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Classifying emotion: a developmental account

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Abstract The aim of this paper is to propose a systematic classification of emotions which can also characterize their nature. The first challenge we address is the submission of clear criteria for a theory of emotions that determine which mental phenomena are emotions and which are not. We suggest that emotions as a subclass of mental states are determined by their functional roles.

The second and main challenge is the presentation of a classification and theory of emotions that can account for all existing varieties. We argue that we must classify emotions according to four developmental stages: 1. pre-emotions as unfocussed expressive emotion states, 2. basic emotions, 3. primary cognitive emotions, and 4. secondary cognitive emotions. We suggest four types of basic emotions (fear, anger, joy and sadness) which are systematically differentiated into a diversity of more complex emotions during emotional development. The classification distinguishes between basic and non-basic emotions and our multi-factorial account considers cognitive, experiential, physiological and behavioral parameters as relevant for constituting an emotion. However, each emotion type is constituted by a typical pattern according to which some features may be more significant than others. Emotions differ strongly where these patterns of features are concerned, while their essential functional roles are the same. We argue that emotions form a unified ontological category that is coherent and can be well defined by their characteristic functional roles. Our account of emotions is supported by data from developmental psychology, neurobiology, evolutionary biology and sociology.

Keywords Emotion · Mental phenomena · Development · Cognition

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1 Introduction: challenges and conditions for a theory of emotion

Emotions are fundamental for human life. Nevertheless, in the current debate there are fundamental differences in the *definition, conceptualization* and *ontology* of emotions. There is little agreement not only on (1) which mental phenomena are emotions and (2) how to classify different types of emotions, but also (3) what the nature of emotions is. The aim of this paper is to propose a systematic classification which allows us also to characterize the nature of emotions.

Emotions in the range of other mental phenomena: The first challenge for a theory of emotions must be to submit clear criteria that determine which mental phenomena are emotions and which are not.

We will argue for a classification of mental phenomena that distinguishes emotions from not only the more basic mental phenomena such as perceptions, felt body-states and basic mental dispositions, but also more elaborated mental phenomena such as cognitive attitudes.

Classifying varieties of emotion: The main challenge for a theory of emotions is to give a classification and theory of emotions that can account for central criteria of adequacy for any such theory. In our own account, we will introduce a classification of emotions according to developmental stages that distinguishes between basic and non-basic emotions, and that considers cognitive as well as feeling parameters as relevant for defining the emotion patterns which individuate emotion types. Non-basic emotions can be characterized as essentially involving not only physiological and phenomenal but also behavioral and cognitive features while the latter are especially significant for the emotion pattern.

The nature of emotion: Griffiths (1997) denies that there is a homologous category of emotion. We will argue that emotions form a unified ontological category that can be well defined by characteristic functional roles. The argument for a homologous category of emotion will be supported by research from neurobiology and developmental psychology. Besides their shared functions, emotions of course differ widely with respect to features like the intensity and quality of the phenomenal experience, the role of cognitive aspects, and specific functions according to the context in which they occur. In order to account for this variety, we will present our classification starting with four basic emotion types. In line with the discrete emotion model approaches (Arnold, 1960; Ekman, 1972; Papez, 1937) and multi-factorial models (Scherer, 1984, 1987) we will illustrate how these basic emotions can be systematically differentiated into complex emotions.

It is our main objective to lay out a general strategy of classifying emotions from a developmental perspective, starting from unfocussed pre-emotions via basic emotions to cognitive emotions. We also present a detailed classification. Our classification will perhaps call for modifications in accordance to new empirical or conceptual insights, however we strongly believe that our general strategy for characterizing emotions is correct and fruitful. To establish this claim we will proceed as follows: In Sect. 2 we will give a short overview of the traditional and contemporary debate between cognitive and perceptual feeling theories of emotion, in order to demonstrate that both cognitive and feeling aspects of emotion should be employed in a framework for emotion. Section 3 is devoted to the classification of mental phenomena, with the aim of differentiating emotions from the other mental phenomena. Section 4 offers a new classification of emotions themselves along developmental lines, leading to a theory of emotion types. In Sect. 5 we discuss further affective states that provide a

challenge for our new classification. In Sect. 6, the developmental account previously introduced will be compared to canonical approaches to emotion in the cognitive sciences. Finally, we will close by arguing for a unified ontology of emotion in Sect. 7, supported by the developmental approach.

2 Outset: the traditional and the contemporary debate

Searching for suitable models, philosophers and psychologists have long focussed on one aspect of emotional experience in order to account for the emotions. The two most prominent advances are feeling theories of emotion, which individuate emotions by their subjective phenomenal content, and cognitive theories of emotion, which individuate emotions solely by propositional attitudes. We will briefly introduce and discuss selected traditional philosophical and psychological approaches. This will be followed by a more thorough discussion of two contemporary suggestions (Goldie, 2000; Prinz, 2004a, b). Thereby we present arguments against the strategy of reducing the explanation of emotions to one of their aspects and set the stage for choosing a multi-factorial framework that considers a range of properties of emotions as contributing to their individuation.

According to the classic feeling theory by James (1884) and Lange (1885), *"bodily changes follow directly the PERCEPTION of the exciting fact, and [...] our feeling of the [p.190] same changes as they occur IS the emotion."* The emotion is thus constituted by the feeling belonging to the perception of the bodily changes. This conception has been embraced for models in psychology (in early introspective psychology: Wundt (1896) and defended e.g. by Zajonc (1980)) as much as it has been in slightly differing models in philosophy (Clarke, 1986; DeSousa, 1987; Greenspan, 1989). Yet, emotions cannot be individuated as feelings alone because they are more fine-grainedly distinguished than physiological changes. Consequently, feelings are insufficient for individuating emotions: beliefs are essential for complex emotions as well. In this regard, Solomon (1977, 1993) particularly emphasizes the significance of cognitive content that is responsible for the "logic of the situation" only by which emotions with very similar feeling parts can be differentiated. Furthermore, complex emotions like shame and embarrassment have an intentional object (the object of the emotion) which is dependent on the cognitive evaluation of the situation and thus involved in the relevant beliefs, whereas feelings can also be individuated without an intentional object (e.g. tiredness). Feeling theories are also unable to account for unconscious emotions, as an emotion can be realized by a significant physiological upheaval without a conscious registration of it (Jäger & Bartsch, 2002).

Contrary to this, cognitive theories emphasize the significance of cognitive content for emotions. The common thesis of all cognitive theories is that propositional attitudes individuate an emotion (Gordon, 1987; Lyons, 1980; Marks, 1982). This claim is supported by scientific experiments on the necessity of background beliefs for the initiation of an emotion in a situation of physiological arousal (Schacter & Singer, 1962).[1] Yet, cognitive theories are contradicted by the observation that several

[1] There is a debate as to whether the experiments from Schachter and Singer allow a significant interpretation. The core observation of the experiment is that those subjects who were ignorant or misinformed about the effects of an epinephrine injection were significantly more susceptible to an actor's mood than informed subjects: uninformed subjects who did not have any explanation of their own bodily states generally got euphoric or angry in response to the respective situations, whereas

species are able to have basic emotions, e.g. fear, although they do not have beliefs and desires (which also applies to young children who can have emotions before they acquire the capability of complex conceptual representations as beliefs and desires (Morreall, 1993)). Thus, these seem to be phylogenetically older than the cognitive apparatus which is required for propositional attitudes. Cognitive theories do also not succeed in accounting for the affective character of emotional states; by reducing them to propositional attitudes they are not distinguishable from them.

