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Whereabouts

Locating Emotions between Body, Mind, and World[1]

Where are emotions? While philosophical theories tended to "internalize" emotions at least from the eighteenth century on by characterizing them as private subjective feelings,[2] twentieth century philosophy and psychology came up with two radical and rather contrary claims about the location of emotions:[3] Behaviorists like John Watson, who believed that scientific reasoning about the mind should confine itself to observable and measurable input-output relations, characterized emotions as behavioral reaction patterns that respond to certain stimuli: We tremor and shiver in response to unexpected loud noises or a loss of balance, and our muscles tense and we turn red when we are restricted in our aims.[4] Such a characterization of emotions like fear and rage is probably the most radical rejection of the inner dimension of emotions to be found among contemporary approaches. It restricts the definition of emotions to certain external triggers like loud noises or loss of balance and bodily reaction patterns such as trembling, sweating, crying, and running away. Emotions, according to behaviorism, can be explained without making reference to any kind of inner realm containing feelings, thoughts, or judgments that could only be accessed from a first person point of view. Behaviorism has been severely criticized for its reductionism from the sixties on, when psychology made a turn back to the interior, assuming all kinds of complex cognitive structures to be at work in realizing intelligent behavior: Most prominently, the linguist Noam Chomsky claimed that language could only be real-

1 The author would like to acknowledge financial support from the SNSF (SNSF professorship grant PP00P1_139037).

2 See Dixon, Thomas. *From Passions to Emotions: The Creation of a Secular Psychological Category*. Cambridge: Cambridge University Press, 2003, and Newmark, Catherine. "From Moving the Soul to Moving into the Soul: On Interiorization in the Philosophy of the Passions," in this volume.

3 There are, of course, other approaches that locate emotions differently, like the James-Lange theory that sees emotions as inner bodily feelings and has been very prominent in twentieth century psychology or the phenomenological tradition that in many respects resembles the view I will defend in the following (cf. Krueger, Joel. "Emotions and Other Minds," in this volume). I have picked these two approaches because they mark two extremes in the twentieth century's attempts at explaining psychological phenomena in general and emotions in particular in ways that fit into frameworks of scientific explanations.

4 Watson, John B. *Behaviorism*. Chicago: University of Chicago Press, 1930.

ized by an inborn language of thought and thereby assumed a complex syntactical structure to be necessary for the realization of our ability to speak and entertain linguistic thoughts.[5] Emotions, in a similar vein, have been explained as kinds of inner cognitive states, as judgments or appraisals have also been explained.[6] According to a cognitivist position, to be afraid means to evaluate a situation as dangerous, while to be angry means to evaluate a situation as an offense against oneself. Emotions understood like this have a meaning that is the result of an inner cognitive evaluation represented in one's mind: one judges oneself to be in a dangerous situation; the emotion fear basically consists in the inner representation that one is in danger. Neither external stimuli nor bodily reactions, according to cognitivism, are central to emotions. Rather, they appear to be contingent triggers and byproducts of a cognitive evaluation that takes place inside the mind. To illustrate where behaviorism and cognitivism locate emotions, one could say that, regarding the traditional Cartesian distinction between the rational mind and the mechanical body, behaviorists reduce emotions to scientifically measurable bodily reactions while cognitivists assume that emotions are cognitive representations and as such part of an inner mental realm.

I will argue in the following that emotions should neither be reduced to meaningless behavioral reactions that are external insofar as they can fully be described from a third person perspective, nor to cognitive evaluations that take place inside one's mind. Emotions, I hold, unfold in dynamic processes, of which brain, body, and world form constitutive parts. The kind of meaning that emotions have should be described as a nonconceptual know-how or as realized by the skillful bodily interaction with a structured social environment. The content of emotions is localized outside in the social world, and we grasp these contents through reactions realized by the body and the brain alike in their ongoing interaction with this environment.

Such an account relies heavily on the explanatory framework offered by *embodied* or *situated cognition*. The approaches united under these umbrella terms develop an understanding of the mind and human intelligence as extended to the body and the outer world. They criticize the kind of cognitivism and neocartesianism that became popular with the rise of classical cognitive science. Reasoning, according to embodied and situated cognition, is not done by the brain alone but rather by living agents that gesture while talking, use material symbols to engage in abstract reasoning and directly interact with

5 Chomsky, Noam. *Cartesian Linguistics*. New York: Harper & Row, 1965.

6 For an overview, see De Sousa, Ronald. "Emotion." *The Stanford Encyclopedia of Philosophy*. Ed. Edward N. Zalta. Spring 2013. http://plato.stanford.edu/entries/emotion/ (23 October 2013).

the world around them instead of developing complex internal representations. A great amount of literature around the embodiment-debate has focused on (visual) perception. Although emotions seem to be a paradigm for many of the central claims various authors hold with regard to perception, there is relatively little work on emotions; one of the main aims of this paper is therefore to apply certain insights from perceptual theories to emotions.

In the third section, *Embodying and situating cognition*, I will introduce the most important notions related to the embodied-cognition paradigm, namely those of embodied, embedded, enactive, and extended cognition and I will give an idea of what it could mean to apply them to emotions. The three following sections (*Embodied emotions*, *Embedded emotions*, and *Enactive emotions*) will then develop the claims that emotions are embodied, embedded, and enactive in more detail. The picture that should arise is that the framework of embodied and situated cognition allows for an understanding of emotions as neither behavioral reactions nor inner judgments, but rather skillful bodily engagements with the social world.[7] The answer to the question of where emotions are thus also gives rise to a new understanding of what emotions are: Emotions are not in the head alone, they unfold, rather, in dynamic processes, of which the body and the world form constitutive parts. Emotions are a practical nonconceptual knowledge through which we directly respond to social rules and norms.

But before developing this approach I will say a little more about the historical background in cognitive science and cognitivist approaches in the next section, *Mind machines and emotional processing*. Behaviorism never managed to come up with a satisfying theory of emotions and its methodological approach to psychology has been harshly criticized ever since the sixties. Cognitivist approaches to emotions, on the other hand, have been dominant in psychology, anthropology, and analytic philosophy until very recently. I will therefore leave behaviorist approaches aside and start with a detailed discus-

7 That social interaction plays a constitutive role for emotions, which is overlooked by the majority of current psychological approaches, is shown by Fisher, Agneta, and Anthony Manstead. "Social Functions of Emotion." *Handbook of Emotions*. Ed. Michael Lewis et al. New York: The Guilford Press, 2010. 456–468. Yet, a complete account would have to say something about the roots of emotions in evolutionary history and their biological functions, too. But here I will restrict the focus to the social environment (see, however, Hufendiek, Rebekka. *Enactive Emotions: An Embodied Functionalist Account*. Unpublished doctoral dissertation. Berlin, 2012). That an account of embedded or situated cognition has to focus on the social environment into which emotions are situated has already been highlighted by Griffiths, Paul, and Andrea Scarantino. "Emotions in the Wild: The Situated Perspective on Emotion." *The Cambridge Handbook of Situated Cognition*. Ed. Philip Robbins and Murat Aydede. Cambridge: Cambridge University Press, 2009. 437–453.

sion of the insights and blindspots of cognitivist approaches, firstly, because I think it is important to understand the historical background against which current approaches like my own argue and, second, because I think that the current critique of cognitivism and the turn back to the bodily and behavioral dimension of emotions tends to forget what the insights of cognitivism have been, since precisely those features of emotions highlighted by cognitivists are difficult to explain in a behaviorist, naturalist, or any kind of non-cognitivist framework.

