Emotions as Bio-cultural Processes: Disciplinary Debates and an Interdisciplinary Outlook

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Abstract This chapter develops a theoretical framework that is capable of integrating the biological foundations of emotions with their cultural and semantic formation. It starts by investigating two leading scientific theories about emotions: one that is dominant in biology and a second one that is dominant in psychology. In biology, we consider the theory of basic emotions that focuses on innate biological emotional mechanisms. Using this approach, we can take physiological states into account. In psychology, we take a closer look at theories focusing on appraisals—the so-called appraisal theories—because these can be brought in to explain the cultural and semantic modification of biological emotional processes. Our examination of the major factors and elements of appraisal processes, which is also an examination of the internal processing of an emotional episode, discriminates unconscious from conscious processes and mental from nonmental processes. The next step is to integrate the two theories—the theory of basic emotions and appraisal theory—to couple emotional sensations with emotional concepts (semanticization). We clarify how basic innate emotional processes and complex learned ones are related to each other. We assume that cognition, feeling, and consciousness gradually become more differentiated in single species and organisms (phylogeny). Correspondingly, one possible hypothesis is that this differentiation process runs parallel on all levels, meaning that these domains can be assumed to be closely linked or even interdependent.

When asked to give typical examples of emotions, people may think of fear, love, hate, anger, jealousy, shame, pride, joy or disgust; perhaps, after some pause for thought, they add surprise, offended honor, or melancholy. Such lists are easy to extend. However, scientific studies, not being satisfied with lists of this kind, introduce criteria to categorize the phenomenal domain. By allying

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structural and comparative analyses, the phenomenal domain of the emotions can be studied from completely different perspectives.

To start with, we have to ask what exactly are emotions. Are they a set of entities that can be distinguished clearly not only from other mental or cognitive processes and states such as thoughts, conclusions, judgments, or perceptions but also from actions? Or do they form a specific subgroup of one or several of these other entities?

As soon as we move away from everyday psychological categories, scientific categories and criteria emerge to take their place. Emotions could then be a specific group of physiological processes that come about at a certain developmental stage in evolution and are further refined in the hierarchy of vertebrates and in particular mammals—before finally appearing in a certain variety of forms in human beings. This variety does not just refer to the range of single emotions but also to their many cultural and individual variations, such as the strength of emotional expression. The questions that then arise are directed toward how emotions come about exactly, what forms them, and how decisive are the biological and cultural influences. When formulating a model of the emotions that may be capable of answering these questions, it is necessary to take into account both the biological and cultural aspects of emotional processes.

Conceptually, there are various theoretical approaches to studying emotions. Two major approaches, which have generated intensive discussion in recent years, are represented by two groups of scientists: those who assume that emotions can be broken down into so-called basic emotions and complex emotions versus those who concentrate on the evaluation or appraisal aspect common to all emotional events. It should be noted that *appraisal theories* proceed from our so-called everyday understanding of emotions, whereas *physiological theories*, which are primarily oriented toward "basic emotions," concentrate particularly on the physiological changes involved in emotional processes.

For our research group, the decisive question was how to integrate the different conceptual perspectives so that both physiological and cultural aspects of emotions could be taken into account. A good way to get closer to answering this question is to start by inspecting the two dominant research directions and examine what the supporters of basic theories and appraisal theories have to tell us. This should help us to work out an approach with which we can consider not only the biological foundations but also the cultural and semantic shaping and refinement of emotions and other affective states. The theories that assume the existence of basic emotional dimensions (basic emotions) and thereby of innate physiological mechanisms offer a suitable starting point for a physiological approach to the research topic. In contrast, the theories that focus on the appraisal character as a function of emotions can be related successfully to explanatory approaches to how they are shaped and refined by culture and semantics.

In the following, we show how a biological-physiological approach and a cultural-semantic approach can be related to each other to form a greater whole. We also clarify how we can use the relation between complex, nonbasic, noninnate emotions and physiologically determined innate emotions to explain emotions as a bio-cultural process.

The research tradition that focuses on basic emotions emphasizes both the communicative function of emotional expression and the action-guiding aspect of emotions. It also assumes that all humans are born with basic emotional abilities in a physiological form, and that we even share several "affect programs" with other animals—from nonhuman primates to other mammals, birds, and reptiles. Dividing emotions into basic emotions and nonbasic, or complex, emotions is nonetheless only one way to categorize them (see, for overviews, e.g., Ekman & Davidson, 1994, pp. 5–47; Ortony & Turner, 1990).

From a scientific point of view, it may well seem like a good idea to start by examining emotions that seem to be universal for all humans as well as, perhaps, some of the other primates. Then, by drawing on examples and counterexamples from other disciplines, we can move toward a concept that is no longer founded exclusively on the so-called basic emotions.

It should be noted here that the various approaches follow different research questions and epistemological interests. Whereas, as mentioned above, the theoretical approaches favoring basic emotions focus their research on the communicative function of emotional expression and the action-guiding aspect of emotions, appraisal theories concentrate on the cognitive function of emotions, that is, the appraisal or evaluation process.

Nonetheless, all emotions are assumed to possess an appraisal or evaluation function regardless of whether they are built on an innate basic emotional ability. The question of a fundamental biological or physiological "emotional tool kit," as posed since Charles Darwin (1872/1904), William James (1884), and William McDougall (1908/1960), cannot be restricted to a few specific (basic) emotions.

Criteria for Basic Emotional Processes

When scientists are asked to name emotions, they generally list fear, anger, joy, disgust, and sadness in the sense of loss.[1] These are held to be universal because it would seem inconceivable for persons not to feel pain and sorrow at the loss of a loved one or not to feel fear when threatened by a wild animal.

The question is: How do things look when we move on to other emotional states that do not belong to this set of basic emotions? Are they assembled from this limited set of basic emotions that cannot be broken down any further (e.g., Johnson-Laird & Oatley, 1992)? Theories supporting this assumption divide emotional states or processes into innate basic emotions and acquired complex emotions. Nonetheless, it must be noted that this classification is the outcome of

an evolutionary approach to emotions that concentrates on the emergence of psychological and psychophysiological mechanisms. In this perspective, the mechanisms underlying the basic emotions are an outcome of natural selection and have a corresponding adaptive function. The differential criterion in this case is phylogenetic continuity. This hypothesis is supported by, for example, the presence of several specific emotions in nonhuman primates as well as in humans (e.g., Cosmides & Tooby, 2000; see also Ortony & Turner, 1990; Reisenzein, 2000).

However, even innate mechanisms, also known as innate affect programs, are not necessarily conceived as unmodifiable mechanisms. Jaak Panksepp (1998), for example, argued that basal emotional processes emerge through "homologous" brain mechanisms in mammals. These mechanisms, or affect programs, are then shaped by an organism's further development and the experiences it goes through. The human ability to think then becomes one way of influencing these universal affect programs.

The most convincing empirical evidence for the existence of basic emotional mechanisms is that discrete emotional behaviors and states can be elicited in mammals through electrical and chemical stimulation. Bejjani et al. (1999), for example, induced a sudden depressive reaction through electrical stimulation of the medial diencephalon close to the subthalamic nuclei of the brain.[2]

Nonetheless, such reductionist theories are confronted with a problem. They must report what constitutes the specific sensation of a basic emotion such as joy or fear. How can we tell whether a mechanism in a human being is basic; and if so, which one is it? We cannot perform experiments on humans comparable to those on animals. Moreover, it is only through analogies based on expressive behavior that we can deduce that certain basal mechanisms ascertained in the rat are similar to those we label joy in humans.

Hence, it is still uncertain how far the theoretical discrimination between basic and nonbasic emotions has any general validity. For example, we still do not know whether there is any meaning in making such a distinction in animals. Initially, it seems that some emotional reactions in humans are similar to those in animals, whereas others are too subtle ever to be found in the animal domain. In any case, at least some emotional components of simpler emotions can be diagnosed in animals.

We compiled a list of criteria that an emotion (an emotional process) must meet to be called basic.