This caveat toward "over-intellectualization" of emotion and action out of emotion has recently also been entered by Goldie (2000). He argues that the explanations for emotions or actions out of emotion that are offered by cognitive theories are consistent with a person not experiencing any emotion at all (p. 39). A standard explanation for action out of emotion and emotion which exclusively refers to beliefs and desires as motivating reasons cannot account for the difference between an emotion and a propositional attitude, or between an action performed out of an emotion and one based on practical reasoning or deliberation without the involvement of any emotion.[2] According to Goldie (p. 40), the fundamental difference between cognitive attitudes and emotions is not grasped by this explanation. He instead suggests a new kind of intentional relation for emotions which is described as "feeling-towards" and which essentially emphasizes the special character of emotional states and accounts for this difference. Although we share the intuition of the difference Goldie is trying to capture, a detailed discussion would show that it is very difficult to develop a clear distinction between add-on theories and other mixture theories that combine attitudes with feeling components. Instead, we wish to raise a further point of criticism: despite Goldie's contribution concerning the over-intellectualization of emotions, he seems to presuppose it in his theory himself when he claims that emotions are essentially individuated by narratives. These narratives are sequences of physiological, behavioral and cognitive events (including action or attitudes) that are informative for an emotion. One disadvantage of this conception is that the narratives remain characterized in a very unspecific way. More important with respect to over-intellectualization is that the mentioned basic emotions which seem to be hard-wired by evolution are independent of narratives that are plausible aspects of only complex emotional instances.

A recent defence of the James-Lange approach is forwarded by Prinz (2004a, b) in his "Embodied Appraisal Theory" of emotions. Embodied appraisals are identified with perceptions of bodily changes that are reliably caused by the instantiation of

Footnote 1 continued
those who knew about the effects of the injection remained calm and largely unaffected. We think that the result of this experiment is that a significant physiological arousal together with the stimuli given by observing an actor alone does not determine an emotion. This remains true even if we account for the fact that the circumstances in which the persons are (e.g. seeing an angry person) induce a change of their feelings. The point is that the knowledge of the injection makes an essential difference in the evaluation of bodily feelings. In this case, the belief of being informed about one's physiological treatment is primarily relevant, and secondarily relevant are the cognitions that are available in the arranged situation.

[2] Cognitive theories of emotion that individuate emotions by the propositional attitude and admit that a further physiological reaction has to take place (e.g. causal-evaluative theories)—are scolded as "add-on theories" by Goldie, because the physiological or feeling-component is merely added on to the feelingless beliefs and desires, but insofar as the action is concerned, it remains totally irrelevant.

core relational themes (e.g. danger). In order to avoid the negative conclusion fixed to perceptual theories, Prinz suggests that emotions are individuated by the difference in their causes.[3] This strategy is not sufficient because an emotion is not only dependent on the actual situation but essentially on the *cognitive evaluation* of the situation. He thus complements his conception by the systematic consideration of the status of emotions that are cognitively elaborated. These are defined as embodied appraisals which are recalibrated by judgments to represent relations to the environment that are different from the primary sensory ones. A recalibration file contains representations of all external causes associated with the emotion. This means that judgements may also be part of it. But why is this still a feeling theory? Prinz claims that "the cognitive concomitant of a cognitively elaborated emotion is not part of the emotion, but it plays a role in determining the identity of that emotion" (Prinz, 2004a, p. 99). To Prinz, "cognitively elaborated embodied appraisals are not composite states [...]. They are comprised of nothing but embodied appraisals. The cognitions that elaborate them are *prior conditions*, not *constituent parts*" (p. 98). Our main criticism is that this is a distinction without difference: if a feature individuates an entity then it is also constitutive of it. Otherwise the individuation is just an arbitrary classification made up for an arbitrary reason. But it is implausible to claim that in the case of, e.g., jealousy, the judgment such that there is another person threatening my relationship simply gives us an arbitrary classification of the emotion. To the contrary, the judgement is so intimately interwoven with the emotion that we have to take it as constitutive. There can be no jealousy without an adequate judgement. But Prinz attempts to defend his view by granting that there is a strong relation between the judgement and the emotion. Nevertheless, he insists that the judgement is not constitutive by adding two reasons. First, he claims, the items in a recalibration file do not activate with the right time course to qualify as components of an emotion. It is a fact that judgements need more time than purely sensory processing but we nevertheless argue that recalibration files activate within the right time course: in the case of complex emotions such as jealousy, there may be a quick onset of an indeterminate feeling but only together with the cognitive evaluation does it turn into the emotion of jealousy. Second, Prinz argues that recalibration files are too heterogeneous to qualify as components of an emotion such that a stable relation between a certain judgement or perception and the emotion cannot be established. Granting that there may be very different particular beliefs that can be relevant for my being jealous, they nevertheless are all part of one type of belief, i.e. beliefs about objects and situations threatening my relationship. Since any token of being jealous includes the identification of a token of that type of belief we may speak of a stable relation between the belief type and the emotion. Therefore it is plausible to prefer the stance that the relevant types of cognitive attitudes are constitutive of complex emotions. They are an important part of the features constituting the emotion pattern. Thus, it makes sense to regard the relevant parts of the recalibration file (being the internal representations of the external trigger) as *part of the emotion pattern and constituent* of the emotion.

With focus on three criteria (subjective experience, explanation of behavior and neurobiological processing) we wish to show that the relevant cognitive features of the recalibration file must be constitutive of cognitive emotions: (i) the difference in subjective phenomenology between a basic emotion and a recalibrated basic

[3] "First, strictly speaking, James and Lange do not need to insist that every emotion has distinctive physiology. They can say that the identity of an emotion depends in part on context [...] in virtue of having different causes." (Prinz, Embodied Emotions, 2004b)

emotion cannot be explained when both are considered as the same embodied appraisal without the difference in cognitive features of the recalibration files being significant. (ii) The same is true for the explanation of behavior. Emotion driven behavior that is explained with reference to an emotion needs to include a cognitive component for the cases of more complex emotions. This must then be constitutive of the emotion, as the behavior is not explainable without it. Take, for instance, shame: typical behavior out of shame, e.g. explaining oneself or apologizing for one's behavior (forgetting your wedding day) presupposes that the involvement of cognitive elements can be attributed to the emoting individual. Thus, the behavior can only be explained by the package of embodied appraisal and the relevant cognitive features in the recalibration file. And if the apologizing behavior is solely explained by the emotion, the cognitive features must be part of it. (iii) Neurobiology: the empirical work of LeDoux shows two paths of informational processing for the emotional cues of fear. Prinz supposes different recalibration files but the same embodied appraisals for both cases. Nevertheless, there are differences between cognitive and non-cognitive emotions and when the features in the recalibration files are added to the embodied appraisals, they are definitely distinct. Besides the different informational processing, there are differences in behavioral possibilities. Only with involvement of the neocortex do we encounter more flexible behavior. As this behavior is explained by the emotion, the cognitive content essentially belongs to it (see also Damasio, 1994). Therefore Prinz cannot defend a purely embodied appraisal theory.

To sum up our introductory discussion of feeling and cognitive theories of emotion: neither is sufficient and necessary for the explanation of all emotional phenomena which involve a wide range of characteristic composite properties.

Furthermore, emotion theories differ in that they focus on different properties: most typologies of emotions distinguish between basic and non-basic emotions—Damasio (1994, 2003), Charland (1997), Ekman (1972, 1984), Plutchnik (1962), Izard (1994)—some classify emotions along uni- or multi-dimensional spaces such as pleasant–unpleasant, relaxation/attention and high–low arousal (Wundt, 1896 for all three dimensions), positive/negative reinforcement (Rolls, 1998), component models (Arnold, 1960; Scherer, 1984) or circuit models (Ekman, 1984; Panksepp, 1998) that explain emotions as evolutionarily developed neural circuits. By emphasizing a certain parameter of the emotional experience and defining emotions according to it, the classifications consequently neglect the other properties.