Mind machines and emotional processing

Classical cognitive science was based on the critique of behaviorism and on the idea that all understanding consists in forming and using appropriate symbolic representations inside the mind and that the mind is a kind of formal symbol processor. The shift of cognitive science from symbol processing to embodiment can best be illustrated in AI. Early AI research was largely dedicated to the project of translating common sense understanding into huge data structures by providing a system with all the information relevant for its task and the rules for relating and applying these facts.[8] The roboticist Rodney Brooks gives a slightly ironic yet very pointed description of the conception of intelligence that guided research in classical cognitive sciences:

> Judging by the projects chosen in the early days of AI, intelligence was thought to be best characterized as the things that highly educated male scientists found challenging. Projects included having a computer play chess, carry out integration problems [...], prove mathematical theorems, and solve very complicated word algebra problems. The things that children of four or five years could do effortlessly, such as visually distinguishing between a coffee cup and a chair, or walking around on two legs, or finding their way from their bedroom to the living room were not thought of as activities requiring intelligence, nor were any aesthetic judgments included in the repertoire of intelligence-based skills.[9]

In the 1960s, cognitivist views of emotions came up with the general claim that emotions are meaningful states rather than mere bodily feelings or forms

8 For detailed overviews and critic of classical cognitive science and early research in AI, see Dreyfus, Hubert. *What Computers Still Can't Do: A Critique of Artificial Reason*. Cambridge: MIT Press, 1993, and Clark, Andy. *Being There: Putting Brain, Body and World Together Again*. Cambridge: MIT Press, 1997.

9 Brooks, Rodney. *Flesh and Machines: How Robots Will Change Us*. New York: Pantheon Books, 2002. 36.

of behavior.[10] As we will see, such cognitivist approaches share the general spirit of classical cognitive science and can be criticized for much the same reasons as these approaches. Yet the most central aim of cognitivist theories has not been to translate emotional processing into a symbolic machine code but rather to show that emotions are more than irrational feelings.

Two claims guide cognitivist reasoning about emotions: First, emotions have a kind of meaning that cannot be ascribed to bodily feelings or behaviors. "Feelings do not have 'directions.' But I am angry 'about something.' The relationship between my being angry and what I am angry about is not the contingent relation between a feeling and an object."[11] Instead, it must be a representational relation, for the simple reason that emotions are about something. Second, emotions are normatively assessable; they can be appropriate or inappropriate. While we would not say about bodily feelings such as a headache or fatigue that they are appropriate or inappropriate, Solomon argues that to have an emotion is to understand a situation rationally and hold a normative judgment, since "If I do not find my situation awkward, I cannot be ashamed or embarrassed. If I do not judge that I have suffered a loss, I cannot be sad or jealous."[12]

An approach that develops these claims in detail and ascribes an evaluative process that leads to a normatively assessable judgment to each kind of emotion is the one developed by Richard Lazarus.[13] Lazarus was an American psychologist whose work has been highly influential with regard to its criticism of behaviorism and the new focus on inner cognitive processes that became prominent in psychology from the sixties on. Lazarus's account is at the same time a prime example of an approach in the vein of classical cognitive sciences that aims to describe emotional processing as a kind of symbolic processing of a certain logical format. It is therefore also a prime example of the overintellectualization of emotions typical for cognitivist approaches.

The claim that emotions have a meaning, that they are about something, is captured by Lazarus's claim that emotions represent *core relational themes*. Emotions seem to be about things that fundamentally concern us, that are relevant for our goals or our well-being: When we are afraid, we represent that

10 Cognitivists usually argue against behaviorism and the James-Lange-theory which characterizes emotions as inner bodily feelings as two different reductionist conceptions. I think that many of William James's ideas can be defended against the cognitivist critique, which will become clearer in the fourth section (*Embodied emotions*).

11 Solomon, Robert C. "Emotions and Choice." Robert C. Solomon. *Not Passion's Slave: Emotions and Choice*. Oxford: Oxford University Press, 2003. 3–24, here 4.

12 Solomon, "Emotions and Choice," 8.

13 Lazarus, Richard. *Emotion and Adaptation*. New York: Oxford University Press, 1991.

we are in danger, when we are sad, we represent an irrevocable loss. It could be said that the term "core relational themes" is meant to express three things: (1) the fact that emotions always represent things that matter or that are of *core* relevance, (2) the fact that emotions always represent things that matter *to us* or that their meaning is *relational*, (3) the fact that *every* type of emotion has a different theme that is *always* represented when the emotion in question is present: I might be afraid of many different things and in many different situations but no matter whether I am afraid of a spider, a possibly coming war, or an upcoming oral exam, whenever I am afraid I represent a situation as dangerous.

Yet according to Lazarus, representing a situation as dangerous is, cognitively, a highly ambitious affair. Being emotional means representing a core relational theme and representing a core relational theme is the result of a long and complex evaluative process: One cannot simply perceive that one is in danger just as one can perceive a spider hanging right above one's head. Representing that one is in danger, just as representing any core relational theme, is the result of an evaluative process that involves several appraisal dimensions: First, one has to judge whether the current situation has any relevance for one's goals and only if it does can an emotion occur. Second, one has to judge whether the situation is congruent or incongruent with regard to one's goals. If it is congruent, any positive emotion can be elicited; if it is incongruent with one's goals, any negative emotion can be elicited. The further evaluations further distinguish which kind of emotion is present: if an emotion is directed to the self it will be pride, guilt, or shame. Several other emotions, such as anger and envy, are directed to other persons. If an emotion involves blame it will be either anger or guilt depending on whether the emotion is directed at another person or oneself.

With such a schema of the various appraisals involved in emotional processing, Lazarus is able to explain what differentiates various types of emotions: they are the result of different evaluations and they have different meanings. He can also make sense of the normative assessability of emotions: just as rational judgments regarding social rules, norms, and values are subject to logical constraints and can be morally appropriate or inappropriate, so can the content of emotions be more or less appropriate, simply because it is the result of a complex evaluation.

Yet, on the other hand, precisely this description of emotions provoked the objection against cognitivism that it overintellectualizes the phenomenon.[14] Being seen as states that are embedded in holistic reasoning processes,

14 Goldie, Peter. *Emotions: A Philosophical Exploration*. Oxford: Clarendon Press, 2000; Prinz, Jesse. *Gut Reactions: A Perceptual Theory of Emotions*. Oxford: Oxford University Press, 2004.

emotions, in this view, appeared to contain language-like judgments. Emotions do, however, not seem to be language-like judgments, and this for the following reasons:

1. Emotions apparently occur in infants and animals, but surely infants and animals do not form language-like judgments.
2. Emotions often appear to be *cognitively impenetrable* which means that they do not vanish when we judge their content to be wrong. Judgments, on the other hand, simply disappear if proven wrong.
3. Emotions have a distinct phenomenology which judgments lack.
4. Emotions are highly motivational, whereas judgments just purport to state matters of fact.
5. Emotions are fast and frugal; in contrast to judgments they are not the result of complex and time-consuming reasoning processes.[15]

This last point is worth some elaboration. It is eye-catching how much Lazarus's decision-tree-structure resembles models developed for all kinds of cognition in classical cognitive science, with the idea in the background that such formalizations of what we seem to be doing, for example, when we see something and decide to go and get it, or when we see something and decide rather to run and avoid it, could help to build intelligent machines able to fulfill such tasks. The critique of these approaches, which I will sketch in the next paragraph, started from the problem that early robots that were meant, for example, to see something and then go and get it would instead sit still for hours, reckoning, before deciding to make one step in the right direction and then sit and reckon again. One could see a robot with an emotion decision-tree-structure, such as the one just sketched, sitting still for hours, just to find out whether the object in front of it is of any relevance for its goals, as well.

