent checks of emotion-expression covariation across a wide range of natural situations.

Unfortunately, the concept of universal “true” expressions is misleadingly commonsensical. The distinction between true, genuine, involuntary universal expressions and false, voluntary, culturally variable displays has become a truism in the study of facial behavior (Ekman et al. 1980; Niedenthal et al. 2010). Nevertheless, its fatal flaws become evident when one tries to put current empirical findings on “true-involuntary” versus “false-voluntary” expressions into a coherent whole (Fernández-Dols and Carrera 2010).

We can exemplify the above-mentioned problem with two illustrations on the psychological relevance of “spontaneous false” facial expressions. Chong et al. (2003) found that Chinese-speaking and English-speaking mothers, when interacting with their 4- to 7-month-old babies, displayed three types of “spontaneous false” facial expressions (two displays were mocked facial expressions of basic emotion). The first display—which the authors called OOOHIEE—consisted of puckered lips and an open mouth (a *caricature* of a kiss that may mean love, concern, and emotional availability). The second display—called WOW—may be a mocked expression of surprise conveying pride and amazement. The third display, an *exaggerated* version of the prototypical expression of happiness—called JOY—may convey a message of playful love. These “spontaneous false” prototypical expressions are probably a key tool in the early emotional communication between infants and their caregivers, but cannot fit into the dichotomy between spontaneous versus posed expressions. The two mocked and exaggerated expressions of surprise and happiness are, paradoxically, the mothers' most intense “true” or “spontaneous” displays.

A second example of the apparently paradoxical combination of true but voluntary displays is Vazire et al. (2009) study. Men and women were simply asked to pose for a photograph. Vazire et al.'s (2009) goal was to capture “spontaneous posed” expressions due to its psychological relevance as spontaneous displays. Actually, the authors found a higher prevalence of “spontaneous posed” smiles

in women (76 % female, 41 % male). Furthermore, “spontaneous posed” smiling was positively correlated with positive affect in women, but with negative affect in men. Again, these findings about an apparent oxymoron—“spontaneous posed” expressions—are extremely informative about the patterns of emotional expressivity and the evolution of emotional expression in men and women.

“False social displays versus true universal expressions” or “spontaneous universal expressions versus voluntary social displays” are not feasible scientific distinctions, and empirical tests of the covariance between facial expressions and the experience of basic emotions need a less simplistic conceptual framework. New approaches to recognition and universality should not take for granted the same assumptions that were usually accepted by most of psychology textbooks during the last twenty years (Matsumoto 2001; Matsumoto and Juang 2008; Myers 2011).

An important source of evidence for exploring the *functional*, and *accessibility universality* of facial expressions of basic emotion would consist in testing the robustness of the coherence between expression and emotion in remote and visually isolated cultures. Such studies would provide a new way of asking whether the hypothesized prototypical expressions of basic emotion are strongly related to the experience of the corresponding basic emotions beyond culture. The next section is aimed at showing how little we know about the right answer to this fundamental question.

2.2 Studies in Remote Cultures

The main idea that summarizes the previous section is that the “recognition of universal expressions” is not an innate and immediate way of connecting with others’ emotions. Instead, it is a language-dependent categorization of some icons of emotion that have been successfully infectious across cultures—not innate adaptations.

Humans can develop universal non-innate solutions across cultures. One conspicuous example is counting. Although counting seems to be a universal solution, it is not an innate capacity. In fact, individuals who have not acquired a language for numbers (e.g., deaf individuals without a proper training in language of signs) cannot represent large exact numbers even if they are integrated in a numerate culture (Gordon 2004; Spaepen et al. 2011).

As the case for counting, the “recognition of facial expressions” is probably a cultural solution for segmenting the dynamic and unstable flow of facial movements into a few fixed and static icons. However, “recognition” can only be accomplished if individuals are socialized in an “expressional” culture (i.e., a society with a language for expressions).