With regard to the criteria in the empirical literature, we will propose a set of features that will constitute criteria of adequacy for any theory of emotions. Emotions are usually characterized by (a) physiological features: physiological arousal, physiological and physiognomic expression, automatic appraisal, neural processing in limbic circuits of the brain; (b) phenomenal features: a subjective qualitative feel; (c) cognitive features: cognitive antecedents and successors, (d) an intentional object; (e) behavioral features: certain (inter-) action tendencies.

In order to account for these criteria and to avoid the difficulties discussed above, we suggest a multi-factorial developmental account of emotion that accepts that there are several components that contribute to an emotion pattern individuating an emotion type. Basic emotions are mainly characterized by feeling aspects, while an attitudinal component is regarded as a relevant part of the emotion pattern of complex emotions as well. Given that background, a systematic classification of the variety of emotions is a core demand of a modern theory of emotion.

3 Locating emotions in the range of mental phenomena

We will begin the analysis of emotions with a systematic taxonomy of mental phenomena. The general strategy is to position emotions within the kinds of mental representations and to separate them from other mental representations. Mental states are usually divided into perceptions, emotions and propositional attitudes. It is not our aim to argue for a radically different line of classification of mental states, however we intend to develop a more detailed view that will lead us to an adequate characterization of emotions. Three kinds of mental phenomena will be distinguished: 1. basic mental representations, 2. emotions, and 3. cognitive attitudes. For each kind we also distinguish between types and tokens. In all our considerations we presuppose basic information and stimulus processing systems which pass as minimally behavioral systems.

3.1 Basic mental representations

On the level of basic mental phenomena that are usually not distinguished when one talks about "perceptions" we want to distinguish 1. those mental phenomena that are relevant to register concrete situations in the world (perceptions), 2. those mental phenomena that constitute mental background conditions for registering the world (basic mental dispositions), and 3. those which register a bodily state and initiate an immediate, instinctive behavioral reaction which secures survival (felt body-states). The class of basic mental representations is completely independent of propositional attitudes and immediately connected to our sensory systems.[4]

3.1.1 Perceptions

The first class of basic mental representations is constituted by basic perceptual experience. This class can be characterized in the following way: *Perceptions*

1. comprise the general perception- and sensory processing-program,
2. are essentially directed towards external objects, and
3. involve conscious phenomenal qualities.

Examples are simple basic mental phenomena such as hearing, seeing, smelling.

3.1.2 Basic mental dispositions

Basic mental dispositions are mainly characterized by their function of stimulating the individual to explore and learn about its surrounding environment. They are not themselves means of registering the world but they modify our abilitiy to register the world by constituting the processing conditions for any information in the environment. Therefore, the central feature of *basic mental dispositions* is that

> they are mental background capacities which promote the systematic and active exploration of the external environment.

Accordingly, the mental phenomena considered in the class of basic mental dispositions are those of *attention, interest, seeking, curiosity, and expectance*. These faculties enable the individual to be motivated to explore its environment and to learn about it.

[4] The class of basic mental representations includes mental states, events, and processes.

3.1.3 Felt body-states

The next category in the classification scheme are *felt body-states*.[5] They can essentially be defined as registering an internal state of the organism's body and initiating automatic and instinctive response behavior with the function of securing the survival of the individual. Essentially, they are

1. immediate, non-reflected reactions of the organism to positive or negative stimuli with
2. a strong foundation in its basic biological reflex program focussing on immediate survival,
3. directed towards internal homeostatic need states,
4. processed in the lower regions of the brain stem,
5. felt, i.e. they involve phenomenal experience.

In other words, they concern very basic biological reactions to certain situation types: usually automatic and distinct response-reactions to the situation with an essential focus on the body state. Think of, for example, a pain reaction. You step on a pine cone in the forest with your bare foot. You feel a stinging sensation of pain and at the same time automatically—without thinking about it—pull your foot back as a reaction to it. By this, the negative condition impairing the organism comes to an end and the pain ceases. This is an example of a fast reflexive and standard reaction tied to basic survival needs.

A central property of *felt body-states* is that the automatic reflex reaction is a necessary and sufficient response to the situation-type under normal conditions: a felt body-state initiates a complete and adequate response to the state of affairs while mainly concerning a state of the organism's body. These basic biological programs enhance the survival of the organism. Therefore, not only pain reactions, but also exhaustion, tiredness, lust, the startle reflex, nausea, homeostatic distress (hunger) and homeostatic pleasure (a good taste), and gustatory disgust belong to the set of felt body-states. Felt body-states can be separated from non-mental states by the fact that they include those processes of homeostatic regulation that are usually conscious. Furthermore, they can be distinguished from emotions because they initiate automatic and rigid reflex reactions that mainly concern a state of the organism's body and that are already present in the infant organism and do not evolve into more distinguished behavioral programs as the more complex class of emotions does (e.g. basic sadness evolving into grief).

[5] These should not be confused with Damasio's (1994, 2003) so-called unconscious emotions or unconscious feelings that also serve the body-related function of homeostatic regulation and presenting brain maps of body states. We want to distinguish the felt body-states that are more of a biological reflex program for self-preservation from these two classes of emotions according to Damasio. First, the emotions and feelings Damasio designates as regulating body states are entirely unconscious neural and chemical responses without a phenomenological component, whereas the felt body-states have a phenomenology. Second, Damasio's emotional states concern the basic homeostatic regulation of all kinds of bodily states, whereas felt body-states are especially reserved for states important for immediate self-preservation. Third, once the emotions and feelings defined by Damasio reach a conscious level, they comprise a class of simple phenomenal experiences, felt body-states and also emotional states as we will introduce them. This is too unspecific a class. Panksepp (1998) and Rolls (1998), on the other hand, classify some felt body-states as affective states (reflexive affects or emotions). Thus, both do not clearly distinguish felt body-states and emotions, because they both involve phenomenal experience (Panksepp, 1998) or, because they both are related to reinforcing stimuli (Rolls, 1998). We argue that although both have a feeling component, these two categories are distinct because of the different functions felt body-states and emotions have.

3.2 Emotions

Typical examples are *anger, joy, love, grief and fear*. Tokens of emotions can be characterized by a large set of different characteristic properties:

1. automatic appraisal that is tuned to: quick onset, brief duration, and typically unbidden occurrence[6]
2. distinctive physiognomic and physiological reactions
3. distinctive cognitions: thoughts, memories, images
4. distinctive subjective experience
5. interpersonal/interactive orientation
6. characteristic behavioral and motivational features

The list of properties includes the initially discussed aspects of the emotional experience: cognitive content and the distinct subjective feeling experience of emotion. As already discussed, neither of these by itself suffices to adequately characterize emotions. The list reveals further properties of the emotional experience that have to jointly be taken into account to characterize the large variety of emotions. We thus need a multi-factorial account of emotion. Despite the plurality of the emotions, they share the following general functions: They characteristically involve 1. a phenomenally encoded *appraisal* of the environment or the cognitive system itself, 2. a *preparation* (and motivation) for action by the elicitation of physiological changes, 3. a typical expression (facial expression, gestures) which is mainly automatic, sometimes instinctive[7] that indicates the emotion itself and the action readiness towards the other subject (contributing to interaction), which 4. allow a *flexibility* of behavioral response which can be essentially increased according to the degree of cognitive content involved. The behavior caused by an emotion can also be varied according to experiences and be deliberately adjusted to a situation. These common functions of emotions allow us to characterize them as a unitary class. This will be important for the discussion of the nature of emotions (see Sect. 7).

3.3 Cognitive attitudes

The last class of mental phenomena that must be distinguished from emotions is that of *cognitive attitudes*. These are cognitive mental states with propositional content (e.g. wishes, desires, beliefs). Cognitive attitudes are characterized in the following way. They are

1. complex cognitive states with propositional or at least conceptual content, which
2. do not essentially involve phenomenal experience.