15 More recent versions of cognitivist approaches have suggested solutions to these problems. I think that at least strong versions of cognitivism fail to meet them in principle, but I am not going to argue for this in detail here. For further discussion, see Scarantino, Andrea. "Insights and Blindspots of the Cognitivist Theory of Emotions." *The British Journal for the Philosophy of Science* 64.4 (2010): 729–768, and Hufendiek, *Enactive Emotions*.

Embodying and situating cognition

A starting point for the turn to embodiment in cognitive science has been the philosophical critique of the narrow concept of intelligence as symbol processing that guided research in the field from the sixties on. This critique was articulated by philosophers such as Hubert Dreyfus[16] and John Haugeland,[17] and has been inspired by pragmatistic ideas as developed by Charles Peirce, William James, and John Dewey, as much as by the phenomenological tradition and its questioning of the relation between subject and object and its focus on the practical relation to the environment as it can be found in the works of Martin Heidegger and Maurice Merleau-Ponty.[18] Intelligence, Haugeland and Dreyfus argued, refers not only to conceptual or inferential reasoning, but rather to all the strategies we might come up with to successfully interact with the environment that are not simply reflex-like but rather entail spontaneous reactions to all kinds of problems we might be facing.

While Dreyfus and Haugeland were articulating a theoretical critique of classical cognitive science from a pragmatist and phenomenological background, many of the groundbreaking ideas at the core of the embodied cognition paradigm stem from a shift in view in research on infant development,[19] animal behavior, and, as we have seen, artificial intelligence,[20] where it became obvious that modeling the mind as something constituted by abstract symbolic processing alone leads to problems on the simplest levels of interaction with the real world and that biology obviously came up with solutions rather different from those of early AI research. It could be said that at the heart of embodied and situated cognition approaches lies the aim to shift the explanatory weight from inside the head to the interaction between body and world: What makes intelligent behavior complex is not necessarily the neural program underlying it, but rather the unfolding interaction between a skillful

16 Dreyfus, *What Computers Still Can't Do*.

17 Haugeland, John. "Mind Embodied and Embedded." John Haugeland. *Having Thought*. Cambridge: Harvard University Press, 1998. 207–240.

18 Many embodiment approaches do indeed refer to Heidegger and Merleau-Ponty and they also share the radical anti-representationalism that can be found in the works of these authors. Yet there are other approaches that develop less demanding and more action-oriented notions of the term "representation." My own account belongs to the latter.

19 Thelen, Esther, and Linda Smith. *A Dynamic Systems Approach to the Development of Cognition and Action*. Cambridge: MIT Press, 1994.

20 Brooks, Rodney. "Intelligence without Representation." *Artificial Intelligence* 47 (1991): 139–159.

body and a structured environment in itself.[21] Rodney Brooks's robots are able to fulfill certain tasks such as collecting cans not by constructing complex internal representations of their surroundings and developing cognitively demanding plans of how to act, but rather by executing very simple perception-action cycles. Their bodily implementation, the movements they are able to make, and the kinds of information they are able to grasp all play constitutive roles that enable the robot to fulfill certain tasks in certain environments without the need to "think," that is, to form and process complex inner representations. To flesh out these general remarks I will explain and differentiate the notions of "embodied," "embedded," and "enactive cognition" in the following, since an understanding of emotions as being realized in the interplay between brain, body, and world rests on these concepts.

The claim that a cognitive process is *embodied* basically means that the body or some part of the body forms a constitutive part of the cognitive process in question. This claim is not to be confused with the somewhat trivial claim that the body plays some *causal* role in the generation of cognition. Neither Descartes nor any hardliner in the heydays of early classical cognitivism would have doubted, for example, that the way our sense organs are built influences what kind of information we can grasp through perception or that the brain needs to be nourished by the rest of the body. Such wisdom is already captured in the Latin saying *mens sana in corpore sano* and certainly would not do as the foundation of a new paradigm in cognitive science. A better example for an actual case of embodiment might be the role that gesturing with the hands plays for the constitution of cognitive processes. Andy Clark, who is among the most prominent philosophers in the embodied cognition debate, argues that gesturing can be a part of online cognitive processing by serving as a kind of "material carrier" in an ongoing feedback loop between brain, world, and body, where "by materializing thought in physical gesture we create a stable physical presence that may productively impact and constrain the neural elements of thought and reason."[22] Contrary to classical cognitivist explanations, Clark would argue that (1) seemingly complex intelligent behavior can often do without complex inner representations and (2) that bodily processes such as gesturing play an important role in the realization of such

21 For more general overviews of the approaches hosted under the umbrella-terms "embodied" and "situated," see Wilson, Margaret. "Six Views of Embodied Cognition." *Psychonomic Bulletin & Review* 9 (2002): 625–636, and Robbins, Philip, and Murat Aydede. "A Short Primer on Situated Cognition." *The Cambridge Handbook of Situated Cognition*. Ed. Philip Robbins and Murat Aydede. Cambridge: Cambridge University Press, 2009. 3–10.

22 Clark, Andy. *Supersizing the Mind: Embodiment, Action, and Cognitive Extension*. Oxford: Oxford University Press, 2008. 128.

intelligent behavior. I will suggest, in this vein, that emotions are not merely accompanied by bodily processes such as inner arousal or facial expressions but that these bodily reactions let us see certain aspects of the world and thereby co-constitute an intelligent access to the world.

The claim that cognition is *embedded* means that cognition takes place in a structured environment and that the cognizer makes use of this environment in a way that co-constitutes ongoing cognitive processes. Again, this means more than the trivial claim that cognition usually takes place somewhere and that the surrounding might have some influence on one's thought, as when the rhythm of the raindrops on my window inspires my thinking, for example. The idea of cognition being embedded is rather that a cognizer is adapted to an environment and permanently relies on its structure instead of building complex internal representations of it. An example from psychological studies meant to show how much we rely on the present situation instead of using internal memory is the block-copying study done by Dana Ballard et al.[23] In this study, people were given a model of colored blocks and were asked to copy it by moving similar blocks from a reserve area to a new workspace. The tasks were performed using mouseclicks and drags on a computer screen. During performance, an eye-tracker monitored where and when people were looking at different bits of the puzzle. One might guess that the problem-solving strategy that people use here is to remember the color and the position of one block and copy it into the new workspace. But this is not the strategy used by most human subjects. The results of the study show instead that people keep on looking back and forth between the models, apparently storing only one bit of information – color or positions – at a time. The conclusion that Ballard et al. draw is that the gaze plays an identifiable computational role that we would intuitively contribute to working memory. Furthermore, the study allows for the more general hypothesis that the brain tends to create programs so as to minimize the amount of working memory required, by relying heavily on the eye movements (another example of embodied cognition) *and* the environment (a case of embedded cognition). As the example shows, claims about the embeddedness of the mind are usually closely intertwined with claims about the embodiment of the mind. The former further highlights the enabling role of the body while the latter highlights the structuring role of the environment. I will argue that emotions are another example of mental states that are not constituted by an internal reasoning process but rather embodied reactions that directly react to aspects present in the environment.

23 Ballard, Dana H., et al. "Deictic Codes for the Embodiment of Cognition." *Behavioral and Brain Sciences* 20 (1997): 723–767. For discussion, see also Clark, *Supersizing the Mind*, 11–12.