1. It has to be irreducible or "pure"; that is, no other emotion is involved.
2. It has to be universal; that is, it must be impossible to find any social group that does not exhibit this emotion.
3. It has to have a distinct facial and postural expression that is easy for others to interpret.
4. It has to be based on an innate affect program.
5. It has to be accompanied by immediate and significant bodily changes that are also assumed to be universal.

6. It has to emerge very early in ontogenesis and disappear very late in cases of degeneration of the brain.
7. It can be induced without the involvement of consciousness (e.g., propositional processes and without the presence of a self-concept).
8. No thoughts are required for it to occur.
9. Arousal has to be of short duration.

These criteria are based on an understanding of basic emotional processes as (still) nonsemanticized (noncognitive) fundamental emotional abilities. We now consider these criteria in more detail.

- *Irreducibility.* This postulate states that no other emotions can be perceived in the irreducible emotion. For example, joy always seems to be only joy compared with the emotion of love, for example, that may well contain joy.[3]
- *Universality.* This criterion means that there is no known social grouping that does not exhibit this basic emotional pattern. The universal basic pattern is then shaped culture-specifically; that is, it does not develop in all cultures in the same way or to the same degree and intensity.[4]
- *Distinctive (facial) expression readable by others.* Paul Ekman and his colleagues (e.g., Ekman, 1972, 1993, 2004; Ekman & Friesen, 1975) focused particularly on this criterion in their research. Nonetheless, even Ekman himself admitted that no data were available on how many forms of expression are universal for one emotion. They also have no one-to-one relation; that is, there is no single specific form of facial expression for each emotion.
- *Innate affect program.* The discovery of such an innate affect program has been claimed by, for example, Joseph LeDoux (1996, 2000) and Jaak Panksepp (1998, 2004). They pointed out that the human species shares this innate affect program with other animals and postulated that this program [i.e., the (discrete) emotions that belong to it] is determined phylogenetically. With this approach, the supporters of affect programs provide us with a central concept of biologically determined basic emotions (although these research approaches have been subject to some criticism from, among others, Paul Griffiths, 1997).
- *Immediate and significant, automatic bodily change.* This is assumed to manifest universally. These changes are attributed to emotions that are assumed to be universal or, otherwise, the outcome of an innate affect program. An example is breaking out in a cold sweat when frightened.[5]
- *Early emergence.* Basic emotions appear very early in ontogenesis and disappear very late during the course of brain degeneration (e.g., during the course of Alzheimer's disease).[6]

These first six criteria are all found frequently in the literature. The next three criteria were formulated by our research group.

- *No necessity for a self-image.* In line with the argument that universal, basic emotions or affect programs can be induced without the involvement of consciousness (e.g., propositional processes), we assume that affect programs

can be activated without any need for the presence of a self-image. Strictly speaking, this is not an additional criterion for defining basic emotions. Any emotion requiring a self-image cannot be a basic emotion. The nonnecessity for a self-image can be seen by looking at neonates, adults suffering from senile dementia, and even other mammals. They all display emotional expressions without possessing a self-image. This is not the case with complex emotions. Persons have to possess a self-image that they can relate to the "images" of other persons to be able to have complex emotions. The self-image locates persons within a (what may well be imaginary) social space or set of relationships. As Ben-Ze'ev and Oatley (1996) stated:

> Emotions that are not basic, but are complex, are those requiring second-order intentionality. They depend on reference to a conception of the self and a social comparison of the present situation of the self with imagined alternatives of the self or others. (p. 89)

A series of emotions, including all those commonly regarded as basic such as fear, anger, joy, disgust, or sorrow (over a loss), do not require a self-image in this sense. However, these emotional processes may arise in a qualitatively different form when a person does possess a self-image. Anger over a perceived insult or disgust as an aversion to persons or ideas are examples of this. For example, before I can be insulted and become angry, I have to be able to relate the insult to myself.

- *No thoughts necessary.* This criterion is also an outcome of analyzing emotional events in babies, nonhuman mammals, and adults with senile dementia. Strictly speaking, although it indicates that no higher cognitions such as deduction, planning, decision-making, or evaluation are necessary, we assume that at least some cognitive processes such as stimulus processing or perception are involved in basic emotions—this position is relatively noncontroversial in the literature (e.g., Clore & Ortony, 2000; Ellsworth, 1994; Frijda, 1994).
- *Short duration of arousal.* This is a further general criterion for a basic emotion, but how far it applies in the same way to all emotions requires further analysis. Someone who feels joy shows it with a smile. Once the cause for this joy has disappeared, the emotion may persist for a short time—but generally no longer than a few minutes and hardly ever for hours (the research literature frequently reveals the claim that an emotion may persist for less than 1 minute). Whether it may also last for days or even weeks is questionable because then it is no longer the immediate first reaction that is typical when, for example, we meet a good friend on the street by chance.

The question whether one can assume that something like basic emotions actually exists relates to the question on how to classify emotions. We consider it important to point out that any consideration of basic emotions is always subject to certain constraints. Even emotions such as joy or fear, which are attributed with universality, are shaped by culture; and once they are also

shaped by language, they are accompanied by higher cognitive processes. As Prinz (2004) expressed it:

> [E]very emotion that we have a word for bears the mark of both nature and nurture. Each is built up from a biologically basic emotion, but its conditions of elicitation, and hence its content, is influenced by learning. No lexicalized emotion is biologically basic. But there is a sense in which all lexicalized emotions are psychologically basic. No emotion contains [insofar] other emotions as component parts. (p. 85)

It should also be considered that during the complex everyday life of a healthy adult human an emotion occurs rarely—if at all—in a basic or "pure" form. It mostly contains elements of other emotional dimensions determined by what is going on in the specific social context. For example, test anxiety (i.e., the mental idea that one will not be able to cope with a future task) is also linked to aspects of shame and the fear of failure; in contrast, the anxiety for a loved person who embarks on a dangerous journey alternates with elements of worry. Likewise, the prospective fear that one feels when one knows one is going to have to walk through a dangerous part of town at night involves earlier experiences of violence and pain. To which basic pattern should this variety be reduced? Are these all forms of fear? Or are we dealing with what is only a culture-specific terminology that lumps together various emotional phenomena? In view of such justified reservations, how can we assess basic emotional processes empirically in the real social world?

Moreover, we find that those who favor a theory of basic emotions significantly (though not exclusively) base their classification into basic emotions and complex emotions according to characteristic signs of an emotional sensation that "break through to the surface." These are, particularly, facial expressions, prosody, gestures, and action readiness. Concentrating on external signs when classifying emotional processes broadly ignores factors such as sensing or implicitly evaluating an event through an emotional process; however, just because such factors do not take on any role on the physiological level of explanation, they do not become irrelevant for the classification of emotions.

Estimation, Evaluation, Appraisal

Categorizing emotions is linked closely to how meaningful or useful it is to distinguish basic from complex emotions, and, in turn, to whether one should start by assuming the existence of so-called innate, physiological basic emotions or focus on an appraisal theory founded mostly on a cognitive model of the emotions. It is important to start by distinguishing clearly between these two levels. Whereas appraisal theories proceed from our so-called everyday understanding of emotions—i.e., are embedded in (everyday) psychology—physiological theories of the emotions address the aspects of emotional processes embedded in physiology. This raises two issues: The first is whether these levels really can be separated from each other completely. Which physiological

mechanisms would physiologists look for if they had no prior understanding (everyday knowledge) of the "object" they wanted to study? Second, the specific social and cultural aspects of emotional processes cannot be understood if one remains on a physiological level of explanation. Persons act and feel on the basis of their everyday psychological understanding of situations. It is important to emphasize once again that physiological processes are shaped by experiences and that these experiences are shaped by culture. We shall return to this later and consider how far it actually is the case.

Appraisal theories provide clearer contours for the cultural modeling of emotions. Focusing exclusively on so-called basic emotions makes it impossible to grasp the total cultural breadth of emotional processes and explain their various cultural specifics. Therefore, we now take a closer look at appraisal theories.