Consequently, *cognitive attitudes* include the set of propositional attitudes that are defined by a subject, an attitude, and a propositional content. Furthermore, there

[6] It is possible to induce certain emotional states in oneself intentionally by creating certain contexts or by exposing oneself to them. But this can be treated as a parasitic case (Elster, 1999), as it is very difficult to not adopt this emotional state in these contexts. Thus, the commencing emotions can be less controlled by the individual than by the contexts into which she submitted herself.

[7] Due to Ekman (1972) we know that in the case of basic emotions there is an immediate instinctive reaction in the form of autonomic responses and a facial expression that is the same for all cultures. Nevertheless, people can learn new display rules such as showing a different culturally transformed automatic facial expression by which the instinctive expression is masked.

are more basic, but nevertheless complex cognitive attitudes which may only be based on conceptual classifications but need not involve a complete propositional content. These are cognitive attitudes characterized by a relation to an object, not to a proposition. A's respect concerning B may be simply based on the classification of B as belonging to a group of people which A classifies as deserving respect.[8] Cognitive attitudes are typified by the kind of attitude and propositional or conceptual content they involve.

Before closing this section, we wish to elaborate the distinctions made thus far between felt body-states and emotions. Let us first mention some essential common features: for one, the feeling aspect of the experience is shared by emotions and felt body-states. The same holds for the automatic appraisal component of basic emotional states that is parallel to the immediate biological response reaction of felt body-states. Nevertheless, there are two main differences which make it necessary to distinguish these two phenomena.

For one, the set of *stimuli* is distinct: while felt body-states are primarily related to internal need states and stimuli, the emotional response constitutes the appraisal of internal and of *external* reinforcing stimuli (see Rolls, 1998) and *evaluates* these as being significant. Felt body-states register basic need states (such as hunger and thirst) and lead to instinctive reactions that are linked to rigid biological programs. External stimuli only play a role insofar as they are immediately related to these basic internal need states (thus, e.g. a strawberry is only a significant external reinforcer insofar as it is related to the instinctive regulation of the homeostatic need state "hunger" (in this distinction we agree with Rolls)). The emotional appraisal situations are further such that they are not resolved by a reflex reaction alone. While felt-body states concern very elementary stimulus-responses, the emotional response sets the stage for flexible and more distinguished behavior directed towards the environment in a more complex situation. Emotions are identified as evolutionarily more recent phenomena (Darwin, 1872) with the strong advantage of dealing with more complex situation types by means of expressive behavior useful for communicating the state, expectations, and reaction-probabilities of an individual.

The second most significant difference between emotions and felt body-states is that emotions have a strong *interpersonal/interactive direction*. The emotional response is largely a communicative one. Supporting evidence comes from studies on the emotional response of infants[9] and adults throughout the world.[10] Expressions of early emotion stages function as a means of interpersonal communication about the state the infant is in. They are directed towards the grown-up individual in expectance of a positive response such as the grown-up offering assistance to the infant by responding to its needs in the specific situation.

By distinguishing these three kinds of mental states, the first step towards the classification of emotions has been made. In line with the intuitions of folk psychology, the category of *emotion* can be clearly distinguished from *basic mental representations*, on the one hand, and *cognitive attitudes*, on the other. Simple hard-wired reaction mechanisms that are anchored in a biological reflex program cannot be classified as

[8] For the sake of argument we presuppose that there are two classes of cognitive attitudes, one involving relations to propositions, the other involving relations to objects.

[9] See Holodynski & Friedlmeier (1999, 2006) on interpersonal to intrapersonal development of the emotional response.

[10] See Ekman (1984, 1993) and Izard (1971, 1994) for intercultural research on facial expression.

emotions, nor can simple cognitive attitudes without phenomenal experience. There is more to emotions than physiological reactions or a particular cognitive states without phenomenal quality. Nevertheless, cognitive content and phenomenal quality are both involved in the emotional experience in a way that will become clear by classifying different kinds of emotions.

4 A new classification of emotion

Now the main task of the paper has to be tackled, i.e. to present a systematic classification of the variety of emotions. We are taking a functionalist approach by characterizing emotions according to their functional roles. Furthermore, we take an ontogenetic perspective towards more fine-grained and complex emotional capacities in order to explain the variety of emotions. Our strategy to account for the variety of emotions in developmental stages is based on the general empirical observation that different emotions can be clearly distinguished according to their ontogenetic appearance (Holodynski & Friedlmeier, 2006; Scherer, 1984, 1987). The developmental theory of emotions will be introduced by distinguishing the four stages of 1. pre-emotions as unfocussed expressive emotional states, 2. basic emotions, 3. primary cognitive emotions, and 4. secondary cognitive emotions.

4.1 Pre-emotions as unfocussed expressive emotions

The first stage of *unfocussed Expressive Emotions* is constituted by innate pre-forms of emotions, which are not immediate biological reflex reaction programs, but concern *expressive interactive* behavior.[11] There are two basic non-intentional and unspecific emotional responses of an infant to situations in his environment which are not yet further discerned or subclassified than as being either generally positive or negative. This stands in contrast to the felt body-states which are reactions specific to fine-grained situation input types. The two distinguishable pre-emotions that are not yet specific emotional reaction types are *comfort* and *distress*.[12] The pre-emotional stage is thus characterized by just two emotions that enable an infant to make a simple positive–negative distinction in the general and unfocussed evaluation of a given situation. The properties of emotional response are exhibited: physiological arousal, automatic appraisal, physiognomic expression, emotion feeling, interactive orientation enabling more flexible reactions to demanding situations than those of the felt body-states.

4.2 Basic emotions: basic affect programs

Essentially the set of emotions on the level of basic emotions comprises *fear, anger, sadness, and joy*.[13] As opposed to other emotions that always necessarily involve

[11] See Holodynski & Friedlmeier (1999, 2006) for research on inter- and intrapersonal emotional development and Izard, Hembree, and Huebner (1987) on changes of expressive behavior during development.

[12] This bipolar classification of emotional life at birth corresponds to the positive/negative distinction by Hume (1739) and Wundt (1896) and follows Bridges (1932) and later Lewis (2000); Lewis and Michalson (1983) with the difference that attention and interest are not classified as emotions but as cognitive capacities.

[13] Basic emotions as basic affect programs owe their name and basic characteristics to the research of Darwin (1872) and Ekman (1972, 1984, 1999). We do not want to insist that there cannot be more basic emotions, although according to our view the best description of the varieties of emotions can be

characteristic cognitions and evaluations, these basic emotions—not requiring conscious processing of stimuli—can be triggered independently of slower cognitive processes that are underlying, e.g. a conscious consideration of a belief, enabling a fast shift of attention and a fast onset. The necessity to introduce a class of emotions which operates without cognitive processing is supported by the empirical findings of two different ways of processing emotional cues for fear, namely the ventral path via the limbic circuit and the dorsal path via the neocortex (LeDoux, 1996).[14] These neurobiological findings confirm the strong intuition that humans share many emotional reactions (such as basic fear) with other mammals: emotions for which we do not need to suppose complex cognitive processing. Furthermore, the exclusion of complex cognition allows faster, though less varied reactions in situations of basic survival than is the case when conscious considerations are involved. Basic emotions are each characterized by coordinated, automated and complex changes. These establish a complex interplay of characteristic expressive facial changes, physiological reactions (musculoskeletal responses, endocrine/hormone system changes, autonomic nervous system changes), and vocal expressive changes. They are short-term, highly stereotypical responses that only involve limited cognitive processing with focus on the actual situation.