An early take on *enactivism* was put forward by the philosopher Evan Thompson, the biologist Francisco Varela, and the linguist Eleanor Rosch in the early nineties. The central claim of *enactive cognition* is that cognitive processes depend on the interaction between the cognizer and the environment so that the content of mental states is determined by an ongoing loop of sensory and motor processes. Perceptual experience, according to this view, is not simply the result of retinal input and neural processing but rather of a sensorimotor process that involves an active agent exploring its environment. Alva Noë, another prominent proponent of enactive cognition, paradigmatically puts this claim in the following way:

> [P]erceiving is a way of acting. Perception is not something that happens to us, or in us. It is something we do. Think of a blind person tap-tapping her way around a cluttered space, perceiving that space by touch, not all at once, but through time, by skillful probing and movement. This is, or at least ought to be, our paradigm of what perceiving is. The world makes itself available to the perceiver through physical movement and interaction.[24]

Traditional accounts of perception take perception to begin with a stimulation of the sense organs resulting in a retinal image that has to be followed by various information-processing operations for perception to occur. The enactive view instead claims that perception is an act of the whole agent that cannot be properly understood as being initiated by passive sensation. This results in a new picture of the architecture of the entire mind. While classical models of cognition tend to see the mind as a 'sandwich' with action and perception being two separate and peripheral slices, and cognition being the hearty filling, Susan Hurley suggests viewing perception and action as closely intertwined such that perceptual contents are established not only through passive input but rather through the ongoing interaction of sensory and motor activity.[25]

Claims about enactivism are usually closely related to claims about embodiment. The idea that sensorimotor skills guide perceptual processing

24 Noë, Alva. *Action in Perception*. Cambridge: MIT Press, 2003.

25 Hurley, Susan. *Consciousness in Action*. Cambridge: Harvard University Press, 1998. A similar view can already be found in John Deweys's essay "The Reflex Arc Concept in Psychology." *Psychological Review* 3 (1896): 357–370, where he argues that action and perception are closely intertwined; they "have been so often bound together to reinforce each other, to help each other out, that each may be considered practically a subordinate member of a bigger coordination" (359). While the hand permanently depends on the control and stimulation of the visual information, vision in turn must be stimulated and controlled by the body's movements. If the eye is not kept fixed on the goal of grasping, if there is no proprioceptive feedback about the body's posture, the task cannot be fulfilled.

and thereby (co-)constitute perceptual content is a claim that could be seen as being nearly interchangeable with the claim that bodily processes (co-)constitute cognitive processes. The whole point of enactive approaches is that sensorimotor skills are a kind of bodily nonconceptual yet intelligent way of actively accessing the world. Indeed, with their term "enaction," Varela et al. mean a kind of 'embodied action.' Embodiment for these authors not only means that any kind of bodily process can (co-)constitute cognition, but rather that "cognition depends upon the kinds of experience that come from having a body with various *sensorimotor capacities*."[26]

A word on what sensorimotor skills are might be in order to clarify what the core claim of enactivism is. The notion of a skill can be used interchangeably with know-how. A skill is a kind of practical non-conceptual knowledge. Skills are abilities but not all abilities are skills. The ability to blink, digest, or breathe for example is not skillful; it is just some kind of automatic processing that the agent performs because it serves a biological purpose. Skillful knowledge on the other hand is usually defined as the result of a training process. While breathing and digesting are abilities that need not be learned, playing the violin or cooking chilli con carne are skillful abilities that presuppose a training process. The kind of sensorimotor skills that people have in mind when suggesting that perception is based on them are, however, much simpler, and the kind of training that we need to acquire them is a sensorimotor trial-and-error process in itself: we have to learn how to move our eyes to grasp information and we have to learn how the incoming information varies with movement to be able to make sense of sensory data. To compare: breathing, blinking, and digesting are abilities, not skills. Although breathing is not a skill in itself there are skillful ways of breathing ranging from panic-induction to the breathing-techniques mastered by divers and opera singers. The interesting claim enactivism makes is that perception is not only an automatic input-generating process, but also a way of gaining practical, non-conceptual knowledge. To process sensory information we have to know how things look from a certain angle and how their size might change when we move closer. This is not a kind of propositional knowledge that we entertain in the form of beliefs or judgments and then apply to the raw sense data; it is a practical embodied knowledge that guides the way we act during perception and (co-) constitutes perceptual content.

In this sense, I will argue that emotions are skillful abilities, too. While embodied, embedded, and enactive approaches to the mind largely focused

26 Varela, Francisco, et al. *The Embodied Mind: Cognitive Science and Human Experience*. Cambridge: MIT Press, 1991. 172 (my emphasis).

on (visual) perception, I think that the most central claims of the debate can fruitfully be applied to emotions; it is therefore surprising that there is so little systematic literature on embodied, enactive, embedded emotions to date.[27] Emotions entail biologically established bodily responses with a certain purpose. Yet at the same time emotions are shaped by a learning process, in which infants learn through the permanent interaction with a social environment how to negotiate their needs and intentions in terms of emotional behavior. What is acquired in such a learning process is not conceptual knowledge or the ability to make the right evaluations in the right situations. It is rather a practical embodied knowledge about what matters in a social context. Emotions are a non-conceptual way to grasp social rules and norms.

Instead of talking about embodied or situated cognition in general, people sometimes refer to the "4 E" – namely the claims that cognition is embodied, embedded, enactive, and extended. I have introduced the first three notions and will apply them to emotions in the following. For the sake of completeness let me also say a word on what extended cognition is and why I will not speak of emotions as being extended. In their famous paper *The Extended Mind*,[28] the philosophers Andy Clark and David Chalmers argue that we should think of the mind or cognitive processes as being literally extended into the environment. When an Alzheimer's patient relies on her notebook where other people would use their memory, the notebook can be seen as part of the cognitive system that enables intelligent behavior. When an accountant in her everyday working routine uses pen and paper for certain multiplications, pen and paper are part of the cognitive system as well. The extended mind hypothesis can be seen as a more radical version of the claim that cognition is embedded into the environment, since it not only claims that we heavily rely on the environment but makes the stronger metaphysical claim that parts of the environment can come to be part of the mind. While I am highly sympathetic to the extended mind-hypothesis, when it comes to cognitive processes such as memorizing, reckoning, or imagining things,[29] I do not think that it makes

27 See Prinz, *Gut Reactions*, Griffiths and Scarantino, "Emotions in the Wild," and Giovanna Colombetti (forthcoming) for the most prominent approaches to emotions understanding them as either embodied or enactive; for the claim that emotions are extended, see Slaby, Jan. "Emotions and the Extended Mind." *Collective Emotions*. Ed. Mikko Salmela and Christian von Scheve. New York: Oxford University Press, 2014. 32–46. What is lacking, to my knowledge, is an approach that applies the reasoning of Noë and the affordance theory of perception to emotions and a developed account of emotions being embedded into a social environment.

28 Clark, Andy, and David Chalmers. "The Extended Mind." *Analysis* 58.1 (1998): 7–19.

29 Hufendiek, Rebekka. "Draw a Distinction. Die vielfältigen Funktionen des Zeichnens als Formen des Extended Mind." *Et in imagine ego: Facetten von Bildakt und Verkörperung*. Ed. Ulrike Feist and Markus Rath. Berlin: Akademie Verlag, 2012. 441–465.

sense to speak of extended emotions insofar as this would imply that emotional *feelings* would be realized not by the body and brain alone but would be co-constituted by parts of the external world.[30]

Embodied emotions

A primary motivation for an embodied approach comes from the phenomenological observation that emotions obviously do involve bodily feelings. This is an aspect of emotions which has been largely ignored by cognitivist approaches but is already captured in the work of William James: "What kind of an emotion of fear would be left," James notably asked, "if the feelings neither of quickened heart-beats nor of shallow breathing, neither of trembling lips nor of weakened limbs, neither of goose-flesh nor of visceral stirrings, were present, it is quite impossible to think."[31] The claim that James develops out of this phenomenological observation is that emotional feelings are constituted by bodily reactions so that there would be no emotional feelings left without bodily arousal and furthermore that different types of bodily arousal allow us to distinguish between different types of emotions. The kind of bodily arousal that constitutes anger differs from the kind of bodily arousal that constitutes sadness. As we have seen above, James has been criticized by a whole tradition of philosophers and psychologists arguing that emotions are meaningful states while bodily feelings are meaningless and that the bodily arousal involved in emotions is rather a vague and arbitrary byproduct of emotions than the essential constituent of them.[32] My aim in suggesting that emotions are embodied will therefore be twofold. First, I will sketch the theoretical claim that the bodily reactions involved in emotions are constitutive for their meaning and, second, I will discuss some empirical studies suggesting that the bodily arousal involved in emotions is far from being just arbitrary.