Besides some experiments conducted in laboratory settings (Fernández-Dols et al. 2008; Gendron et al. 2012; Jack et al. 2012), the crucial test of these two antagonistic hypothesis—recognition of universal expressions versus language-dependent categorization of expressive icons—should be carried out in visually isolated and preliterate cultures. In this type of cultures, individuals are not socialized in an “expressional” culture.

On the one hand, if people from visually isolated and preliterate cultures (a) share our concept of “expression”, and (b) categorize such expressions as members of less visually isolated cultures do, then there is some chance for inferring the existence of a truly innate way of emotion recognition. On the other hand, if individuals in visually isolated cultures fail to pass any of the two aforementioned tests, the hypothesis of recognition of emotions as a form of language-dependent categorization would be reinforced.

The aim of this section is to show how classic studies on recognition of emotion in visually isolated cultures were afflicted by a number of methodological problems that made the testing of these pre-conditions of universality inconclusive.

2.2.1 *Closing the Door to Naturalistic Studies*

At the end of 1960s, the research advances of anthropologists, psychologists, linguists, ethologists, and systems theory scientists were synthesized by some prominent scholars in *The Natural History of an Interview* (Bateson et al. 1971). *The Natural History* reflects some of the methods and the theoretical grounds of that time: the interest on microanalysis of behavior, the need to study contextual information, and the indivisible nature of social interaction when describing and explaining human communication (Bateson 1971).

Scholars like Birdwhistell, Mead, or Hinde addressed issues like the importance of naturalistic observation, the need to incorporate context in the *explanans*, the study of social interaction to explain behavior, or a direct criticism on the assumption that a set of facial expressions would be indexes of basic emotions (Birdwhistell 1970; Hinde 1982, 1985; Mead 1975). But these criticisms to a poorly grounded theory were misinterpreted. For example, Birdwhistell was depicted as an anti-Darwinian for rejecting Darwin’s claims on universal facial expressions of *emotions* (Ekman 1973, 1980; Ekman et al. 1972). These assertions have led BET theorists to self-proclaim themselves as the only truly representatives of the evolutionary approach (Izard 1971; Tracy, in press; see rebuttal by Barrett, in press).

Not surprisingly, when prominent ethologist Robert Hinde (1982, p. 220) declared that “in so far as nonverbal communication is not merely a matter of the expression of the emotions, but of negotiation between individuals, the title of Darwin’s (1872) book has biased research”, psychologists did not pay attention to his remarks.

Since the late 1970s, behavioral ecology developed a theoretical ground for explaining animal communication as a tool for manipulating other’s behaviors in social interactions (Dawkins and Krebs 1978; Seyfarth and Cheney 2003). Behavioral ecology was quickly accepted in disciplines like ethology, becoming one mainstream approach for explaining animal communication. Contrariwise, psychologists continued citing BET evolutionary explanations for the universality of facial expressions of *emotion* as the prescriptive approach, although ethological evidence supported behavioral ecology’s claims instead of BET’s reformulations

of Darwin's original ideas (Fridlund 1994, 1997). This fact has influenced the low prevalence of naturalistic studies in emotion research programs and the editorial reluctance to publish this type of studies. Consequently, while ethology has developed a rich descriptive ground for further explanations on animal communication, psychologists have self-neglected this possibility.

2.2.2 Anthropologists: *The Forgotten*

It has been largely claimed—even for closing any debate on the universality of facial expressions of *emotion*—that the studies conducted among visually isolated and remote cultures were the definitive proof for rebutting criticisms on BET assumptions (Ekman 1999; Matsumoto et al. 2008). According to Matsumoto (2001, p. 173) “the universal basis for emotional expression is no longer debated in contemporary psychology and is considered a pancultural aspect of psychological functioning”.

Although a detailed criticism and analysis of Ekman's results on recognition studies with visually isolated and remote cultures has been published by Russell (1994, 1995) and contested by Ekman (1994, 1999), we will review this controversy bridging the gap between psychology and anthropology.