The following properties can be explained by this characterization: (i) The variance between individuals and cultures is minimal for basic emotions that are also called basic affect programs.[15] (ii) The basic affect programs must be the evolutionarily more ancient emotional responses.[16]

At the stage of basic emotions, the first full-blown emotional responses emerge: joy (2–3 months), anger [4–6 months (Stenberg, Campos, & Emde, 1983); 7 months (Holodynski & Friedlmeier, 1999)], fear [7–9 months (Lewis, 2000, Schaffner, 1974)], and sadness (3–7 months). We want to argue that they constitute four types of emotions which correspond to a limited number of types of universally given challenges in life, which are linked to a limited set of evaluations and have a corresponding adaptive function. Examples of fundamental challenges are: danger (leading to fear), separation from positive conditions, e.g. separation from a parent, loss, inadequate self-efficiency (leading to sadness), frustration of expectancies, registration of inhibitions (leading to anger), self-efficiency and social acceptance (producing joy). The basic affect programs then regulate perception, evaluation, and behavior simultaneously in order to respond to the specific challenge. To fulfil this function, they have different characteristic feature-values for the different parameters (behavioral, phenomenal, physiological) of different emotion types. In the ontogenetic process of diversifying the basic emotions, cognitions such as propositional attitudes become

Footnote 13 continued
restricted to these suggested four. Compared to Damasio, we are excluding only disgust, which is a borderline case that we discuss later on. Ekman includes disgust and surprise.

[14] The ventral stream enables a direct and fast connection to the amygdala while the dorsal processing (including more elaborate cognitive information) constitutes a longer and slower path via the neocortex (see Li, Stutzmann, & LeDoux, 1996).

[15] Explicit evidence for the invariance between cultures comes from studies on facial expression (Ekman, 1972; Ekman & Friesen, 1971, 1986; Izard, 1971, 1994), vocal expressions (Banse & Scherer) and physiological arousal patterns during the emotional event.

[16] Evidence comes from neurobiological research: in the brain, the basic affect programs are identified with neural activation patterns of specific types of subcortical circuits (Damasio, 1994, 2003; LeDoux, 1996; Panksepp, 1998, 2005), mostly centered in the limbic system—the evolutionarily older part of the brain. Conscious cognitions, however, are processed in the evolutionarily younger neocortex.

especially important. Although complex emotions such as menace, envy and jealousy can be characterized as diversifications of the basic emotion fear, the interconnection is only a loose one: we can speak of four families of emotions unfolding the basic affect programs.

4.3 Primary cognitive emotions

Primary cognitive emotions comprise the first stage of emotions in which a minimal set of cognitive content is present in the emotional pattern.[17] Depending on the cognitive development of the individual, cognitive operations like considering propositional attitudes are performed that lead to *cognitively justified emotions*. Generally, the primary cognitive emotions can be characterized by a minimal set of typical attitudes that accompany the emotion. First, the cognitive content is an essential constituent of the emotion and it is a relevant part of the cause of the behavior that is triggered by the emotion. Second, the cognitive content plays an important explanatory role for the behavior caused by the emotion. These cognitive contributions constitute the cognitively *enriched* emotions, and they explain the (i) *variations* in the display, and the (ii) cognitive *extensions* of basic emotions.

(i) Cognitive content can account for cultural variations in the display of the emotions of the basic affect programs. Depending on cultural socialization and the transmission of cultural values and experiences, the emotional expression (and the self-report of feelings) is monitored and influenced under public conditions—whereas the emotional response is very similar if the individuals are under no special social observation conditions.[18] Thus, the emotional display rules show the difference between cultures dealing with the universally shared basic affect programs as soon as a cognitive stage is reached.

(ii) Standard primary cognitive emotions are *extensions* of the basic emotions and differentiate these more finely, for example amusement about a funny situation, since it includes the cognitive evaluation that there is something going on that is non-standard and unexpected. Nevertheless, there are also primary cognitive emotions that we characterize using basic emotion terms, for example "joy at the clear composition of the triumphant conclusion to a Beethoven symphony", the experience of which involves cognitive content. Both examples require some amount of cognitive content, thus they are both situated at the same developmental stage. The difference is that amusement can only be found at the level of primary cognitive emotions as it necessarily presupposes minimal cognitive content, whereas joy is a basic emotion that can be initiated independent of any cognitive content but may also be found in an appearance including cognitive content. In a way much alike, anxiety includes cognitive content in that a situation is evaluated and experienced as alarming with

[17] A well studied paradigmatic case is fear (LeDoux, 1996). Basic fear as a basic emotion that does not involve any cognitive content can be distinguished from cognitively based fear that includes a cognitive attitude about the intentional object. LeDoux shows very nicely how two separate paths for processing fear, namely the dorsal (via neocortex) and the ventral (via limbic system) part of the brain, work. The conscious cognitive content is added to a typical basic fear reaction processing via the neocortex that is simultaneously engaged to the ventral processing. The dorsal processing leads to the cognitively based fear of the primary cognitive emotions.

[18] See the studies by Averill, Opton, and Lazarus (1969), Ekman and Friesen (1971), Lazarus, Option, Tomita and Kodama (1966) on differences in self-reports and display of emotions between American and Japanese subjects.

respect to possibly involving a displeasing and disconcerting event. This is different from fear, which can be experienced without cognitive content.

4.4 Secondary cognitive emotions

Secondary cognitive emotions are the high-level cognitive emotions in our classification. This is the stage in which the most complex emotion concepts are exhibited. They require a mini-theory as a constitutive element of the emotion pattern in addition to the experiential, behavioral and physiological features. A mini-theory includes, as a necessary component, a concept of the self (Lewis, 1992), as well as (i) a cognitive evaluation of a situation, (ii) beliefs about concrete social relations to individuals as well as about general social norms (Stipek, Recchia, & McClintic, 1992), and (iii) expectations or hopes concerning the future given the situation. They are thus complex emotions dependent on cultural information and personal experience. Secondary cognitive emotions develop within the four dimensions of the basic emotions when they are enriched by cognitive mini-theories by which they are differentiated into more finely grained emotions—based on the more differentiated evaluation of the situation they entail a corresponding broader variance in phenomenology.

The necessity to introduce mini-theories in order to explain occurrences of certain types of emotions is nicely explained by an example. The main argument supporting this claim is the observance of cultural differences not only in emotional, expressive and behavioral features but also in the context of the emotions' appearance, their evaluation and their significance for social and self regulation. These differences are such that we need to assume cognitive content that amounts to a mini-theory in order to explain them. Consider the examples of shame and pride. Both are emotional reactions to compliments about an accomplishment. But the reaction the individual is exposed to for, say, playing a music instrument well, differs strongly for Americans and Chinese. American mothers praise their child and encourage their playing, whereas Chinese mothers rather play their children's accomplishment down and work with shaming techniques and tell them to go and practice some more (see Mascolo, Fischer, & Li, 2003; Wu, 1996). The responses to these reactions to accomplishments consequently differ as well: American children are more self-confident, show positive self-expression and feel proud, whereas Chinese children do not recognize their achievement and rather feel exposed and ashamed. Where American objectives are oriented towards e.g. independence and personal achievement, instead, Chinese feel proud when they succeed in harmonizing the self with others and in modesty. This is evidence that emotions which are situated within a given socio-cultural context and system of cultural values are strongly dependent on them, and are modulated according to them during the upbringing of the individual. With development, the individual acquires the knowledge of central values and beliefs of his culture and the emotional events can be interpreted in an increasingly sophisticated manner (Fischer, Shaver, & Carnochan, 1990; Mascolo & Griffin, 1998; Sroufe, 1996). The resulting complex emotions differ strongly between the cultures in their specific causes, functions and appearances. The involved sets of cognitive contents thus do not only contribute nuances that may affect the expression of emotions, but also concern the core of the emotion itself. Further examples of these emotions that vary strongly between cultures are love and guilt. The

most complex secondary affect programs are not even represented inter-culturally, but rather specifically belong to and reflect a cultural tradition.[19]

To sum up: We have introduced the four developmental stages for emotion: 1. pre-emotions as unfocussed expressive emotions, 2. basic emotions, 3. primary cognitive emotions, and 4. secondary cognitive emotions which increase in complexity of the emotion patterns relative to the amount of relevant factors constituting them, especially concerning the cognitive content for stages three and four.[20] Of course, the phenomenal quality involved in the emotion can be of high intensity at all levels. The four emotion types fear, anger, joy and sadness constitute the basic dimensions in which the more complex emotions unfold and become differentiated during ontogenetic development. Of course, we sometimes experience mixtures of emotions which can be best described as e.g. an emotion of a new love in combination with fear about the future of it.