With regard to the first point, the decisive shift from cognitivism to an embodied account is to describe the bodily reactions in themselves as realizing

30 Andy Clark would probably agree that emotional feelings should not be described as extended (cf. Clark, Andy. "Spreading the Joy? Why the Machinery of Consciousness Is (Probably) Still in the Head." *Mind* 118.4 (2009): 963–993). Yet, Jan Slaby ("Emotions and the Extended Mind") makes an interesting case for emotions being extended relying on the phenomenology of Hermann Schmitz.

31 James, William. "What Is an Emotion?" *Mind* 9.34 (1884): 188–205, here 194–195.

32 For a more recent approach, see, for example, Solomon, "Emotions and Choice," and Nussbaum, Martha. *Upheavals of Thought: The Intelligence of Emotions*. Cambridge: Cambridge University Press, 2001.

a kind of intelligent behavior. Bodily reactions such as trembling, sweating, being on the verge of tears, having a lump in the throat, blushing, having 'butterflies in the stomach,' having 'one's legs turn to jelly,' and so on form complex reaction patterns *through which* we grasp certain aspects of the world that matter.[33]

When we are afraid, we do not judge that we are in danger, instead the pattern of bodily arousal, that is, our hearts beating faster, our muscles tense, and the rise of adrenaline co-constitute a non-conceptual access to the world that represents a situation as being dangerous in a non-conceptual format. Emotions certainly do have a meaning and Lazarus is certainly right in claiming that their meaning is always relational and that emotions always represent something that matters to us. Yet Lazarus simply equates this kind of meaning with conceptual knowledge, while I think that emotions are non-conceptual representations that are mainly constituted by bodily reaction-patterns. Conceptual knowledge is a kind of abstract and situation-independent knowledge, whereas the term non-conceptual knowledge or content was coined to highlight how perception differs from judgments or other propositional states. A person who has the concept of pain, for example, is probably able to explain what pain is and what it is not. She can use the concept in all kinds of contexts, thinking, for example, that she would prefer not to be in pain, while she actually has a headache. Perceiving that one is in pain might be seen as a state that has some kind of content or meaning, too, but the content appears to be rather different. It is situation-dependent in a way that conceptual content is not. It occurs only when a person actually is in pain, and cannot be used for further reasoning about pain. We might say that it has the function of informing the person in question about the pain's cause while the concept has the function to reason, as it were, about the nature of pain, tell other people about one's pain, compare different forms of pain, and many other things. What I want to suggest is that emotions, with regard to their type of content, are much more like pain-perceptions than like pain-concepts. This

33 An important forerunner of this account is the approach developed by Jesse Prinz (*Gut Reactions*). Prinz's theory is problematic with regard to the details, though. Prinz uses Fred Dretske's theory of representation to make sense of the claim that emotions are biologically established mechanisms with the function of representing core relational themes or urgent situations to us. Along with the adoptation of Dretske's approach comes a view of emotional representations as being passive input states and a strict separation between certain emotions such as fear with a biological function and other emotions such as guilt that only get set up once we acquire language (for a detailed critique of Prinz's view, see Hufendiek, *Enactive Emotions*). In the following, I will aim to avoid these problems by describing emotions as enactive and embedded.

might be most plausible when thinking about emotional reactions in infants: From very early on, infants react with fear when they hear an unexpected loud noise, show joyful reactions when they are stroked, and react angrily when captured in an embrace that is too tight. These appear to be reactions that have a certain kind of meaning. But this kind of meaning is realized by the whole body, it is bound to the situation in which it occurs, and the infant certainly does not conceptually understand the character of the situation in question.

Bodily reactions do not simply accompany emotions but rather (co-)constitute an intelligent access to the world. This is the crucial move for a theory of embodied emotions that really meets the core claim of the embodied cognition paradigm.[34] Such a view shifts the explanatory weight from internal cognitive processing to the direct interaction between body and world. As I will argue in the next section (*Embedded Emotions*), what makes emotions more complex states than bodily feelings such as pain is the way they are embedded into the social context rather than the inner processing they involve.

The implication of such a view is that all emotions do involve bodily arousal and that the bodily arousal differs between different kinds of emotions. This brings me to the second point, namely the question of whether it is empirically plausible to make such a claim. It has been objected that this is not the case, since the bodily arousal involved in emotions is rather vague or arbitrary. While, as we have seen, James considers the reactions of the nervous system in fear and rage to be distinct, according to the philosopher Martha Nussbaum the feeling of bodily arousal involved in an emotion can vary and should therefore not be regarded as an essential aspect of the emotion. While "many men report experiencing anger in connection with a boiling feeling," Nussbaum states, "my own experience of anger is that it is associated with tension at the back of the neck, or a headache that appears the next day."[35] This little phenomenological self-observation is meant to deny that every type of emotion is associated with a certain kind of bodily arousal. Whether rage is associated with boiling blood, or tensed muscles around the neck, or another bodily reaction, or no bodily reaction at all, can vary from person to person and is therefore no criterion by which to individuate emotions, that is, by which to distinguish different types of emotions. Since Nussbaum's phenomenological

34 Wendy Wilutzky et al. have pointed out what the precise criteria for an embodied – and also an embedded and enactive – account of emotions should be. Cf. Wilutzky, Wendy, et al. "Situierte Affektivität." *Affektive Intentionalität. Beiträge zur welterschließenden Funktion des Gefühls*. Ed. Jan Slaby et al. Paderborn: Mentis, 2011. 283–320.

35 Nussbaum, *Upheavals of Thought*, 61.

description thwarts the Jamesian description of the phenomenon, I will bring some empirical data into the discussion.

The possible sources for empirical evidence of bodily reactions involved in emotions are numerous and even today many studies are far from issuing clear and stable results. Instead of discussing the evidence for distinct bodily reactions of distinct types of emotions in detail, I just want to highlight two points here:[36] First, the picture that people have in mind when arguing that bodily feedback is vague and cannot constitute different emotional feelings is often far too narrow. The place to look for bodily reactions is not only the inner organs and the visceral feedback stemming from them, but also the endocrine system and the somatic nervous system that innervates skeletal muscles, including those of the face. One can get an idea of the role that facial muscles play in the determination of emotional feelings simply by observing the grim feelings that correspond to a contraction of the corrugator muscle between the eyebrows and of the pleasant feeling stemming from a relaxation of them.[37] An embodied account of emotions can include fine-grained changes in facial expression, bodily posture, endocrine level, respiration patterns, and so on.[38]

The second point I want to make concerns Nussbaum's objection that bodily reactions differ from person to person and can therefore not be useful to differentiate between emotions. I think that Nussbaum indeed makes a point here against the Jamesian view, as far as this can be interpreted as claiming that there is something like a 'common essence' of bodily arousal that has to be present in precisely the same form in each token of a certain emotional kind like fear or rage. This appears to be not very likely since the whole nervous system is highly plastic and we should not expect to find the same reactions, for example, in the endocrine system, in the same person over several years, just as one can have doubts about whether we find the same reactions

36 For a more detailed discussion, see Hufendiek, *Enactive Emotions*.

37 For facial EMG studies of the role of the corrugator muscle in emotional processing, see Schwartz, Gary E., et al. "Lateralized Facial Muscle Response to Positive and Negative Emotional Stimuli." *Psychophysiology* 16 (1979): 561–571. For the finding that different kinds of emotions are associated with different facial expressions across cultures, see Ekman, Paul. "Universals and Cultural Differences in Facial Expressions of Emotion." *Nebraska Symposium on Motivation*. Ed. Jonathan Cole. Lincoln: University of Nebraska Press, 1971. 207–282. For a similar suggestion with regard to the bodily posture associated with pride, see Tracy, Jessica, and Robert Robbins. "The Prototypical Pride-Expression: Development of a Nonverbal Behavior Coding Scheme." *Emotion* 7.4 (2007): 789–801.