It has already been pointed out that theories restricted to studying basic emotional abilities and forms of expression focus particularly on the communication function and the aspect of action readiness to which emotions contribute. It has also been pointed out that appraisal theories have shifted attention to the cognitive function of emotions. This is significant in the following discussion insofar as cognitive function is important when it comes to explaining complex emotions.

The *appraisal theories* of emotions, which have grown into an important field of emotion research over the last two decades, pay less attention to the ontological status of specific emotions and far more to how emotions arise in general. Their central assumption is that emotions are triggered by the subjective appraisal or evaluation of situations and events in terms of the significance of what is perceived for the organism (e.g., Roseman & Evdokas, 2004; Roseman & Smith, 2001; Scherer, 1988; Schorr, 2001). A further assumption is that different emotions are accompanied by different patterns of appraisal; that is, each discrete emotion is triggered by a correspondingly discrete pattern of appraisal. Hence, the "character of an emotion" (i.e., how it is perceived or felt) is determined by its specific pattern of appraisal. This leads to a further assumption: Appraisals precede an emotion and *trigger* emotions. They are not, for example, a phenomenon that accompanies an emotion and is stored in memory after an actual emotion has occurred, nor are they an appendage to physiological reactions (Roseman & Smith, 2001). They *may* be part of an emotion, but they do not *have* to be because not every appraisal is also followed by an emotion. By making us "aware" of the appraisal (Roseman & Smith, 2001), an emotion additionally possesses an evaluative function when it is the consequence of an appraisal. However, because appraisals trigger emotions, this does not mean that they cannot also be part of or even the consequence of an emotion.

Hence, appraisal theories are confronted with two types of problems when explaining how emotions are triggered: first, regarding assumptions about the appraisal process; and second, regarding assumptions about the structure of the appraisal. Assumptions on the process point to the sequence of mental and nonmental processes as well as how these processes relate to and possibly

influence each other. Assumptions on the structure of emotional processes refer to the appraisal *dimensions* and the appraisal *patterns* (i.e., what is appraised in relation to what in each case and which specific emotions correspond with which patterns of appraisal).

We start with assumptions on the structure of emotional processes. Many critics of appraisal theories equate appraisals exclusively with *cognitive* and largely conscious evaluation processes that grasp the significance of events and situations by comparing the qualities of these events with the mental structures of the persons perceiving them. This turns opinions, intentions, wishes, goals, and beliefs into matrices for depicting and appraising situations and events. Although most appraisal theories also take into account automatic and nonconscious appraisal processes, they develop a clear concept on the participation of (higher) cognitions in the genesis of emotions. Such concepts generally contain more or less detailed considerations of the various object domains that are appraised, such as actions, events, and objects (e.g., Ortony, Clore, & Collins, 1988; Parkinson & Manstead, 1992). Furthermore, they report which properties of the object domains are appraised—e.g., their valence (positive–negative) or, depending on the level of cognitive development, the probability of occurrence, the "coping" potential, or the attribution of responsibility or causality (e.g., Scherer, 2001). Propositional attitudes often play an important role, thus requiring the presence of verbal structures (particularly marked in, e.g., Solomon, 1976 but also in Oatley, 1992 and Oatley & Johnson-Laird, 1987).

Although most appraisal theories expressly permit nonconscious and automatic appraisals, this level of the genesis of emotions was long neglected. Recent work has attempted to explain how automatic appraisal processes (what Ekman, 2004, called "auto-appraisers") can be related to more cognitive appraisal processes and, above all, how these levels can still be taken into account while avoiding the assumption of pure determinism and pure automatism (which is precisely the appraisal theorists' criticism of the basic emotions approach). It has already been mentioned that most appraisal theories consider that the cognitive components of the genesis of emotions reveal highly depictable links to social and cultural spheres (Manstead & Fischer, 2001; Mesquita & Ellsworth, 2001).

These studies relating auto-appraisers to more cognitive appraisal processes should form the basis for the development of more advanced models capable of forging even stronger links to automatic physiological and, in particular, neurological processes in the genesis of emotions. Furthermore, it may be possible to bring these two forms of theory closer together, even though appraisal theories are psychological theories whereas physiological theories are applied on another level of explanation.

However, as soon as one tries to form such links, one is compelled to analyze the *process assumptions* in appraisal theories in more detail. As mentioned above, any interpretation of the (supposed) focus of appraisal theories on conscious estimations leads to a strongly cognitivist or mentalistic perspective

that broadly ignores the autonomic and physiological processes as triggers of emotions (or as chronologically first elements). Particularly LeDoux (1996), Öhman (1986), and Zajonc (1980, 1984) have emerged as opponents of such purportedly purely cognitivist appraisal theories. These authors introduce the results of subliminal priming studies or conditioning studies as arguments supporting the possibility of *affective* reactions before cognitive activities become involved. In contrast, other findings—particularly those from the neurosciences—also indicate that emotional or affective reactions can emerge without the involvement of (higher) cognitive activity. Moreover, under some circumstances, they even have to do so if one wishes to pay heed to the arguments in evolution theory that the speed of subcortical processing particularly serves adaptive behavior in critical situations (Berridge, 2003; Cosmides & Tooby, 2000; LeDoux, 1996; Öhman, Flykt, & Lundqvist, 2001). Admittedly, even what were originally conscious processes can become so automatic that they are carried out at great speed. One has only to think of the reactions of competitive athletes or acrobats. There are also purely neuroanatomical justifications for the existence of systems that may trigger emotions (or affect programs) independently from those systems responsible for higher cognition (Gray, 1994; Panksepp, 1998).

Even the founders of appraisal theories such as Magda Arnold (1960) or Richard Lazarus (1966) paid explicit attention to the possibility of nonconscious, automatic appraisal processes. Accordingly, "Appraisal is not the result of reflection. It is immediate and indeliberate" (Arnold, 1960, p. 172, cited in Kappas, 2002, p. 86). Hence, how can we coordinate these two ways in which emotions emerge? It is necessary to bring together higher cognitive processes on the one side and subcortical processes on the other because they are able to both assess the significance of events in the environment in relation to the organism and trigger affect programs or emotions.

Without wanting to go any further into the well known debates on what cognition contributes to the emergence of emotion, we point to integrative approaches that view the process of the emergence of emotions as a hierarchical and modular, but not necessarily parallel, system. These approaches assume different levels of information processing that are generally distinguished in terms of the degree of (conscious) cognitive involvement.

From a process perspective, an example of the integration of different forms of emotional processing is Scherer's component-process model. This discriminates, in principle, three possible forms of information processing: sensorimotor, schematic, and conceptual (Leventhal & Scherer, 1987; Scherer, 1994).

Sensorimotor processing is the lowest stage of potential emotion-initiating processes, comparable with, for example, the innate subcortical affect programs postulated in neuroscientific models that function in a manner similar to that of stimulus–reaction mechanisms. As Leventhal and Scherer (1987) stated:

> The sensory motor level of processing consists of multiple components, including a set of innate expressive-motor programmes and cerebral activating systems which are stimulated automatically, that is, without volitional effort, by a variety of external stimuli and by internal changes of state. (p. 8)

Damasio's (1994) discussion of innate emotional reactions to certain *properties* of stimuli (not to their conceptual content) can be viewed as such a sensorimotor case.

The next level in the hierarchy is the *schematic* processing level on which learned emotional reactions acquired during the course of socialization occur. This level integrates sensorimotor processes with picture-like prototypes of emotional situations. Leventhal and Scherer (1987), once again, stated:

> Schemata are created in emotional encounters with the environment and are conceptualised as memories of emotional experience: They are concrete representations in memory of specific perceptual, motor (expressive, approach–avoidance tendencies and autonomic reactions), and subjective feelings each of which were components of the reaction during specific emotional episodes. (p. 10)

LeDoux's (1996, 2000) studies on the conditioning of fear are a good example of schematic processes. Another is the uneasiness one feels when returning after a long time to a place associated with a number of "bad memories."

Finally, the *conceptual* level of information processing integrates reflective, abstract, and deliberative activities (Leventhal & Scherer, 1987, p. 11). Anxiety about a future test would be a typical process for this.