4.5 Examples

In the following section, we will consider a few examples which will be helpful to illustrate the developmental perspective on emotions that we have introduced. The basic affect programs constitute four emotion types—by spelling out the four developmental stages by means of examples, the systematic connections between the stages by the dimensions of the four basic affect programs (fear, joy, sadness and anger) and the differentiation into more elaborated cognitive emotions will be become apparent.

4.5.1 Fear

The first stage of the emotion type of fear is the unfocussed expressive emotion of *distress*, an unspecific, strong perturbation, possibly combined with a startle response. Distress is the unfocussed response to a negative situation that is immediately triggered by stimulus properties (Sroufe, 1996) without concrete reference to the cause. Behavioral aspects include crying and increase of body tension.

The basic affect program of fear is observed between the age of seven to nine months (Magai & McFadden, 1995; Lewis, 2000). Fear corresponds to the fundamental life challenge of *danger* which can be caused by threat, e.g. by potential injuries, predators, enemies or death. The basic affect program coordinates the response to the situation that usually consists in defence behavior (flight, avoidance, attack) with the focus on self-protection. The corresponding typical facial expression exhibits widely opened and raised eyes, a hard stare, raised and drawn together eye-brows, short horizontal/or vertical forehead wrinkles, and lips that are pressed tightly together or an opened squared mouth.[21]

The primary emotion contributes a justification of the fear by a salient belief. Therefore, we can speak of a *cognitively justified fear*. Menace is spelled out by the

[19] For example, amae—found in Japan—which is a satisfying feeling of deep gratifying dependency on a person or institution (Morsbach & Tyler, 1986).

[20] Once a higher stage is reached, the previous ones can nevertheless be (non-simultaneously) exhibited; adults thus can have emotions of all four developmental degrees. Take, for instance, an adult walking in a park in a strange and unacquainted area. First, she may experience an unspecific distress that is then replaced by a specific fear of the gloomy guys lingering in the shadow at the next corner.

[21] For a complete description, see Ekman (1972).

minimal set of cognitive content that consists in the awareness of the threat posed by something, of the incapability to influence this, and the loss of control of the situation.

At the level of secondary cognitive emotions a differentiated mini-theory is contributed that expands to the psychological dimension. The necessary new component is a theory of oneself including a full-blown concept of self. In the case of fear, this involves danger of the integrity and the basic values of oneself as it is developed when four year old children develop a theory of mind. Regard the complex cognitive emotion of jealousy. Jealousy is based on the faculty of strongly evaluating a personal relationship as outstanding, and interpreting it as being menaced by a rival, which is combined with a fear of loss.[22] A further example is the emotion of envy that is elicited by the following cognitive mini-theory: an appreciation of a certain object (or feature), together with the knowledge that someone else is in possession of this entity, and that oneself is not in the possession of it. This is interpreted as injustice, together with a strong fear of not receiving what would be appropriate for oneself, and is combined with the fear of threat posed by someone who is privileged in a context that is essential for oneself.

4.5.2 Sadness

The emotion type of sadness starts out with the same unfocussed expressive emotion of *distress*. At the infant stage, the response to a negative situation, such as the separation from the mother, is no more differentiated than by unspecific perturbation and discomfort.

At about two to three months (Magai & McFadden, 1995), when the basic affect program of sadness is first observed, the environmental contexts are perceived with more differentiation. Sadness occurs in situations of strong negative impairment (separation from positive conditions and stimulus events, loss, inadequate self-efficiency) and is the affect program for unease and strong dejectedness. A corresponding distinct facial expression is also exhibited. The eyes are narrowed and glazed with dropped lids, the eyebrows exhibit a T-form, while the mouth is opened with partially stretched and trembling lips. By the expression, the presence of a negative constellation that often has to do with loss is indicated.[23]

Primary cognitive emotion cognitively justifies and accompanies sadness: the emotion of disappointment is characterized by the minimal set of cognitive content that comprises the awareness of the missing fulfillment of certain expectations and the missing possibility of changing or controlling the situation. This leaves the individual without the chance to actively improve the situation, in consequence of which she can only suffer from the negative conditions.

At the level of secondary cognitive emotions, a cognitive mini-theory is advanced that differentiates the emotional dimension of sadness. The more differentiated emotion of grief includes a set of cognitive content that contains the recognition of a loss of an object (typically a person) and the longing and yearning for its return, together with the knowledge of the impossibility of changing the situation as much

[22] Many theorists argue that all complex emotions are *essentially* blends of basic emotions. We do not consent to this thesis. We agree that features of basic emotions can be parts of a more complex emotion. In the case of jealousy, for example, the essential dimension is that of fear; although in a case of jealousy elements of anger may be involved, they are not constitutive of the emotion.

[23] Sadness is an essentially social emotion, which is suggested by the description of its function as the strengthening of community (Averill, 1986).

as the impossibility of its return. This set of cognitive content results in strong perturbation through the tension that is characteristic for the emotion of grief.

4.5.3 Joy

Joy is the general affect program for positive stimuli and pleasure and thus constitutes a positive emotional dimension. The corresponding unfocussed expressive emotion is *comfort*, i.e., unspecific overall pleasant well-being.

At the age of 2–3 months (Magai & McFadden, 1995), infants begin to smile and show excitement and happiness at the sight of familiar, intimate and positive events, states, and experiences. The stage of the basic affect program of joy is best described by the typical facial expression that involves relaxed neutral eyes, a bit narrowed and with crow's feet, lower lips that are pushed up a bit and, most distinctively, corners of the lips that are raised to a smile. This expression shows a readiness to act in a friendly and positive way and an openness to social experience. The typical example is the joy of the infant upon the returning of her mother. Behavioral aspects involve attention and interest in the interaction.

A cognitively justified variant of joy is e.g. exhilaration. The minimal cognitive set includes the awareness of pleasure or evaluation of a positive quality in a situation, event or person, an unexpectedness thereof, and the awareness of the best fulfilment of one's hopes and expectations.

At the stage of secondary cognitive emotions, cognitive mini-theories about positive experiences, objects, individuals, relations and cultural values differentiate the emotion dimension of joy even more strongly. Regard e.g., love: love depends on a theory about the differences between social relationships. Based on this, the appreciation of a loved person will be in unison with the special evaluation of the partnership. This is accompanied by the wish, feeling and attitude of unity, commitment and responsibility.

Happiness/bliss/elation can be described as an abstract, all-embracing, thorough feeling of comfort, which depends on the positive evaluation of a situation as beneficial for oneself, and which also includes certain values and convictions (harmony, unity, meaningfulness, independence). These emotions show great cultural variation as they strongly depend on the culturally influenced evaluation of a situation and the focus that is thereby set on an occasion that functions as the emotional trigger.

4.5.4 Anger

A further negative emotional dimension is constituted by the emotion type of anger. Beginning with the unfocussed expressive emotion of distress, it can be combined with a startle response in situations of impairment and frustration.

