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THE FEELING BODY: TOWARD AN ENACTIVE APPROACH TO EMOTION

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For many years, emotion theory has been characterized by a dichotomy between the head and the body. In the golden years of cognitivism, during the 1960s and '70s, emotion theory focused on the cognitive antecedents of emotion, the so-called “appraisal processes.” Some saw bodily events largely as by-products of cognition, and as too unspecific to contribute to the variety of emotion experience. Cognition was conceptualized as an abstract, intellectual, “heady” process separate from bodily events. Although current emotion theory has moved beyond this disembodied stance by conceiving of emotions as involving both cognitive processes (e.g., perception, attention, and evaluation) and bodily events (e.g., arousal, behavior, and facial expressions), the legacy of cognitivism persists in the tendency to treat cognitive and bodily events as separate constituents of emotion. Thus, the cognitive aspects of emotion are supposedly distinct and separate from the bodily ones. This separation indicates that cognitivism’s disembodied conception of



cognition continues to shape the way emotion theorists conceptualize emotion.

During the last two decades, this disembodied conception of cognition has been seriously challenged by the rise of embodied and situated approaches in cognitive science (see Clark, 1997; Varela, Thompson, & Rosch, 1991). The dynamical systems approach has challenged the idea that cognition is the manipulation of abstract representations according to syntactic rules, and has proposed instead that cognition emerges from the coupled interactions of the brain, body, and environment (Beer, 2003; Kelso, 1995; Port & van Gelder, 1995; Thelen & Smith, 1994; Thelen, Schöner, Scheier, & Smith, 2001). Other theorists have stressed, in a variety of ways, the embodied and situated nature of cognition (Clancey, 1997; Clark, 1997; Johnson, 1987; Varela et al., 1991).

Nevertheless, most emotion theorists have not embraced the embodied view of the mind. This reticence is surprising, given the important roles played by the body in early emotion theory. Well-known examples are Darwin's (1872/1998) interest in the bodily expression of emotion, and James' (1884/1968) and Lange's (1885/1967) claim that emotions *are* bodily processes. The body already played an important role in the theories of emotion of Aristotle, Descartes, Spinoza, and Hume, to mention only a few. As we will see, the importance these authors accorded to the body does not mean that they denied or neglected other aspects of emotion, such as their cognitive and evaluative characters. Rather, these authors all conceived of emotions as psychosomatic states, and each focused on different aspects of emotion according to their specific theories.

Whereas emotion theorists have kept their distance from the embodied approach in cognitive science, theorists of embodied cognition have tended to treat cognition as if it were a "cold," nonemotional process. This attitude is also surprising. Given the intimate link between emotions and the body, emotions should be privileged phenomena for attempts to reintegrate mind and body.

Our aim in this chapter is to bring emotion theory and the embodied view of cognition closer to each other. We first present an overview of classical (pre-Jamesian) theories of emotion and show that they were all psychosomatic. We then turn to the disembodied stance of cognitivism and trace how and why emotion theory came to lose the body. We argue that cognitivism not only neglected the body, but also tended to classify previous theories of emotion as *either* cognitive *or* physiological. This tendency has fostered a tension between these two features of emotion that exists to this day. The main manifestation of this tension in current emotion theory is the tendency to see cognitive and bodily

processes as separate aspects or constituents of emotions. Finally, in the remainder of the article, we sketch an embodied approach to emotion, drawing especially on the “enactive approach” in cognitive science (Noë, 2004; Varela et al., 1991).

CLASSICAL PSYCHOSOMATIC ACCOUNTS OF EMOTION

Unlike more recent cognitivist theories of emotion, classical (pre-Jamesian) accounts of emotion were thoroughly psychosomatic. These accounts acknowledged that emotions have both cognitive and bodily components. Let us mention some of the most influential examples.

In *On the Soul (De Anima)*, Aristotle (version, 1981) claimed that it is necessary to analyze both the *form* (the function) and the *matter* (the bodily aspects) of emotion. For example, anger can be seen as the desire to avenge an insult, as well as the “boiling of the blood.” For Aristotle, there is no doubt that the body plays a crucial role in emotion: “It seems that all the *attributions* of the soul, e.g., temper, good temper, fear, pity, courage, also gladness and love and hate, exist with the body, for the body is being affected simultaneously with these” (403a). If the body plays this role, Aristotle continued, then the emotions are *logoi en hyle*, which could be translated as “embodied ideas.”¹

It is true that in *The Art of Rhetoric*, Aristotle (version, 1991) did not mention bodily processes. Rather, he described (a) the temperament typical of people in emotional states, (b) the situations that typically arouse these states, and (c) at whom or what these emotions are directed. This text is considered the first “cognitive theory of emotion,” yet there is no need to think that a tension (if not an explicit contradiction) exists between the claims of the *Rhetoric* and those of *On the Soul*. The fact that emotions have a cognitive aspect does not mean that the body plays *no* role in emotion (unlike what 20th-century cognitive theorists of emotion will maintain). In addition, to take Aristotle’s *Rhetoric* as giving a definition of the nature of emotion would be misleading. The aim of the *Rhetoric* is to teach the orator how to arouse emotions in the audience by depicting real or fictional situations, so as to influence and change their judgment. It is not an attempt to describe the *ousia* (essence) of emotion.