Proceeding from this model of information processing and the theory of stimulus evaluation checks (SECs) (Leventhal & Scherer, 1987; Scherer, 1993), Scherer has argued in favor of a concept of "modal" emotions (see also Scherer, 1984) because all of the possible combinations of SECs can result in an almost infinite number of emotions that differ not only in kind but also intensity. Scherer pointed to correspondences regarding certain problems confronting organisms in their ontogenesis. He called emotions that appear regularly because of frequently occurring SEC combinations "modal emotions," and argued:

> Modal emotions are therefore characterized by a prototypical pattern of appraisals and the corresponding patterning of expression, autonomic arousal, action tendencies, and feeling states (Scherer, 1994, p. 30).

We use the explanation of the following scheme for the internal processing of an emotional episode worked out by part of our research group to continue our examination of the major factors and elements of appraisal processes.

Course of an Emotional Episode

Internal Processing of an Emotional Episode

The following scheme covers the mental and nonmental states, events, and processes involved in emotional processing. It does not represent a purely

temporal sequence but is predominantly the outcome of analysis. Entries printed with a gray background in the scheme indicate a conscious process.

Sensation (*Sinnesreizverarbeitung*)	Unconscious, automatic, physiological
	Sensational phenomenal experience (*Sinnesempfindung*)
Perception (*Wahrnehmung*)	Interpretation of the sensation:[1] (1) The whole process is unconscious, or (2) one becomes conscious of that which is perceived ("perceived as"), or (3) conscious reflection on what is perceived as something: Perceptual phenomenal experience (*bewusste Wahrnehmung*)
Appraisal (*Einschätzung*)	Interpretation of the perceived in relation to its significance for the organism/the self: (1) the whole process is nonconscious, *or* (2) the outcome of the appraisal process becomes conscious to varying degrees: -Sensational experience of an emotional state (feeling) -Conceptualized emotional experience
Evaluation/reappraisal (*Bewertung*)	Conscious, evaluative reflections about the perceived or the appraised (or other contents of consciousness) in relation with its significance for the self

We introduce three examples to make the scheme easier to understand: (1) Assume that you are walking along the street in the dark. You see a man approaching you with a baseball bat, and you react with fear. Here is another, different kind of example: (2) You are reading a crime story late in the afternoon just as dusk is falling. You have just arrived at the passage describing how the victim is murdered. When you finish reading it, you draw the curtains, make sure your front door really is locked, and phone a friend for a chat. Finally, (3) You come into a room, shake hands with everybody there except one. When you ask yourself afterward how you could have been so rude as to leave somebody out, you explain it to yourself by thinking that you did not greet this person properly because you spontaneously found him or her unpleasant.

How can we describe these episodes in detail? Each begins with a *sensation* that initially remains nonconscious and proceeds automatically on the physiological level. This means that you do not perceive the "gestalt" in the dark as a man or even as a gestalt; you do not perceive the letters on the page of your crime story as letters or the meaning of these letters as a meaning. When entering the room full of persons, you initially do not perceive the room as such or the persons as persons, and so forth. Your senses are initially stimulated unspecifically. This is a purely physiological or neurophysiological level of description. In philosophical terms, this is the level of sensation that, in contrast to the purely physiological, is accompanied by consciousness.

The next stage of *perception* (i.e., conscious reflection on that which is perceived to be something) is of particular interest in, for example, philosophical deliberations over consciousness. It also relates to the concept of intentionality. I relate myself to something as being something—for example, to the man as being a man with a baseball bat—and the first thing I ask myself is whether he intends to attack me. At this stage of perception, one can say that we are already dealing with a "semanticized" perception, that is, the meaning of the term "man" is already linked to the perception. Naturally, this is a conscious perception.

The second example, in which the reaction of fear follows the description of a murder in a crime story, differs from the first example because the fear is not elicited by a concretely experienced situation but by the description of a situation that captures the imagination (Holodynski & Friedelmeier, 2005, p. 49). Although this is not conscious perception of a situation, it is nonetheless conscious imagining.

Finally, in the last example, in which one enters a room and greets everybody present except one person, all the persons in the room have been perceived consciously, but their appraisal or evaluation—exhibited in the failure to greet one of them—initially remains subconscious. Nonetheless, it can be made conscious through later reflection on one's own behavior and is therefore not inaccessible to consciousness.

This brings us to the next component in the emotional process: the *appraisal*. Here as well, a distinction is made between consciously perceived and not consciously perceived. A common definition for appraisal is interpretation of the perceived in terms of its significance for the organism, or the self. This process may proceed completely without consciousness (as in the failure to greet one person in the room), or one becomes conscious of the outcome of the appraisal process in various stages (when we see the man coming toward us on the street with the baseball bat and interpret what we perceive as a threat to the self).

Conscious appraisal is accompanied only by a sensational experience of an emotional state so long as it is neither conceptualized nor semanticized: that is, the sensation is not linked to the concept "fear" or to another concept such as "joy." However, when we are dealing with a conceptualized sensation, as is mostly the case in humans, we call it a conceptualized emotional experience because a sensation is perceived as a specific emotion, such as fear. This is because humans acquire concepts about the use of words in situations in which, in the case of emotions, there is a sensational experience of an emotional state.

The coupling of sensation and concept (semanticization) can be clarified as follows: The startle reflex of an infant is assigned the term fear by repeatedly pairing a sound with a sensation. For this word to become a concept for the developing child, she or he will also learn when she or he is entitled to have this sensation and when not (e.g., "You don't have to be afraid of. . . ."). A facial expression is perceived in another member of the species that is given the name "fear." The other is consoled and protected. The word "fear" becomes embedded in action contexts and accompanies specific forms of sensation and expression. It is only then that it can be called a *concept*. In addition, the ways of

regulating emotion are also learned conceptually (i.e., together with the concept or in the sense that they belong to the complete meaning of the concept).

However, successful regulation of emotion or the lack thereof also influences the strength of sensation. Eventually, the sensational experience and the concept of an emotional state can no longer be separated. Nonsemanticized body sensations cease to exist.

The process scheme of an emotion described above requires further explanation. The conceptualized emotional experience can lead to a conscious *evaluation* or *reappraisal*. Such consciously evaluative thoughts (reflections) on what is perceived or appraised (or other contents of our minds) are made with reference to the significance of what is perceived for the self. An interesting case here is our example in which one person was not greeted. This "failure to greet" is also perceived, but it is only later that it becomes subject to a reappraisal with the conclusion that the person who has not been greeted is an unpleasant person with whom one does not want to have anything to do.

What is special about this case is certainly that there is initially no conscious appraisal and also no sensational conscious experience of an emotional state or conceptualized emotional experience. The usual cases of reappraisal are certainly those in which we reconsider a conscious conceptualized emotional experience along with the appraisal linked to it. In the crime story example, it would be typical for an adult who has just drawn the curtains and made sure the front door is locked to reassure himself or herself that these acts were merely anxious reactions due to reading the story, in other words, a fiction that is not pertinent to the current real-life situation. The reader would then decide that he or she should not exaggerate, and there is no need to feel any more afraid than in a comparable situation in which reading a crime story had not made such an impression.

We could have placed the aspect "evaluation or reappraisal" under the heading "appraisal." However, it is helpful to distinguish it conceptually when analyzing examples such as the one in which a person enters a room and greets all but one person.

The appraisal accompanying an emotion is an interpretation of that which is perceived in terms of its significance for the organism, or the self. Referring to the examples: What is the significance of the baseball bat in a man's hand on a street at night? Phrased in this way, it seems that appraisal always has to be a conscious process. This is also not the case. The entire process can proceed unconsciously, or the outcome of the appraisal process can become conscious to varying degrees. Conscious appraisals or evaluations require the ability to engage in conscious reflection, whereas unconscious appraisals proceed almost automatically. Of course, a conscious decision does not have to trigger an emotion. One can arrive at the conscious appraisal that children in Africa are living in terrible conditions and that it is absolutely necessary to help them without having to trigger the emotion "compassion."