The basic affect program for anger develops somewhere between four and seven months (Magai & McFadden, 1995; Stenberg, Campos, & Emde, 1983). It is manifested at the registration of inhibitions and at the frustration of expectations and goals. The causes are predators and situations of impairment. The affect program of anger launches physiological responses such as an accelerated heart beat, blood flow from the viscera toward the muscles, motor activity, and a characteristic facial expression: lips that are tightly pressed together or are opened to a wide mouth where the teeth can be seen, eyes opened widely and raised eyebrows, strong vertical and sometimes also horizontal forehead wrinkles. These responses mobilize and preserve energy at

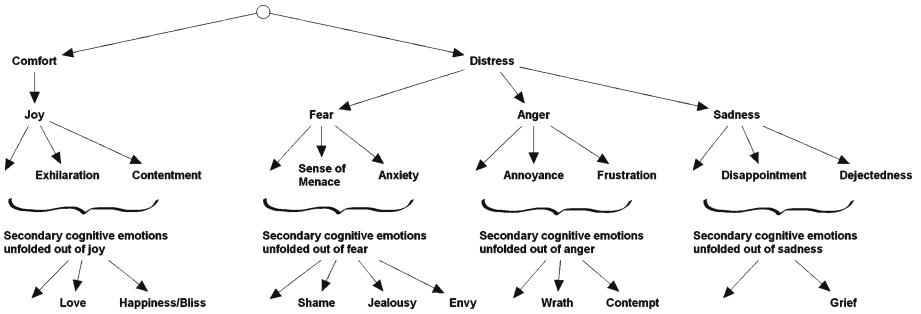

Fig. 1 Developmental stages

a high level in order to respond to the obstacle that needs to be coped with (Ekman, 1972).

The minimal cognitive content accompanying cognitively explained anger requires the awareness of a certain inhibition of a goal, the inhibition of which is negative for one's own situation, the unjustified interruption of a positive activity that needs to be overcome, plus the assessment of a possibility of successful action leading to the goal. A further primary cognitive emotion is, for example, frustration or annoyance, which refers to the frustration of expectations and goals and the inadequacy of the treatment in a certain situation.

At the stage of secondary cognitive emotions, a cognitive mini-theory differentiates the anger dimension even further. Wrath (moral rage), for example, requires the acquisition and awareness of strong normative values and a concept of justice in a certain cultural and social context. In such a setting, an action towards oneself or somebody else can be evaluated as unjustified and judged morally reprehensive, this being a condition for the morally encoded anger-emotion of rage (Fig. 1).

5 Challenges for the classification

The emotions that can be classified in the developmental scheme are not the only affective states. Up to now, we have only regarded emotional events, i.e., short-term, highly intensive, rapid emotional occurrences at a particular point in time directed toward an external or internal event of significance to the individual. In addition to that, there are (a) emotional dispositions and (b) moods. How do these affective states relate to each other? Can we account for them?

Our suggestion is the following: The emotional event (= the emotional state of fear, joy or sadness) can be distinguished from the (long-term) emotional disposition of an individual that is expressed by the propensity to have certain occurrent emotions. These are stable affective character traits of the individual (= being an anxious, cheery, irascible, irritable or melancholic person) that constitute the temperament of a person.[24] They are of longer duration, less intensive, involve no focus on a certain event, but contribute the capability to entertain a certain emotional state under particular circumstances. Analogous to the four developmental stages for the emotional

[24] See Alston (1967), Goldie (2000) and Elster (2000) on the distinction between emotional state, disposition and character trait.

event already characterized, there are four stages of development for emotional dispositions as well. The development begins with a first stage that is defined as a disposition for distress/well-being, followed by a disposition for a certain affect program (e.g. an fearful or cheerful person), followed by the disposition for a certain cognitive emotion (e.g. an anxious person, an annoyed person) and ends with the disposition for certain theory-dependent emotions.

Moods are further affective phenomena that have to be taken into account. Moods are rather diffuse affective episodes of low intensity and a relatively long duration. Damasio (2003) describes them as background emotions that contribute to the acute emotional state. Their most salient feature, which also distinguishes them from emotional events, is that they are non-intentional and do not necessarily involve special cognitive content. However, they profoundly influence emotional and informational processing (see for example Erk et al., 2003; Frijda, 1987; Frijda & Mesquita, 2000). They are often caused by a certain acute emotional occurrence, as in the case where your mood changes from cheerful to melancholic after an event that made you sad. This sad mood again influences the way in which new events are experienced and emotionally evaluated. Interestingly, these moods only correspond to basic emotions. Moods constitute the long-term counterpart to the basic emotions. Together with a cognitive attitude, moods turn into emotional events which can be more differentiated than the basic emotions (Table 1).[25]

A further challenge is the classification of cases of controversially discussed mental phenomena. Our first distinction between the classes of mental phenomena provides clear criteria of discrimination for these cases.

Take, for instance, pain, which is often included in the set of basic emotions. Rolls (1998) argues that emotions are systems of reward and punishment based on reinforcing stimuli that are neurally realized in the brain. Likewise, Panksepp (1998) identifies also interest and seeking as emotional systems in the brain that function with reward and punishment. Obviously, these are accompanied by a positive or negative phenomenal quality for the individual. As has been discussed above (p. 11), the shared property of phenomenal quality does not suffice to classify states of pain (felt body-states) as emotions. However, the reinforcing character of pain alone is not sufficient for qualifying a state of pain as an emotion either. In contrast to Rolls, we classify pain as a felt body-state and not as an emotion. Pain is "more" than a simple sensation in that it is an unlearned *reinforcing* stimulus *internal* to the organism, but pain is "less" than emotion in that the pain response is primarily focussed on an internal need and involves a fast instinctive reaction, not flexible behavior with focus on an external object. Attention, interest and seeking alike are basic mental dispositions that are background processing capacities, which lack the characteristic functions of the emotions, namely flexibility of action, and communicative orientation.

A further case is that of disgust. Gustatory disgust is a reflex reaction to negative conditions for the individual's body-state (as it would be negative for the organism to eat decayed food). It is an immediate biological response reaction that is standardly initiated (and already present at infancy) and results in instant recovery from the negative stimulus without flexible behavioral possibilities (rejecting or spitting out the

[25] Scherer (2000) lists further affective states: affective attitudes and interpersonal stances. We want to argue that these can be explained by the interaction of the emotional event, disposition and mood of an individual at a certain time and situation.

Table 1 Relationship between emotions, moods, and dispositions

Emotional event	Mood	Emotional disposition
Pre-emotions: distress, comfort		Disposition for distress, well-being
Basic emotions: fear, anger, sadness, joy	Corresponding moods: apprehensive, irritable, melancholic/sad, cheerful	Disposition for a certain affect program (e.g. being an anxious, irascible, melancholic, or happy person person)
Primary cognitive emotions		Disposition for a certain primary cognitive emotion (e.g. disappointment)
Secondary cognitive emotions		Disposition for a certain secondary cognitive emotion (e.g. being a jealous person)

item of food).[26] There is further evidence for the special role of disgust. In empirical studies Dittrich (1991) and Atkinson et al. (2004) investigated how good we are in detecting the kind of emotion expressed either by facial or by static or dynamic bodily signals. The core result is that joy, fear, anger, and sadness can be readily identified even under the condition that the bodily signals are only presented by static point light displays. But in both cases—facial signals or signals of bodily movements—disgust is recognized notably more poorly than the four basic emotions. According to our view, the reason for the special role of disgust is the fact that it is only a bodily reaction lacking the functional role of interaction. Since this functional role is a necessary component of emotions, we classify disgust as a felt body-state but not as an emotion.