BET foundational field studies (Ekman 1972; Ekman and Friesen 1971; Ekman et al. 1969) have constructed an idea of interdisciplinary and methodological novelty around their different expeditions. For example, Matsumoto (2004, p. 46) stated that “his [Paul Ekman's] studies in New Guinea bridged the gap between anthropological ethnography and psychological experimentation”. But unfortunately, when taking a close look at the primary (Ekman 1972; Ekman and Friesen 1971; Ekman et al. 1969) as well as secondary sources (Ekman 1973, 1980, 1982, 1994, 1999, 2003; Ekman et al. 1972) on those three expeditions it is not possible to find nor anthropological ethnographies neither any fieldwork that would resemble anthropologists' standard procedures (for an introduction to ethnographic methods, see Agar 1996).

For example, Ekman's *The face of man* (1980) was meant to be the ethnography for his three remote culture's expeditions. After the primary sources were published (Ekman 1972; Ekman and Friesen 1971; Ekman et al. 1969), and several secondary sources were available for emotion researchers (Ekman 1973; Ekman et al. 1972), the publication of a book related to those expeditions with 69 pictures and its corresponding commentaries was highly anticipated. But apparently, what was meant to be the awaited “bridging of the gap between anthropology and psychology” was just another secondary source showing the typical prejudices on anthropology, as well as repeating the same introduction, methods, and results from previous sources (Ekman 1972, 1973; Ekman et al. 1972).

What makes *The face of man* (1980) strikingly appalling for anthropologists—specially for visual anthropologists—is the ethnocentric and *etic* approach taken by these studies. They dismissed ethnography, and *exported* experimental psychology to an alien territory where psychologists move in the dark (Leys 2010; Rosenwein 2010).

Psychologists' preference for approaching cross-cultural studies on remote cultures as mere descriptions of facial expressions clashes with the most basic principles of the ethnographic method (Malinowski 1922/1984, 1935/1965; for new developments in the field, see also Agar 1996, pp. 1–51). For example, if we inspect Malinowski's visual ethnographical collection, the absence of close-ups is noticeable. Instead, natives are always portrayed within a setting, a situation, or background. This fact allows other ethnographers to use those sources as secondary data—in a similar fashion as psychologists will use meta-analyses (Rosenthal 1991)—as well as to obtain an accurate description of the context in which the behavior was displayed. Anthropologists are able to reconstruct accurately these scenes when observing contextual information such as the type of decorations (e.g., providing information of chieftainship and rank). Likewise, the tools and elements of material culture surrounding the people can inform of their occupation, their belonging to one of the different clans and sub-clans, and these contextual elements can even provide information on the month of the year in which the picture was taken (Young 1998).

These methods contrast with the surmises made in *The face of man* (1980), where the psychologist makes (Western) commonsensical inferences on what emotions might feel the person portrayed by assessing the facial expression displayed. For example, in plate 33E, Ekman remarks on a woman displaying a Duchenne smile after Sorenson knelt down to take her a picture are that “she probably does not understand the function of the camera but enjoys the situation”. In the same sequence, we can observe a picture of the same woman (plate 33F) with tightened lips and her shoulder raised, being commented upon as showing clear signs of embarrassment. On logical grounds, if the woman previously did not know about the function of the camera, although enjoying the situation, it is not plausible that a moment after, nor changing the woman's understanding of the camera's function neither the gaze of the photographer, the woman's felt emotion would have switched from enjoyment to embarrassment. Ethnography of emotion concepts would have accounted for the embarrassment's antecedents, the usual reactions when feeling embarrassment, or even if the Western embarrassment concept itself is suitable for that culture.