The fear in the first example is generated from the simultaneous nonconscious processing of the three schemes "man," "baseball bat," and "nighttime"—a

combination that forms a prototypical mental model of fear in Western culture. If, for example, the Makassar (an ethnic group in Indonesia) were to go for a walk at dusk, they would probably have to simultaneously perceive the hoot of an owl and a certain whistling of the wind through the trees to trigger fear because they take this as indicating the presence of certain dangerous spirit beings (the "owl wind"). Interpreting these perceptions as antecedents of danger is something that is learned culturally.

Naturally, one can ask whether this type of quasi-automatic appraisal is in any way an evaluation. If this type of appraisal, and thereby the emotional process, is disengagement of the stimulus–reaction mechanism, it should mean that although the person does not have freedom of action in the sense of reflection on which is the better alternative the reaction is based on an unconscious appraisal (i.e., on a largely habitualized appraisal or interpretation), not just on the triggered stimulus. Hence, what we call "appraisal" can also be a learned reaction to pleasant or unpleasant experiences; it does not necessarily have to be the outcome of conscious reflection on these experiences. With a stimulus–reaction mechanism, however, the reaction always follows the stimulus, even in circumstances in which this mechanism may damage the organism or not lead to success (Damasio, 1994; LeDoux, 1996; Scherer, 1994).

One generally talks about emotions when the appraisal emerges from a pleasant or unpleasant feeling of which one is conscious. There are no unconscious feelings. Appraisal and feeling coincide. This is not a conscious cognitive appraisal, but an "intuitive" one, a sensational experience of an emotional state. It may well be that the Makassar feel the owl wind rather than perceive it consciously. They register a sudden feeling of fear. Alarmed by this, they focus attention on their environment and then perceive the hooting owl and the specific wind.

It can be assumed that cognition, feeling, and consciousness gradually become more differentiated in single species and organisms (phylogeny). Correspondingly, one hypothesis is that this differentiation process runs parallel on all levels, meaning that these domains can be assumed to be closely linked or interdependent.

There have been comprehensive debates on the proportion of cognition and consciousness in this process. When it is stated in the literature that the "nature and intensity of the emotion are predominantly determined by the subjective evaluation of the meaning and consequences of an event for the individual concerned" (Scherer, 2004, p. 140), it implies that emotions accompany conscious experiences.

The process scheme presented above should tell us which mental and nonmental states, events, and processes are involved in emotional episodes. Usually, one starts such processes with sensations and perceptions that are appraised or evaluated by the individual experiencing them. We have seen that most of these stages can be accompanied by phenomenal experiences.

Body-Related Aspects of the Processing of an Emotional Episode

When asking which mental and nonmental states and processes are involved in emotional episodes, it is also necessary to take into account the body-related aspects. These aspects permit distinction between "internal" bodily changes (internal events during an emotional episode) and "external" bodily changes (expressive and bodily reactions as "external" changes during an emotional episode). The internal changes are "steered" by the regions of the brain responsible for nonmotor changes, including autonomic bodily changes that we (generally) are unable to modify voluntarily such as neuroendocrine changes, that is, hormonal and (para-)sympathic changes (e.g., changes in blood pressure, heart rate, skin conduction; hair raising; goose pimples).

Externally observable bodily reactions that accompany emotional behavior are mostly controlled automatically, particularly by subcortical brain regions. Such reactions include facial expression, prosody or tone of voice, gestures, and body language. The latter is expressed through how persons stand, sit down, incline their head, or hold their hands defensively in front of the chest or reach out in a greeting of welcome. Empirical emotion research has focused particularly on facial expression and prosody—the former because it is extremely differentiated and is viewed as a universal means of expression and communication. Although these bodily reactions are largely automatic, their occurrence and strength can be influenced consciously.

Not only body language but also facial expression and prosody provide our interaction partners with information on our emotional state. They tell them something about what situation we are in and how we "appraise" it. In this sense, we communicate something to our interaction partner. This communication can have an "objective" and a "subjective" character. If we display a face distorted by fear, it implicitly communicates a warning to our partner. She or he then automatically looks around to locate the source of this fear and, if need be, protects herself or himself as well. If we meet a happily smiling girlfriend in the local bar, we tend to conclude that the smile reflects her subjective mood rather than her evaluation of the bar as such a great place. In the first case the communication provides information on the objective situation in our environment and in the second on the subjective well-being of our girlfriend.

Within an evolutionary or natural history framework, the informative or communicative character of emotional expression seems to have a central function. Even when an organism communicates only subjective well-being, we still know that its display of contentment and relaxation does not threaten danger. Things are different when we have to deal with a young person who is grimacing aggressively. The signs of the subjective mood are also elements of a situation that involves us and to which we can and must adapt our behavior.

The externally observable bodily reactions that not only help to form but also accompany emotional behavior include action readiness as well as actions or movements. Escape behavior is a typical example: We, or our bodies, react to a

situation that arouses fear by tensing our muscles and "readying" the movements that will enable us to run away. In some circumstances, however, we hear only one suspicious noise, and our muscles tense; but when this noise is not followed by any further unsettling events, our body relaxes again. In this case, the readiness to flee is not followed by flight; we do not jump up and run out of the house. Our heart rate subsides, and we do not break out in a sweat.

Moreover, there are bodily changes that we can attribute precisely to certain bodily zones, although we can generally describe them only metaphorically. These could be labeled gestalt bodily changes. Many of them are well-known sayings, typically found in utterances such as: "Those pictures of starving children in Africa brought a lump to my throat." "I was so in love. Even just seeing him or thinking about him sent tingles up and down my spine." "When he stressed that the only reason Mr. Jones had commended me was because he was in a good mood today, I felt my hackles rise." These bodily sensations are subjective representations of expressive and bodily reactions. Along with the appraisal, the actual expression, and bodily reactions, they are a further component of an emotion.

Whereas the gestalt bodily changes represent conscious perceptions of our own bodily changes, other bodily changes remain completely nonconscious.[8]

Relation Between Basic Emotions and Appraisal Processes

We assume the existence of basic emotions in the sense of basic emotional abilities that have evolved adaptively to promote survival. These specific basic emotional dimensions (e.g., sorrow, disgust, joy, fear) are, to a certain degree, innate and emerge very early in phylogenesis in all known cultures as well as in some of the higher mammals, particularly the nonhuman primates. They are triggered by appraisal processes whose course must also be innate in a rudimentary form; that is, there are certain basic appraisal processes as well. These appraisal processes are less accessible to modification than those for other emotions; that is, they are less susceptible not only to cultural influence and shaping but also to being shaped by personal experiences. Nonetheless, they can still be modified over the course of the personal biography (e.g., the lion trainer who displays no fear or flight when approaching lions) and through growing up in a particular society and culture. However, there are stereotype trigger mechanisms for certain emotions. An example is the aggressive behavior of mothers when their offspring are threatened. These emotions do not have only *one* specific trigger mechanism; aggressive behavior can also be triggered by other situations.

It is not just stereotype trigger mechanisms that can be shaped by culturally molded experience; this is even truer for nonstereotype trigger mechanisms. Moreover, appraisal processes may be acquired that are culturally shaped

(i.e., not innate) and are therefore assigned to the so-called complex emotions—the next topic in this chapter.

Complex Emotions/Nonbasic Emotional Events

We start by listing a series of nonbasic, "complex" emotions and then name criteria to show how far the content of this list is justified and what elements these examples have in common.

- Anxiety
- Trust
- Shame
- Pride
- Agape
- Eros
- Hate
- Compassion
- Malicious joy (gloating)
- Test anxiety
- Enjoyment
- Envy
- Jealousy

Despite its arbitrariness, this list presents a highly characteristic selection of nonbasic or complex emotions. By and large, what all these emotional states have in common is the need for higher cognitive abilities than basic emotions and the fact that they are generally accompanied by a simultaneous decline in the elements of bodily arousal.