Another mental state that is commonly classified as a basic emotion is surprise. We want to argue that surprise does not constitute an emotional state by itself, but is an aspect involved in the triggering of an emotion. It concerns the recognition that something is distinct from one's expectations. Surprise is therefore a cognitive process at the onset of an emotion. Regard, for example, joy (if the situation exceeds expectations) or fear (if the situation is more threatening than expected, where the difference to the startle-response is that we are dealing with conscious cognitive processing).

Further, arrogance and vanity also are not adequately characterized when treated as emotions because according to our intuitions they do not involve any phenomenal experience. They are missing the phenomenal quality in the same way as "cold" beliefs do. Therefore they are cognitive attitudes. Cognitive attitudes can be involved in the onset of an emotion, e.g. arrogance can be part of the onset of pleasure if someone enjoys his arrogant behavior.[27]

[26] Yet, we have to distinguish the phenomenon of disgust concerning decayed food from disgust that involves the cognitive evaluation of objects, e.g. a spider. We call such cases cognitive disgust. It is a question of debate whether cognitive disgust should be treated as an emotion. We suggest that it is not an emotion but only a cognitively initiated body-state, e.g. the same basic bodily reaction that is connected with gustatory disgust is now initiated by an attitude, e.g. in this case that there is a spider. Thus, the phenomenal quality of the original felt body-state is now also connected to a formerly neutral stimulus via a conditioning process.

[27] There is a discussion on phenomenal qualities of different propositional attitudes (see Horgan & Tienson, 2002). We claim that propositional content does not have any phenomenal quality, but may be accompanied by a feeling aspect of an additional emotion (for example being happy about judging oneself to have better looks or to be smarter than someone else).

6 Advantages of the developmental approach

There are important phenomena concerning emotions which are not adequately accounted for in alternative theories but which are nicely treated in the developmental theory.

1. The variability of emotions in the same situation throughout individuals: Behaviorism explains this variability by the concept of learned, resp. conditioned reactions. Except for three innate emotions (fear, anger, and love), Watson (1913) defines emotions as solely learned through classical conditioning. Yet, there is a big intra- and inter-individual variability of emotional reactions to the *same* conditioned event, from which follows that the thesis is not sufficiently empirically founded. The developmental approach can explain this variability by allowing an interaction between the environment and the organism that is equipped with differentiated capacities, properties and experiences. There is more to emotions than acquisition by passive conditioning.

2. Interculturally shared emotions such as fear: The thesis of universalism of emotions is held by evolutionary biology (Darwin, 1872; Ekman, 1972; Ekman & Friesen, 1971, 1986; Izard, 1971, 1977, 1994; Tooby & Cosmides, 1990) as much as by neurobiologists (Panksepp, 1998; Rolls, 1998). Emotions are regarded as phylogenetically ancient responses that are evolutionary advantageous adaptations which are informationally implemented and computed in neural circuits in the brain. This approach cannot account for the diverse emotions that involve complex cognitive content and are more differentiated between cultures and individuals. The developmental approach works with the argument of universal emotions only for the two basic stages of development, which are independent of complex cognition.

3. The variation of emotional phenomena across cultures: This point is stressed by the social constructionist thesis (Averill, 1980; Armon-Jones, 1986). Emotions, their in- and output situations and reactions are socially constructed, and solely dependent on the variation of environment, tradition, sociolinguistic and raising practices. The social constructivists cannot account for universally shared emotions; instead they would argue that these candidates themselves must be different between cultures. The developmental account states that cultural dependence only concerns emotion stages with cognitive content.

4. Phenomenal experience is the focus of theories of introspection (Wundt, 1896). We are not discussing the methodological problems of introspective theories, but we wish to illustrate that it is not the case that every emotion can be adequately characterized on the basis of introspection: repressors for example exhibit every property of physiological arousal for fear, but are not consciously aware of their being in fear (Jäger & Bartsch, 2002). Furthermore, this introspective position tends to claim that phenomenal content is the sole feature for individuating emotions. Although our account considers the phenomenal aspect of emotions as an essential feature, it does not take it to be the only constitutive feature of emotions.

5. The complexity of the emotional response increases with age. To account for this is the main objective of developmental psychology (e.g. in Ainsworth, 1974; Holodynski & Friedlmeier, 1999; Lewis, 2000; Lewis & Michalson, 1983; Trevarthen, 1984). A differentiation of four basic emotions to an elaborate emotion system takes place during the development of the individual. The developed complex emotions depend on their ontogenetic preforms. The developmental approach is generally

compatible with data from neurobiology, learning theory, intercultural studies and common sense.

7 The nature of emotion

Griffiths (1997) argues against the thesis that emotions constitute a natural kind. One of his arguments is based on the observation that there is a difference in the triggering stimuli for more basic emotions and for complex emotions: sensory input suffices for the former, whereas additional cognitive input is characteristic for the latter. He distinguishes the output-side in much the same way: basic emotions contribute to standard physiological changes and more rigid behavior than the complex emotions. Since the causes and effects of basic emotions, on the one hand, and of complex emotions, on the other, are different, they do not belong to the same ontological category. According to our view, these differences are contributing factors to the emotion pattern, thus accounting for the variety of emotions, but they are not essential for a mental state to belong to the category of emotion.

Emotions constitute a unified ontological class that is defined by the following four characteristic functional roles: 1. The phenomenally encoded *appraisal* of the environment or of the cognitive system itself. It serves the distinction of emotions from perception, which does not have a comparable evaluative aspect, and from cognitive attitudes which lack the involved phenomenal quality. 2. The *preparation* (and motivation) for action by the elicitation of physiological changes (a feature which distinguishes emotions from cognitive attitudes), and 3. a typical expression that indicates the emotion itself and the action tendency (readiness) toward the other subject. This property is especially characteristic for emotions as such. It is directed at contributing and inducing interaction and is lacking in all other mental phenomena. 4. Emotions allow a *flexibility* of basic behavior which can be essentially increased according to the degree of cognitive content involved. This is where cognitions can be present in the emotional response in different degrees by which the emotions are further distinguished from felt body-states. These are the essential functions of emotions. According to an inference to the best explanation, the shared functional roles imply that there is one ontological category of emotions.

Griffiths' main argument for the ontological difference between basic emotions and complex emotions is based on the thesis that they have different underlying causal mechanisms: basic emotions are modularly organized, whereas complex emotions are not. Given the assumption that natural classes share the same causal mechanisms, it follows that emotions do not form a natural class. Two refutations can be offered to this position. 1. The causal mechanisms are not as distinct as Griffiths claims. Griffiths' observation that basic emotions are modularized and complex emotions are not is based on the observation that basic emotions show activation in different brain areas and rely on different ways of information processing. Nevertheless, a closer look reveals that if you compare a basic and a complex emotion of the same category, for example fear and sense of menace, it is shown that in both cases the limbic system is activated, while in the case of menace as a complex emotion, we find an additional activation in the neocortex. Thus, the involved causal mechanisms are not completely different but have essential overlapping activations. 2. We accept that emotions do not constitute a natural kind, but they nevertheless form a unitary class since the most

promising account of emotions is a functional one: according to that, the underlying causal mechanism is not an essential property of an emotion.

We have put forward essen tial functional roles which allow us to characterize emotions as a unitary subclass of mental states. The functionalistic account of emotions is advantageous as it (mainly) complies with our everyday intuitions of a unitary class of emotions. It is also adequate because there is a further argument which shows that emotions do not constitute a natural kind. For any feature in our multifactorial account of emotions the following holds: it is not necessarily involved in an instantiation of an emotion since there are emotions without expressions; there are unconscious emotions etc. (Elster, 1999). Our functionalist and developmental approach of emotions as constituted by patterns of emotion types can account for the unity of emotions as well as for the plurality of their appearances.

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