2.2.3 *Ethnography and Sorenson*

Although there are no traces of any ethnography made in BET foundational field studies, we can indirectly assess the quality of their qualitative data when reviewing the stories devised for the recognition task of emotional antecedents (i.e., assigning stories, instead of words, to expressions; Ekman and Friesen 1971). The authors stated that previous pilot studies, conducted during their first expedition (Ekman et al. 1969), provided themes to create the stories, except for the surprise and fear stories. But such search of themes seem to be based in a ethnocentric and Westernized approach. For example, in the fear story, the Fore main character remains completely alone in the village, and tools for everyday labor (e.g., knives, axes) are absent. It is highly unlikely that a village will remain completely empty, but it is extremely unlikely the combination of the former statement with

the sudden disappearance of knives and axes—considered by the authors as self-defense weapons, instead of tools for daily life activities. Likewise, the stories that were supposed to be provided by the Fore were circular while including a semantic context—an emotion term (e.g., for the story of anger, “he is angry”; for the story of happiness, “he is happy”), although Ekman’s new method was designed to avoid translation problems (Ekman and Friesen 1971, p. 125).

Another issue worth discussing is the collaboration of the anthropologist Richard Sorenson in BET foundational field studies. Previous criticisms on the need to acknowledge anthropological wisdom, advices, and methods could be easily dismissed by BET advocates when stating that they had an anthropologist among the expedition members. That line of reasoning would eventually lead us to believe that Sorenson not only spoke the local language (Bahinemo and Fore), but he also conducted an ethnography of emotion concepts while helping the psychologists of the expedition to avoid frequent ethnocentric errors that could have been made in the field. Unfortunately, Sorenson was just the *man with the movie camera*. Ekman (1999, p. 310) refers to Sorenson as just a “cinematographer” and “not a trained social scientist”.

But Sorenson (1975, 1976) reported that the moderate to high agreement rates for the recognition of basic emotions through facial expressions shown in the first and second BET foundational expeditions (Ekman and Friesen 1971; Ekman et al. 1969) were due to method artifacts. Sorenson argued that (a) the translators leaked the “correct” responses, (b) researchers thought that their participants were noble savages, ignoring the “eagerness with which the economically opportunistic Fore were ready to change their activities and beliefs according to the Western model” (Sorenson 1976, p. 140), (c) researchers followed an ethnocentric approach to data collection, and (d) researchers were the center of attention and the Fore “were quick to seize on the subtlest cues for an indication on how they should respond and react” (Sorenson 1976, p. 141).

2.2.4 *From the Field: Lessons from the Trobriand Islands*

Using our own experience in the fieldwork conducted in Papua New Guinea (2013 Trobriand Islands’ expedition), we will provide an illustrative example to account for the importance of ethnographic data and anthropological methods to prepare a solid ground for conducting hypothesis-testing studies on facial expression.

When dealing with preliterate cultures anthropologists usually develop an informal grammar and vocabulary on which upcoming anthropologists will rely on. As a dynamic system, this linguistic corpus will be modified and validated with the passing of generations of researchers conducting fieldwork in the area (for the case of Kilivila language in the Trobriand Islands, see Fellows 1901; Malinowski 1935/1965; Senft 1986). This opened-source knowledge is probably built on a limited network of informants—normally high ranked chiefs and their relatives.

Due to the oral nature of the language, the well-educated and higher ranked Trobrianders of certain sub-clans (e.g., Tabalu, Mulabwema, Toliwaga) are the holders of the ancestral knowledge (i.e., the stories, the myths, the language) that

is transmitted orally to certain sub-clans' members. By this custom, we may find that there is one Kilivila language for the elders, whereas the less *educated* commoners (*tokai*) use other variant of Kilivila language. This two-language system may entail some problems for the ethnographer, but namely it can invalidate a psychologist's research if he disregards ethnographic methods and relies solely on local translators for gathering data. The *educated* people will provide the emotion terms and the defining features of the emotion concepts in the elders' variant of Kilivila, whereas the commoners will rely on a different variant of Kilivila.