This finding can be specified further and in no way indicates that it is impossible to apply the scheme introduced above (sensation, sensational phenomenal experience, perception, appraisal/evaluation, emotional sensation, emotional perception). Just as we listed criteria for the attribution of basic states above, we can now give additional criteria for nonbasic states:

For more complex emotions to emerge, it is necessary for an organism to have an image of the self. In our work group, this is one of the most important preconditions for the presence of a complex emotion. In contrast, this is not necessary for a basic emotion such as fear to emerge. However, for an organism to feel shame, it must become aware that it has done something wrong and has not met a social expectation; it has to relate the violation to itself—sanctions from a group that prescribes rules are not sufficient.

It is also frequently possible to identify basic emotions as components of complex emotions. Shame, for example, can be the fear of having done something wrong and being sanctioned for this in whatever form, even if this means that one has "only" failed to live up to one's self-image. Gloating contains joy at somebody else's misfortune; even pride contains joy as a basic emotion.[9]

We can also see that more complex emotions are shaped to a far greater extent by culture than basic ones. An extreme is malicious joy (gloating) because it does not seem to exist in the form we know it in some cultures—or at least, a number of cultures reveal no word and no mental concept of gloating. Moreover, different forms of jealousy or envy are an almost paradigmatic example for the study of cultural differences. The cultural differences within human emotionality also seem to be based partly on the fact that basic emotions fuse to form more complex emotional schemes in completely different ways. For example, among the Ilongot, an ethnic group of (former) headhunters living in the Philippines, sorrow and anger are conceived as one emotional unit. Sorrow over the death of a relative is always accompanied by anger at the painful loss, and this generates a readiness to injure others, making it a frequent trigger for headhunting excursions in earlier times (Rosaldo, 1993).

A further central aspect is that complex emotions emerge later in ontogenesis than basic emotions and disappear earlier in forms of dementia. The opposite is a defining characteristic for basic emotions (they emerge early in ontogenesis and disappear late).

Moreover, we assume that the bodily changes at the beginning of an emotional episode are less significant and less immediate in complex emotions (e.g., love, anxiety, and trust). For some complex emotions, it is even conceivable that they are marginal. Hence, one of our group's hypotheses is that highly cognitive emotions (e.g., *Weltschmerz*) are rarely associated with strong bodily changes; they are mostly weak changes. However, because *Weltschmerz* is still a phenomenal experience (i.e., it is still "felt"), one has to ask what is felt when no clear bodily changes can be ascertained.

In contrast, there is no question that these emotional episodes call for and involve higher, more complex cognitive processes such as associative processes or propositional abilities. It has already been pointed out that having an image of the self is also a major precondition for the emergence of complex emotions.

We qualified the definition of complex emotions above by stating that the bodily changes at the beginning of an emotional episode are less significant and less immediate. This qualification comes from the "observation" that, at least in the highly cognitive emotions, a disturbance of the emotional balance (as one could call it in everyday language) can lead to significant bodily changes. This can even be introduced as a defining criterion for this form of emotion. (The observation that the intensity of an emotion declines as a function of the cognitive ability to anticipate it is, in contrast, a different aspect.)

A good example of this is enduring love compared with falling in love (even at first sight). The love between long-term partners cannot be confirmed bodily in the same way as that between partners who have just fallen in love. In the latter, "hearts beat faster" when they see each other or think about each other, and their hormone levels fluctuate rapidly. These intensive psychophysiological "arousal states" generally smooth out over the course of a relationship, giving way to a "calmer" emotional attachment. It could be that enduring love is

experienced as being less emotional because a level of homeostasis (including, for example, strengthening of the immune system) has become established. In contrast, a disturbance to this level of homeostasis through, for example, the death of one partner, triggers major emotional reactions such as shock, deep sorrow, and depression. The love, the intensity of the attachment between long-term partners, can then frequently be traced in physiologically intensive ways through feelings of sorrow and the pain of loss. In this context, it seems worth mentioning the ethnographic finding that there are cultures, such as the Ifaluk in Micronesia, that make no conceptual distinction between sorrow and love. They are both described with the same term, *fago*. These connotations may be explained by the frequent experiences of loss facing these inhabitants of atolls so frequently devastated by typhoons. Each loving attachment is accompanied by the—in this context, very real—possibility of loss, making sadness and sorrow a basic element of love (Lutz, 1988, pp. 119–149).

Beyond the emergence of emotions when the level of homeostasis is disrupted in enduring affective states, the relation between these states and the accompanying emotions that emerge parallel to them can be conceptualized in a further important way: Enduring love is not an emotion like falling in love. It is a far more permanent (i.e., dispositional) affective state. Persons have to accept this state for themselves; that is, they have to find themselves in this state and feel it as such. It is not enough for them to have knowledge of such states in the form of social or symbolic categories.

However, both an affective disposition and knowledge about socially relevant states involve forms of self-appraisal that may be accompanied by the corresponding emotions or form the backdrop against which these emotions are staged.

The relation between emotions (e.g., falling in love, shame, pride) and the enduring (dispositional) states (i.e., love, disgrace, honor) related to them can be analyzed and conceptualized as follows: The enduring states are a kind of background feeling, background disposition (love), or in some cases background knowledge (honor, disgrace) that provide a framework within which emotions such as an acute feeling of love, pride, or shame are staged. Although these background states are shaped strongly by social and symbolic categories, they also have natural biological foundations such as the phylogenetically given attachment behavior to be observed in many species in the animal domain in the case of love, the display pattern or posturing in the case of victorious superiority (pride), or signs of shame, that is, bodily hunching and ducking in the case of defeat or rule-breaching behavior.

Hence, from the perspective of a theory of emotion, pride and shame (just like love) can be labeled as internalized social and symbolic categories that (may) include an affective disposition facilitating the context-dependent occurrence of specific emotions. Therefore, a person who loves a partner is predisposed in a special way to feel fear and anxiety when this partner is in trouble without even considering that a long-term "calm" love can "flare up" intensively again and again in certain contexts. Individuals who have an

inferior status in their social environment-perhaps the "black sheep" of the family or a school dropout with a failed career in a community of educated and respected "high achievers"—are particularly predisposed to frequent experiences of shame (e.g., when their successful brothers and sisters receive praise and recognition).

Differential Criteria for Specific Emotions

When considering how to distinguish between specific emotions, it is useful to draw on the concept of the "formal object" in philosophy. This concept makes it possible to characterize an emotional process as a specific process. Because sweat is perspired, the heart beats faster, fists are clenched, tears are shed, and so forth during more than one emotion, bodily processes (outside the brain) do not suffice to explain the finely graded distinctions in our emotional sensations.

Ronald de Sousa's (2003) explanation for the concept of the "formal object" is particularly helpful because it refers directly to emotions.

> . . . every emotion has a *formal object* if it has any object. A formal object is a property implicitly ascribed by the emotion to its target, focus, or propositional object, in virtue of which the emotion can be seen as intelligible. My fear of a dog, for example, construes a number of the dog's features (its salivating maw, its ferocious bark) as being frightening, and it is my perception of the dog as frightening that makes my emotion fear, rather than some other emotion. The formal object associated with a given emotion is essential to the definition of that particular emotion. It is also, in part, what allows us to speak of emotions being appropriate or inappropriate. If the dog obstructing my path is a shitzu, my fear is mistaken: the target of my fear fails to fit fear's formal object. (3)

The core of this definition is the statement that a formal object is a property (being frightening) that implicitly attributes an emotion (fear) to its target (the dog) and through which the emotion may also be appropriate or inappropriate.

To clarify once again what de Sousa meant: Imagine that you are walking past a farmyard when a dog rushes toward you barking angrily. You enter a state of fear and try to flee. This emotion can be called appropriate because it can be assumed that the dog could cause major injury. However, if somebody calls out that the dog no longer has any teeth, the fear, were it to continue, could be called inappropriate because you now know that under these circumstances the dog can no longer do you any harm.

In this case, the action tendency that accompanies fear (i.e., to flee) could also specify the emotion "fear." Nonetheless, in many cases, emotions or feelings are not specified unequivocally by such action tendencies. For example, a major property of yearning is that the person, object, or location we yearn for is not to be found in our proximity because otherwise we would be unable to attribute the emotional state of yearning.