38 With such a broadened concept of bodily reactions in the background, the observations that animals with a cut vagus nerve and patients with a spinal cord lesion still have feelings can be explained (see, for example, Damasio, Antonio. *The Feeling of What Happens: Body and Emotion in the Making of Consciousness*. New York: The Ecco Press, 1999. 290–291).

in the endocrine system when observing fear in a young and an old person. This assumption also explains why research on the physiological reactions accompanying emotions until now remains somewhat blurry.[39] In an overview of recent studies in the psychophysiology of emotions, Margaret Bradley suggests that many of the differences that occur among various studies are the result of studies' having neglected the importance of context-dependent aspects of emotional reactions.[40] A problem has been that different studies compared, for example, the physiology of fear in situations as different as hearing a loud noise, looking at a picture of an amputated leg, giving a public speech, or imagining an intruder in one's house. Yet cardiac reactions tend to differ when test persons process affectively similar events in different types of tasks.

Therefore, what I want to suggest is that emotions do not have common essential bodily ingredients but are rather realized by complex patterns of bodily reactions that recur in similar situations because they are set up to fulfill this function. I would therefore agree with Nussbaum as long as the claim is that emotions cannot be individuated with regard to the bodily arousal they involve *alone*. But this does not mean that the bodily arousal is simply arbitrary and certainly not that emotions can only be individuated with regard to their cognitive content. Consider Nussbaum's example of rage again. Nussbaum reports that while many men say that they associate rage with a boiling feeling, she associates rage with a tense feeling around the neck and sometimes a headache occurring the next day. With regard to the studies discussed above, there might be several reasons for these differences: gender reasons might be important, but there is also evidence that people have different abilities when it comes to sensing their own heart rate,[41] and the same might prove to be true for sensing ones own body temperature. Yet tensed muscles, increased heart rate, and elevated body temperature all fit into the prototypical pattern of bodily arousal that is generally associated with rage. What would be disturbing is if Nussbaum reported feeling her heart beat slow down whenever she is angry, or if she associated it with a relaxation of her muscles from the currogator all the way down to the belly and the toes. My guess is that in such a case we would doubt whether the feeling that Nussbaum describes could be labelled as a case of anger at all. This intuition together with the

39 For an overview, see Larsen, Jeff T., et al. "The Psychophysiology of Emotion." *Handbook of Emotions*. Ed. Michael Lewis et al. New York, London: The Guilford Press, 2008. 180–196.
40 Bradley, Margaret. "Emotion and Motivation." *Handbook of Psychophysiology*. Ed. John T. Cacioppo et al. Cambridge: Cambridge University Press, 2007. 602–642.
41 Barrett, Lisa Feldman. "Interoceptive Sensitivity and Self-Reports of Emotional Experience." *Journal of Personality and Social Psychology* 87.5 (2004): 684–697.

evidence discussed above should suffice to exclude an approach that denies any significant functional role of the bodily changes involved in emotions altogether.

Embedded emotions

To see what an account of *embedded emotions* could look like, we have to focus on the role that the world and its particular structure play for emotions. Wherever the environment comes to play a (co-)constitutive role in emotional processing, in the sense that it is the interaction with the structured environment rather than complex internal representations that explain the intelligence of an emotional reaction, we can reasonably speak of emotions being embedded.

Lazarus suggested that emotions are the results of internal inferences because he thought emotions to represent rather complex affairs: In anger we seem to *evaluate* something as being incongruent with our goals and furthermore a kind of demeaning offense against me or mine. An embodied embedded approach demands an explanation of how such a seemingly complex cognitive process can be described as an interaction between the body and the world. A first step could be to describe emotions in analogy to pain or fatigue as homeostatic reactions, that is, non-cognitive bodily reactions in which a neural 'evaluation' concerning the body's well-being and bodily processing together constitute a sensation that has the function of guiding the organism's behavior. Yet this seems to be an account much too simple with regard to emotions, since emotions steadily react to *social* scenarios and their core relational themes involve *normative* vocabulary such as "being offended" in the case of anger or "being deceived" in the case of jealousy. People tend to get angry upon being insulted, jealous upon being betrayed, and feel guilty when they think that they mistreated somebody. Also, when we talk about emotions, we notoriously treat them as being normatively assessable by speaking about just anger, inadequate jealousy, or the maddening pride of somebody too full of herself. Such a continuous evaluation of our emotional reactions wouldn't make much sense if emotions weren't different from sensations such as pain or fatigue. This seems to speak in favor of a cognitivist approach since it is difficult to see how bodily feelings could be meaningful reactions to social rules and norms of which we could reasonably speak as being appropriate or inappropriate.[42]

42 That emotions are primarily reactions to social scenarios and that with regard to emotions such as anger, guilt, and jealousy we would simply not know what they are about – if not

My aim in the following will be twofold: Relying on results from developmental psychology, I suggest that the content or core relational theme of an emotion could be simpler or more fundamental than Lazarus claims. Yet I will not deny that the content of emotions is normative. Instead, I will take Rodney Brooks's famous statement that "the world is its own best model"[43] as a guideline and suggest that the social norms that we grasp while we are emotional are external and we can come to directly respond to them without entertaining complex inner models of the rules and norms in question. The ontological structure of the social world in which we are situated is normative in itself and emotions are a non-conceptual skillful way to grasp these social norms.

Consider anger again. The feeling of anger typically arises in certain social scenarios. Lazarus would say that it reacts to an offense and that to represent an offense we have to understand that we have been blamed by somebody first. Yet this is a complex evaluation that we should not expect in infants younger than three. If you think of the earliest anger reactions in infancy, though, you might wonder whether this is an appropriate characterization. Infants of only a few weeks' age frequently react aggressively when being caught in an embrace that is too tight.[44] This is certainly a social scenario but one where the infant is restricted and not literally offended. My suggestion is, therefore, to broaden and simplify the content of anger. In anger, on a basic level, certain situations are identified as *restrictions-to-be-fought*. The bodily reactions involved in anger prepare for an aggressive response and at the same time highlight a certain aspect of the world, namely the restriction. In reacting to such scenarios and incrementally applying anger reactions to more complex scenarios, infants learn to negotiate their needs and intentions with the social environment and they come to understand what offenses are on a fundamental, perceptual level, where they learn to deal with offensive scenarios that are communicated primarily through facial expressions or bodily gestures by the others. The bodily side of an anger reaction – the "boiling of the blood," the

about social scenarios – is nicely shown by Fischer and Manstead, "Social Functions of Emotion."