For example, in Kilivila language, the term *mwasila* works as the descriptor for shame (Senft 1986), whereas *badegila* is used for describing embarrassment. In a context in which the translators are the well-educated elders, the production of an ethnography of those concepts would not be probably validated by a sample of commoners. In fact, commoners tend to confuse the concept of shame and embarrassment, because the term *badegila* is unfamiliar to them (i.e., it is from the elder's Kilivila variant). Under the descriptor *mwasila* (shame), commoners will mix up stories and examples of women falling over in front of men with stories on moral transgressions. Thus, *mwasila* is used by commoners as a global category that will include the features of shame and embarrassment.

One of the main problems that a psychologist faces when conducting studies in remote cultures is that we behave differently than anthropologists, and locals are only *accustomed* to anthropologists' way of doing things. We are continuously being observed by the villagers. They gossip, hypothesize, and make predictions on every single detail of our behavior. We are a single case study for the whole population of our potential participants (DeVita 1990).

For example, the first thing Trobrianders acknowledge is that we do not sit down with the elders and chiefs to *talk* (*bigatona*). *Bigatona* is one way of building rapport with the informants and getting access to chunks of information while doing exchanges of betel nuts or tobacco. Unlike anthropologists, psychologists are a type of *Dim Dims* (a way Trobrianders have to refer to Caucasians and Europeans) mainly interested in studying the commoners (*tokai*). Thus, anthropologists aim at reaching the best group of sources reliable enough to gather the information they need for their ethnographic data, whereas psychologists urges to find a large representative sample from a population of commoners.

2.3 Conclusion

This chapter has described some definitional and methodological problems at the core of the concept of "recognition of universal facial expressions of emotion". A thorough analysis of each of the terms that constitute that concept raises important questions.

Current empirical evidence supports that *emotion* is a polysemous term that refers to a complex network of phenomena and their corresponding mutual links (Fig. 2.1). In this network, *recognition* is not a nonverbal instantaneous categorization of the

sender's experience, but a semiotic task in which the receiver connects "emotions as signs" (artificial icons of emotions such as prototypical facial expressions) with emotions as "cognitive representations" (language-dependent concepts of emotion).

One of the reasons of this characterization is that prototypical *expressions* of basic emotion are not observed when people experience such emotions nor in natural (Fernández-Dols and Crivelli 2013) neither in laboratory settings (Reisenzein et al. 2013). This fact, strongly suggests that *expressions* are actually icons of emotional behavior. *Expressions* would work out like infectious signs adopted in many cultures, but not *universal* in a strict sense (i.e., they are not innate adaptations shared with other primates for millions of years).

The main conclusion of this analysis is that research on recognition has still to answer a basic preliminary question about universality. The mainstream approach is that recognition is an instantaneous and innate process of nonverbal categorization. We hypothesize that recognition of emotion is a successful cultural device for segmenting the flow of a complex behavior (facial muscles' movement) into a number of memorable, salient prototypes.

The appearance of universality in the recognition of expressions would be similar to the appearance of universality of counting systems based on precise numbers. While numbers are apparently universal today, researchers (Gordon 2004; Pica et al. 2004) have concluded that there is a probably innate representation of quantity (*one, two, many*), but numerating is dependent on cultural contexts that, through explicit socialization, combine the primitive representation of quantity with other cognitive competencies (see Norenzayan and Heine 2005).

In the same vein, recognition of emotion might be based on a basic, maybe innate, perception of core-affect (e.g., pleasure vs. displeasure). This fact, combined with other cognitive abilities through socialization, would eventually lead to the categorization of emotional events in terms of signs such as words and icons (prototypical expressions).

A crucial test of these two competing hypotheses would consist in carrying out tests of recognition in isolated, preliterate cultures in which this *infectious* cultural device ("recognition") should be absent. Unfortunately, such tests have rarely been performed in a proper way (for a recent promising development in field studies see Gendron et al., 2014). They require a truly interdisciplinary integration of ethnographic and experimental methods that was not accomplished in the few studies carried out with remote cultures during the 1960s and early 1970s. We believe it is time for carrying out these tests.

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