Universal and Culture-Specific Emotions

A large part of early and more recent debates on a theory of emotion have focused on how far emotions are shaped by culture. We have turned this question around: Can we find any emotions at all in humans that can be confirmed as not being subject to the shaping of culture? We believe that every emotion can be shaped by culture in social situations. Admittedly, we assume that some emotions are far more indifferent to culture than others and, in this sense, also less socially and culturally modeled. However, these basic emotions are difficult to study empirically because we encounter emotions only in their socially and culturally conveyed forms. It is only very early and very late in life—when cultural and social influences have either not yet (in infants) or are no longer (in persons with senile dementia) formed completely—that we can come close to the postulated basic emotions. Nonetheless, even here they always occur within a cultural context.

Universal Emotions

Emotions are termed universal in terms of their expression, the ability to recognize them, the stereotyped bodily reaction(s) they produce, and their underlying affect programs. Nonetheless, we can identify cultural variations even with this type of emotion (e.g., the intensity of their occurrence, the motor reactions incurred, their potential for being copied, and the trigger situations and regulation styles that are always highly socially defined).

Culture-Specific Emotions

Some examples of culture-specific emotions are *Weltschmerz*, nostalgia, *amae* (form of love), or *amok* (form of frenzy).

In the literature, the Japanese love concept of *amae* is frequently discussed as an example of a culture-specific emotion. Japanese psychoanalyst Takeo Doi (1973, 1986) has defined it as a form of passive love that he understands as the cultural elaboration of childhood attachments and their mental correlates. *Amae* is a need for dependence—a strong desire to be surrounded by, cared for, spoilt by, and protected by others in a manner similar to the childhood experience of loving parents. Passive love in the sense of being "cared for and looked after lovingly" by others is, according to Doi, a universal pattern of experience during infancy that Japanese culture raises to the emotional prototype for love attachments between adults as well (couples as well as close relatives). Doi stated that even in adult love relationships the Japanese seek

and cultivate forms of infantile attachment behavior that are inconceivable in love relationships in the European-American context. The *amae* concept, with its emphasis on the aspect of dependence, relates closely to the social and familial structures of Japanese society that do not anticipate reciprocity within the internal family context.[10] Hence, *amae* is the culture-specific manifestation, emphasis, and conceptual elevation of a universal (basic) affective attachment experience but does not represent a completely cultural construct.

The Malaysian phenomenon of *amok*, a term that has also entered many European languages, can be conceived as being somewhat more culture-specific. In the context of traditional Malaysian cultures, two forms of *amok* can be distinguished (from a Western perspective): the collective "martial *amok*" and the individual "solitary *amok*" (Spores, 1988; Winzeler, 1990). The former used to be (and still is) practiced in martial conflicts. A group of males would use ritualized spiritual and physical techniques to bring themselves into a state of fearless, highly aggressive frenzy that would enable them to attack their enemies without fear of death. This is the *amok*—of a sacred spiritual and heroic nature from the Malaysian perspective—with which Europeans came into contact particularly in the context of anticolonial uprisings and struggles. This form of spiritually based collective heroic *amok*, found in numerous Southeast Asian societies, continues to play a significant role in resistance movements as well as in the context of the Islamic *perang sabil* (Holy War) movements.

Amok is part of a complex set of culturally shaped physical techniques, particularly including diverse martial arts (*silat*) with a general emphasis on extreme physical self-control. The ability to build up and focus one's own aggressive potential purposefully so it can be unleashed in battle in a concentrated form is a major element of these physical techniques. In this sense, the Malaysian *amok* is exactly the opposite of its Western interpretation as a "blind frenzy" arising from a confused mental state. To some extent, the same applies to the forms of solitary or also "secular *amok*" (Winzeler, 1990, p. 120) in which individuals deliberately induce an *amok* state in themselves for personal reasons before attacking their surroundings with mortal intent, taking into account that these attacks will probably bring about their own death. Winzeler (1990) pointed out that Malays themselves make no conceptual distinction between collective and solitary forms of *amok*:

> The evident fact that the two forms were either the same or closely related in Malay culture helps to explain what often appalled or puzzled later European observers about individual amok—which was that death sought or achieved through an attack upon innocents could have a positive, even heroic, meaning. (p. 100)

Because *amok* also refers to the conscious elicitation of an emotional state, it is questionable whether it is a culture-specific emotion or more of a culture-specific form of emotion regulation.

Interdisciplinary Outlook

During the course of this chapter, we have mapped out and considered central problem areas and discussion fields for the emotions. We here summarize the outcome of these ideas, and, once again, outline the interdisciplinary nature of our cooperation in detail.

We start with a brief summary of the central problem areas in this chapter: differential criteria and the justification for distinguishing between basic and nonbasic, or complex, emotions; the cultural shaping of the processes of emotion; the relation between physiological processes (basic emotions, affect programs) and appraisal processes; the relation between emotions and enduring dispositional emotional states; and finally the specificity of emotions.

Although we have repeatedly questioned the theoretical validity of distinguishing between basic and nonbasic emotions in this chapter, we have decided to retain it. At the end of the day, it does make it possible to work out and classify the effects and functions of physiology, semantics, and culture. We can summarize this again in few sentences.

On the whole, there are two main reservations about assuming the existence of basic processes of emotion. First, an emotion hardly ever occurs in a basic form in a healthy adult embedded in the complexity of daily life. For example, which proportions of other emotional dimensions may "fear" still contain to be identified as such? This varies greatly as a function of culture-specific habitualization and terminology. Even emotions that are held to be universal, such as joy or fear, are shaped by culture; that is, they are habitualized and semanticized (i.e., conceptualized) in different ways in each culture. As soon as they become shaped by language, higher cognitive processes accompany them.

Nonetheless, it is still possible to ascertain basic emotional abilities, which are defined as emotional processes that are, to a certain degree, innate and appear very early in phylogenesis in all known cultures as well as in higher mammals and primates. These emotions are triggered by innate appraisal processes.

We then define nonbasic emotions as those in which the accompanying appraisal process is either not innate but acquired or in which basic emotions are fused in culturally different ways to form more complex emotional schemes. However, this appraisal also involves the acquisition of processes that are likewise shaped by culture (i.e., are not innate). Therefore, we assign these to the group of so-called complex, or nonbasic, emotions.

We made further statements on the cultural shaping of emotion processes. We recalled, for example, that even the circumstance that certain perceptions are interpreted as antecedents of risk is something that has been learned culturally. Furthermore, we pointed out once more that unconscious appraisals may also be shaped culturally insofar as they can become to a large extent habitualized and are no longer elicited solely in response to a stimulus. Because cultural shaping can extend to acquired patterns of behavior, these can also remain nonconscious as a result of habitualization.

We then turned to the relation between physiological processes (basic emotions, affect programs) and appraisal processes: Although most appraisal theories also include automatic and nonconscious appraisal processes, their main focus has been on formulating a concept for the involvement of (higher, conscious) cognitions in the genesis of emotions. Hence, we have to ask how automatic physiological emotion processes relate to the appraisal processes that trigger an emotion process and belong to it. We have confirmed that even automatized physiological processes and their attendant automatized appraisal processes are not only influenced and shaped by culture but are also shaped by personal experience. However, this applies to a much smaller extent than it does in those emotional processes linked to higher cognition and accompanied by a higher degree of consciousness. Whereas conscious appraisals or evaluations require the ability to engage in cognitive reflection, it is not necessary for nonconscious appraisals, which occur almost automatically. In fact, we noted that formerly conscious processes can become so automatic that they can be performed at great speed.

This finding fits in with the ideas of appraisal theorists who depict the process by which emotions emerge as a hierarchical and modular system. They assume different levels of information processing that can generally be distinguished in terms of the degree of (conscious) cognitive involvement (this final point should also have become clear in our scheme for the internal emotional process). Sensorimotor processing, which is comparable with the innate subcortical affect programs postulated in neuroscientific models, represents the lowest level of possible emotion-initiating processes. The hierarchically higher level is that of schematic processing on which learned emotional reactions are initiated that have been acquired during the course of socialization and are strongly shaped by culture.