43 Brooks, Rodney. "Intelligence without Reason." *A. I. Memo* 1293 (1991): 1–27, here 15.

44 Parkinson, Brian, et al. *Emotions in Social Relations, Cultural, Group, and Interpersonal Processes*. New York: Psychology Press, 2005. A cognitivist might respond that starting with emotional reactions as they can be observed in infants simply begs the question, since it is by no means clear whether these reactions deserve to be called full-fledged cases of emotional states. A very brief response to this might say that first, what we learn from recent studies in developmental psychology is that emotional reactions in infants are much more differentiated than we used to think and second, an approach that can include these examples without on the other hand reducing emotions to meaningless bodily feelings seems to be far more integrative and plausible than one that has nothing to say on early emotional reactions at all.

tension of the muscles, and the grim facial expression – is very similar to a homeostatic reaction such as pain or fatigue. Yet emotions very quickly develop from such basic reactions to immediate threats – such as an embrace that is too tight – to social scenarios, such as being blamed or offended. My main claim is that to represent something as an offense when angry does not presuppose that an infant has an explicit understanding of what it means to be blamed or offended. I rather think our abstract concepts of restrictions and offenses are derived from the non-conceptual knowledge that we gain in the direct interaction with the others while we are emotional. Somebody who has the concept of an offense but has never actually been angry, ready to react aggressively, to defend her territory, her bodily well-being, her close relatives, or her honor can be compared to a blind person thinking about colors. Of course such a person could be able to use the concept in a reasonable way; it is just that the person lacks what normally constitutes our non-conceptual understanding of what that concept is all about.[45]

Yet even if this approach sounds more plausible with regard to anger reactions in infants, one could still argue that to represent something as a restriction-to-be-fought means to evaluate something as something that is bad and should be avoided. How can such a normative evaluation be understood as a non-conceptual embodied reaction? Here is where the description of the structure of our social environment and the way we are adapted to it comes in. What Lazarus calls core relational themes should, in my view, be understood as relational properties of a socially constructed environment. They steadily reoccur in our social environments and we come to grasp and react to them. In a nutshell, this is to say that the social world we are surrounded by is a human construction that is real and can have certain causal effects on its inhabitants, even if they are not able to conceptually understand the rules and norms they are affected by and react to. One way to unpack this would be to say that our social world is a huge, historically developed construct of entities that are reproduced because they serve a certain function. These entities include, among others, artifacts, institutions, contracts, forms of behavior, and communication. The radical ontological claim is that these entities are what they are independently of a single subject that ascribes a certain function to them.[46] Social rules and norms do not depend upon any individual recogniz-

45 A similar claim can be found in Prinz's neosentimentalist approach, where he argues, relying on Hume and Hutcheson, that emotions constitute our moral concepts. Cf. Prinz, Jesse. "The Emotional Basis of Moral Judgement." *Philosophical Explorations* 9.1 (2006): 29–43.

46 The latter account is the one entertained by Searle, John. *The Construction of Social Reality*. New York: Free Press, 1995; the one I am arguing for here can be developed out of the works of Ruth Millikan (mainly out of *Language, Thought and Other Biological Categories: New Foun-*

ing that they are in place. We make up these rules as we go along in our social interactions. Rules can be established as conventions that the members of a social group follow without these rules being explicitly represented beforehand. It is not a necessary criterion of a rule that somebody represents it and then purposefully establishes it. It is a criterion for a rule that it is followed and can be violated by more than one member of a social group. People can establish these rules without the intention of doing so and might or might not come to explicitly represent these rules later on. Jealousy, to take another example, represents cases of being left out.[47] In a setting where people live in certain constant relations with each other, interact with each other, and depend on each other, those relations are governed by a huge number of explicit and implicit rules. Occurrences of jealousy in early infancy could be seen as such cases where an infant detects the violation of a rule on the side of the caregiver. The rule is established through the normal amount of attention and care that the infant is used to receiving and has to be negotiated with the infant's needs.[48] If you take attention and caring to be types of behavior that get reproduced in the relation between infants and caregivers because they serve a certain function, you can also reasonably speak of cases where these behaviors fail to be performed by the caregiver and this is what the infant's reaction is set up to detect. An infant, when responding distressed to its caregiver paying attention to another infant, represents and communicates its being left out of a social context without explicitly understanding that a norm has been violated.[49] Yet from an outside perspective, we can find the infant's reaction appropriate or inappropriate since it takes place in a social context that is governed by rules and norms. This is what makes emotions normatively assessable: the fact that they are embedded into a social context

dations for Realism. Cambridge: MIT Press, 1984) as has been suggested by Markus Wild (*Biosemantik. Repräsentation, Intentionalität, Norm*. Unpublished habilitation thesis. Berlin, 2010).

47 Lazarus and many others would think of jealousy as an emotion that represents one's having been deceived. Again, relying on developmental psychology, I suggest that we should think of jealousy as a simpler reaction since it can be observed in infants of a few months of age already (cf. Parkinson et al., *Emotions in Social Relations*).

48 The claim that infants act as competent agents in social scenarios from early on, for example, by picking up on their caregivers' facial expressions and responding to them, is fundamental for the approach of embedded emotions that I am sketching, but cannot be developed here in detail. For further discussion, see Meltzoff, Andrew N., and M. Keith Moore. "Imitation of Facial and Manual Gestures by Human Neonates." *Science* 198.4312 (1977): 75–78, Trevarthen, Colin. "Communication and Cooperation in Early Infancy: A Description of Primary Intersubjectivity." *Before Speech*. Ed. Marta Bullowa. Cambridge: Cambridge University Press, 1979. 321–348, and Hufendiek, *Enactive Emotions*.

49 Parkinson et al., *Emotions in Social Relations*.

and are treated as appropriate or inappropriate reactions to conventions, habits, rules, and norms. We do not have to claim that emotions are *inner* evaluations of normative affairs to make sense of the claim that they are normatively assessable. The norms are out there; they are constituted through our social practices. Externalizing emotions basically means to relocate their constitutive elements, and normativity is certainly a constitutive component of emotional content. The picture we are left with is that in emotions we respond to external rules and norms via bodily reactions. I will develop the idea of emotions as such a dynamically unfolding process between brain, body, and world in the following.

Enactive emotions

As I have sketched above, traditional views of perception have usually thought of perceptions as starting with an input – a retinal image – and then proceed with cognitive processing, which turns the retinal image into a full-blown perception. With a similar model of passive reception of information, evaluation of the information, and finally a behavioral reaction, traditional approaches to emotions have described emotions as having an input and an output side, where the input was thought to be some sort of cognitive or neural appraisal and the output the physiological reactions and feelings caused by this appraisal.[50] With regard to perceptions, enactive theories have challenged the traditional picture, arguing that perception is not the passive reception of data but rather an active exploration of the environment, and that perceptual content should not be thought of as a snapshot generated out of retinal input and further cognitive processing but rather that it is an ongoing loop of sensorimotor processes that constitutes what we see.

When we think about emotions, the trouble already starts on the phenomenological level: one might wonder whether emotions present a fact, such as that one is in danger, or whether they motivate for an action, such as to flee. It seems that emotions do both of these things at once. In this vein, I have suggested that being angry does not simply represent something as an offense or a restriction or as something to be fought, but as a restriction-to-be-fought. What we represent in emotions is a kind of content that is descriptive and motivating at the same time. While this is an observation mainly established from a phenomenological perspective, a look at psychophysiological studies

50 See, for example, Griffiths, Paul. *What Emotions Really Are: The Problem of Psychological Categories*. Chicago: University of Chicago Press, 1997.

can substantiate the suspicion that what is sensory input and what motor output is notoriously unclear with regard to emotional processing.