Our scheme, which has subjected the functions and degrees of consciousness in emotional events to a more precise analysis, reveals that if conscious appraisal is not conceptualized or semanticized it is accompanied by a sensational experience of an emotional state. However, when (as is mostly the case in humans) we are dealing with a conceptualized sensation, we call it a conceptualized emotional experience because the sensation is perceived as a specific emotion. Appraisal and feeling are then congruent, so this is not a conscious cognitive appraisal but a sensational experience of an emotional state. It is not only the outcome of the appraisal process that differs in the degree to which it is conscious; the entire process leading up to the outcome can run automatically and nonconsciously.

Therefore, we assume a slow, gradual separation of cognition, feeling, and consciousness over the course of evolution. We also assume that these domains can be closely linked or interdependent.

The relation between cognition and physiological processes is a special case. What all nonbasic emotional processes have in common is the need for greater cognitive ability than is required for basic emotional processes. The more an emotion process is shaped cognitively (as in *Weltschmerz*), the

greater the decline in the physiological processes involved. Nonetheless, because *Weltschmerz* is also a phenomenal experience (i.e., it is "felt"), our research group performed a theoretical analysis of what happens when the bodily arousal components decline. Even in what are called highly cognitive emotions, we find significant bodily changes when the emotional balance is disturbed (disturbance of the homeostatic level). Emotional processes can therefore be distinguished not only from other mental or cognitive processes or states (e.g., thoughts, conclusions, judgments, perceptions) but from actions as well through the presence of an element of appraising or evaluative phenomenal experience.

We have ascertained that emotions (e.g., falling in love, shame, pride) and enduring (dispositional) states (e.g., love, shame, honor) are frequently interrelated. When this is the case, their relation can be analyzed and conceptualized as follows: The enduring states provide a kind of background feeling, background disposition, or in some cases even a background knowledge that serves as a framework in which acute emotions are actualized. Although these background states are shaped by social and symbolic categories, they nonetheless have natural, biological foundations.

To explain the specificity of an emotion, we have fallen back on the concept of the "formal object" in philosophy. This views a formal object as a property that an emotion implicitly attributes to its goal object. We explained this with an example.

We hope that these interdisciplinary considerations and analyses will provide a suitable framework for defining the phenomenal domain of emotions in more precise scientific terms. Taking various interdisciplinary perspectives should simultaneously make this framework more comprehensive.

Notes

[1] These typical forms of emotion, which frequently correspond to classifications into basic emotions, are almost exactly the same as the common—modern Western—understanding of emotion. When US-American college students were asked to give typical examples of the category "emotions," they most frequently named happiness (152) followed by anger (149), sadness (136), love (124), fear (96), hate (89), and joy (82) (Fehr & Russell, 1984; see, also, Johnson-Laird & Oatley, 1989).

[2] The automatic way in which this emotion arises is supported and made understandable by LeDoux's (1996) hypothesis. This assumes the existence of two neural circuits for the activation of emotions, one subcortical (thalamoamygdala) and one involving the neocortex. The subcortical circuit evaluates the emotional significance of events via rapid and automatic processing of sensory data. For instance, according to LeDoux (1996), neurons in the thalamus projecting to the amygdala are distinct from those that provide the major inputs to the auditory cortex (after having reached the thalamus). The direct connections from the thalamus to the amygdala respond to a much wider range of stimuli and are broadly tuned. An acoustic stimulus that reaches the amygdala via the thalamus needs much less time than a stimulus reaching the amygdala via the cortical pathway. According to LeDoux (1996), the amygdala can be activated without cortical interference within a period of about 12 ms (for a review of research on the amygdala, see Markowitsch 1998/1999). In other words, the direct thalamic shortcut to the amygdala bypasses the cortex. It cannot inform the amygdala on what is being perceived but can induce a fast signal that, for instance, warns that something dangerous may be there. The cortical pathway, on the other hand, allows detailed recognition. By the time the cortex has evaluated the meaning of the sound, the amygdala has already started to react.

[3] This does not, and cannot, answer the question whether complex emotions can also be traced back to basic emotional abilities and, if so, how. It also does not state to what basic emotions they, in turn, can be reduced. A strong hypothesis is that the basic emotions reveal a monadic character and thereby an "intrinsic affectivity" (Reisenzein, 2000, p. 211). The weak hypothesis is that basic emotions also possess nonaffective components such as cognitions. Diametrically opposed perspectives would be, for example, the early positions of Robert Solomon (1976) and Dietrich Dörner (1993), which reduce the emotions completely to nonemotional cognitions.

[4] In contrast to universality, certain complex emotions are unknown in some cultures, not only in terms of their phenomenology, the subjective sensation (the feeling), but also in terms of whether there is a word to describe them. Robert Solomon (2002, p. 138) commented on the ambiguity arising from this criterion by asking: "Is an emotion basic because it is found to be universal, or is an emotion necessarily universal because it is basic?"

[5] Meta-analyses of the available findings provide far more support for the idea that specific activity in the autonomic nervous system (ANS) does not correspond to discrete emotions but could be more in line with a dimensional concept along a positive–negative or "approach–avoidance" continuum (Cacioppo, Berntson, Klein, & Poehlmann, 1997; Cacioppo, Berntson, Larsen, Poehlmann, & Ito, 2000; Davidson, 1994). Cacioppo and colleagues go further and point out that bodily changes are not a necessary condition for the appearance of discrete emotions because there are significant indications for emotional states without differentiated ANS changes (Cacioppo et al., 2000; see Davidson, 1994, p. 240).

[6] As explained above, LeDoux's (1996) hypothesis that subcortical processing or thalamus–amygdala interaction bypasses the neocortex at a first level of processing helps us to understand why human infants smile at a face as soon as they are capable of detecting its contours and why children, according to Trevarthen (2004) and Trevarthen, Aitken, Vandekerckhove, Delafield-Butt, and Nagy (2006), first interact with their environment on an affective–procedural level.

On a global level, the subcortical interaction may be sufficient for generating emotional feelings. Subcortical regions mature relatively early, whereas higher cortical areas, including the memory-processing hippocampus, mature later. The cortical circuit participates in the deeper processing of faces and in all higher-order cognitive antecedents of emotion, such as appraisal or attribution. These underlying pathways are genetically predetermined and designed to respond unconditionally to stimuli arising from life-challenging circumstances (Panksepp, 1998). In line with Panksepp, after birth a great deal of neural unfolding remains to be completed in every species. The maturation of specific neural systems establishes essential conditions for certain forms of emotionality to unfold. The interaction between environmental events and genetic events in the brain is dynamic. Only the basic blueprints for brain connectivities are encoded in genes. Primary emotional tendencies related to attachment, fear, anger, and separation distress emerge very early in development to help organisms cope in situations that compromise their survival. Other emotional tendencies, such as sexual lust and maternal devotion, may emerge later to promote reproductive processes. Social emotions, such as play and dominance-seeking, appear later in development to help promote the establishment of social structures (Panksepp, 1998).

[7] The term "interpretation" is not being used here in the cultural or humanistic tradition but in the sense of categorical interpretation. An example is the perception of another person and his or her classification as female or male. Hence, this does not concern the meaning of the perception for the perceiver.

[8] Whether gestalt bodily changes are perceived consciously also depends on social and cultural factors. To a great extent, bodily perceptions are learned socially and culturally. The history of medicine provides a multitude of examples. As soon as syndromes become named and classified as specific diseases, there are always people who start to perceive them in themselves and suffer from them consciously. The "burnout syndrome" is a good example.

[9] This raises the question of the relation between basic and complex emotions. Is it similar to that between primary and mixed colors? That is, are basic emotions like primary colors that can be mixed together to produce a multitude of shades (Plutchik, 1984, p. 217)? Or is a more appropriate model one based on analogies with chemical compounds, so basic emotions can be combined similarly to chemical elements to form new "matter" in which the constituent elements can no longer be recognized (e.g., water, in which the elements of hydrogen and oxygen become unrecognizable (Röttger-Rössler, 2004, p. 11).

[10] A full account of *amae* cannot be given here. For more details, see Doi (1973, 1974, 1986) and Hinton (1999).

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