Several studies suggest that emotional behavior (that is, bodily postures, facial and vocal expressions) commonly regarded as mere output can modulate emotions and sometimes even trigger them.[51] To test the influence of facial feedback on emotions and emotional feelings, for example, participants were given non-emotional tasks to guide the production of facial expressions without cueing the emotional meaning of the expression. Participants then had to evaluate certain stimuli like cartoons with regard to the question of whether they are funny or not. Findings suggest that the intensity and quality of the participants' manipulated facial expression affected the intensity of their self-reported emotional feelings as well as their autonomic responses. Facial expressions modulate emotions and sometimes even trigger them.[52] Bodily postures seem to impact emotional experience in a similar way: in a study conducted by Stepper and Strack,[53] the participants' bodily posture was manipulated by asking them to adopt one of two conventional working positions, one of which induced an upright and the other a slumped posture. Participants then received positive feedback concerning their performance on an achievement task. Those who received success-feedback in the slumped posture felt less proud and reported being in a worse mood than participants in the upright position.[54] Furthermore, an emotion-specific tone of voice has been found to amplify emotional experience as well.[55] Taken together, these studies suggest a picture of expressive behaviors facilitating, modulating, and producing corresponding emotional reactions and feelings. This suggests that in emotional processing input and output processing pathways are not clearly separated. Rather, emotional processing seems to work in feedback loops: the agent produces output that affects its input in a systematic way. It not only

51 Niedenthal, Paula M., et al. "Embodiment in Attitudes, Social Perception, and Emotion." *Personality and Social Psychology Review* 9.3 (2005): 184–211. See also Krueger, "Emotions and Other Minds," in this volume.

52 Stepper, Sabine, and Fritz Strack. "Proprioceptive Determinants of Emotional and Nonemotional Feelings." *Journal of Personality and Social Psychology* 64.2 (1993): 211–220; Adelmann, Pamela, and Robert Zajonc. "Facial Efference and the Experience of Emotion." *Annual Review of Psychology* 40 (1989): 249–280; Laird, James. *Feelings: The Perception of Self*. Oxford: Oxford University Press, 2007.

53 Stepper and Strack, "Proprioceptive Determinants."

54 For similar results, see Duclos, Sandra E., et al. "Emotion-Specific Effects of Facial Expressions and Postures on Emotional Experience." *Journal of Personality and Social Psychology* 57.1 (1989): 100–108.

55 Hatfield, Elaine. "The Impact of Vocal Feedback on Emotional Experience and Expression." *Journal of Social Behavior and Personality* 10.2 (1995): 293–312.

receives stimuli from the world but also is a source of stimulation to itself. Getting angry in a certain situation might not depend on the input received from the external world alone. The agent's entire situation, including bodily posture and current facial expression, plays a role as well. The traditional claim that emotional processing starts with a cognitive evaluation or a neural appraisal (for instance, in the amygdala) and triggers bodily arousal which is then felt ignores the multiple feedback sources in an emotional process.

How can this observation be brought together with the claim that emotions are embodied reactions to a structured environment? The finding is actually more of a missing link than a challenge to what I have been suggesting so far. I have described emotions as bodily reactions to a structured environment, where the *interaction* between body and world is meant to substitute for an inner appraisal process such as the one developed by Lazarus.

We can now replace Lazarus's inner decision tree model by an interplay between what the world affords to the agent and the agent's skillful embodied reactions: Consider the example of anger again. Anger, I suggested, detects restrictions, or rather restrictions-to-be-fought. This description of the content already contains a bodily and a worldly component: The restriction is an element of the world and the motivation to fight it is a skillful bodily reaction. My claim is that anger, just like any other type of emotion, is constituted through an ongoing loop where we might perceive something as a restriction and prepare to fight it – but being in a tensed posture, on the other hand, might also facilitate seeing something as a restriction.

This claim can be developed by understanding emotions as representing *affordances* in a Gibsonian sense, although Gibson only applied the term to perceptions.[56] For Gibson, perception always involves proprioception and thereby has a kind of content that is fundamentally observer-relative, although the kind of external information that is picked up through perception is taken to be real.[57] Such a description is a good starting point for further exploring the sensorimotor abilities and the motivating potential involved in emotions:

> The affordances of the environment are what it *offers* the animal, what it *provides* or *furnishes*, either for good or ill. The verb *to afford* is found in the dictionary, but the noun

56 Furthermore, Gibson avoided the notion of "representation" entirely, since it evokes the picture of an internal image of the world. I think that it suffices to redefine the notion as a kind of action-oriented representation that is realized in the interplay of the skillful agent and the structured environment. I cannot develop this view in detail here; for further discussion, see Hufendiek, *Enactive Emotions*.

57 In Gibson's own words: "Egoreception accompanies exteroception, like the other side of a coin." (Gibson, James. *The Ecological Approach to Visual Perception*. New York: Psychology Press, 1986. 126.)

> *affordance* is not. I have made it up. I mean by it something that refers to both the environment and the animal in a way that no existing term does. It implies the complementarity of the animal and the environment.[58]

Affordances are properties of the environment that have to be seen relative to the animal: for certain animals, certain fruits look *eat-able*, for persons of a certain size and shape, certain objects look *sit-upon-able*, others *stand-upon-able*, and so on. An affordance is an objective external feature of the environment, yet it only exists with its specific value *for* a certain animal. A certain mushroom might be poisonous for one animal and nutritious for another. A lion might be a possible mate for a lioness but a predator for a zebra, and so on. As Lazarus already remarked, emotions are always concerned with the relations between the individual and the environment; they have a relational meaning as well. Yet Lazarus further argued that the individual can only grasp these relations through a complex process of cognitive evaluation, while in Gibson's view affordances themselves have a value for the organism and that this value can be directly perceived:

> The perceiving of an affordance is not a process of perceiving a value-free physical object to which meaning is somehow added in a way that no one has been able to agree upon; it is a process of perceiving a value-rich ecological object. Any substance, any surface, any layout has some affordance for benefit or injury to someone. Physics may be value-free, but ecology is not.[59]

The perception of the environment is therefore always laden with the representation of values concerning the organism's well-being. With regard to emotions, this claim has to be extended such that emotions can also represent social rules and norms through reoccurring forms of behavior, facial expressions, and so on. I have suggested that this is the case since emotions are embedded into a well-structured social niche.

Yet it does not explain in what sense emotions are directly motivating and why we only react to some instances of core relational themes and not to others. This is what the notion of affordance can add to the story. Relational properties exist independently of whether a single agent actually perceives them, and also independently of the whole species in question being able to detect them at all. While the former is true for affordances as well, the latter is not. Affordances cannot be specified independently of the abilities of the agent to detect and react to a feature. While something can be a restriction for an agent even if the agent is not able to detect this property, something can

58 Gibson, *The Ecological Approach*, 127.
59 Gibson, *The Ecological Approach*, 140.

only be *a-restriction-to-be-fought* if the organism has the ability to detect and react to the affordance. Affordances belong to animal-environment systems, including the abilities of the organism to detect and interact with the environment. The notion of affordance therefore makes it possible to see emotions as skillful reactions to things that matter in our social environment, such as restrictions or rule-violations.

* * *

Affordances allow for an enactive account of emotions, externalized social norms allow for an embedded account of emotions, and embodied reactions constitute the skillful knowledge through which we grasp the social rules and norms that form emotional content. Taken together, this leaves us with a picture of emotional reactions that do not exist in the head alone but are rather constituted by the structured environment and the skillful embodied agent. This picture seems to give a substantially more adequate description of the phenomenon than the behaviorist picture that radically externalizes emotions and the cognitive picture that takes emotions to be cognitively demanding judgments inside the head. That emotions fundamentally involve the body does not mean that they are meaningless. That emotions are complex does not mean that they are "in the head" alone. Their complexity unfolds between brain, body, and world.

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