Descartes’ (1644/1988) treatise *The Passions of the Soul* is a detailed account of the role of the body in emotion and emotion experience. For Descartes, the passions are mental states or processes “caused, maintained and fortified” by the body (art. 27). According to Descartes, the body acts on the mind through the movements of the animal spirits that reach the pineal gland. In his treatise on the passions, Descartes

referred to this theory to account for the variety of our emotional feelings: Each specific movement of the spirits gives a specific impulse to the pineal gland, which in turn causes a specific feeling.

Descartes was also interested in explaining the bodily *manifestations* of emotion. He observed, for example, that redness accompanies joy because the opening of the orifices causes the blood to flow more rapidly and to become thinner and hotter; this, in turn, fills the face and renders it smiling and joyful (art. 115). On the other hand, paleness and coldness of the limbs is a manifestation of sadness; in sadness, the orifices are closed and blood is retained around the heart. These ideas are particularly important in the history of emotion theory. Darwin (1872/1998) assumed that the perception of the behavioral and bodily manifestations of emotion constitutes feelings, and James (1884/1968) claimed that each emotional feeling depends on a specific pattern of bodily arousal.

In addition to careful physiological descriptions, Descartes (1644/1988) provided definitions of emotions that relate them to “cognition.” He claimed, for example, that the recognition that one possesses some good causes joy, whereas sadness is caused by the recognition that one possesses some fault (art. 93). These definitions do not occupy much of the treatise. Nevertheless, they reveal that, for Descartes, bodily events are strictly related to mental ones. Emotions depend on the interaction of mind and body, in both directions—from the body to the mind, and from the mind to the body.

Descartes’ (1644/1988) account of the passions also influenced Hume (1739/2003) and Spinoza (1677/2000), whose theories are sometimes defined as “cognitive” because they analyze emotions in relation to *ideas*. But this categorization is misleading if taken to imply that, in these theories, the body plays no role in emotion.

On the one hand, one cannot disembodied Spinoza’s (1677/2000) theory because of his overall account of the mind-body relation. According to Spinoza, mind and body are two of the infinite attributes of the same divine entity (which is also no other than nature). They are not two separate substances that interact causally, but are coordinated properties of the same substance. In this framework, emotions are defined as modifications of both attributes, “affections of the body by which the body’s power of acting is increased or diminished, helped or hindered, and at the same time the ideas of these affections” (p. 163).

On the other hand, Hume (1739/2003), in his *Treatise on Human Nature*, defined the passions as sensations arising in the soul from the body. He eventually ended up analyzing the passions in relation to ideas. Once again, this does not mean he held that emotions are disembodied. Rather, he stated that illustrating the activity of the body occurring in

emotional episodes would take him too far astray from his main concerns in the *Treatise* (see *Treatise*, Book 2, Part 1, Section 1).

COGNITIVISM AND THE DISEMBODIED STANCE: HOW EMOTION THEORY LOST THE BODY

Our interpretation of classical accounts of emotion as psychosomatic is different from the one offered by philosophers of emotion, such as Kenny (1963), Solomon (1976), and Lyons (1980). These authors tended to classify classical theories as *either* “cognitive” *or* “physiological,” and they emphasized either one of these two aspects to the detriment of the other. Their readings of the classical accounts are thus consistent with their own disembodied view of emotion: Cognition (e.g., beliefs, desires, judgments, and evaluations) is an intellectual—not a bodily—process, and bodily events (e.g., physiological arousal and behavior) are contingent by-products of cognitive processes.

According to these authors, “physiological” and “behavioral” accounts of emotions cannot capture the fact that emotions depend on what we know and believe about the world. The same criticism is made of theories that focus on the experiential aspects of emotions (feelings) and that explain these aspects in terms of the awareness of one’s bodily processes (as did Descartes, Hume, Darwin, and James). Such theories are described as “mere feeling theories.” This (mis)characterization assumes that such theories simply identified emotions with feelings, to the neglect of other aspects of emotion, and that feelings are epiphenomena.

From the cognitivist viewpoint, only cognitive theories can capture what really matters about emotions—namely, their world-relatedness and meaningfulness. “Cognition,” in this view, has nothing to do with the body. It is an abstract, intellectual process that is not influenced by the state of the body. Experiential aspects of emotion, when acknowledged, depend uniquely on such abstractly characterized cognitive states. The tendency is to either deny their bodily aspect or reduced it to a by-product. We can call this attitude “the disembodied stance.”

The manifesto of the disembodied stance is Kenny’s 1963 book *Action, Emotion and Will*. Kenny spent a whole chapter arguing that experimental psychology cannot say anything fundamental about the relation between emotion and behavior. The reason is that psychology as an empirical discipline provides only causal accounts of the link between emotion and behavior. Such a link, in Kenny’s view, is merely contingent. For example, there is no necessity for anger to cause aggressive behavior (or a specific pattern of bodily arousal); it is logically possible to conceive of anger as associated with some opposite action (e.g., buying flowers).

For Kenny (1963), to unveil the essence or necessary features of emotions, we need to analyze their *intentional objects*—that is, the distinctive cause of each emotion. Kenny did a remarkable job both in specifying the various objects of emotion and in distinguishing subtleties in our use of the words *feeling*, *pleasure*, and *desire*. On the one hand, this kind of analysis provides a rich and sophisticated account of what we think emotions are about, and of how we use certain terms. On the other hand, it discourages empirical observations by suggesting that the necessary features of mental states can be defined solely through introspection and logical analysis. As Griffiths (1997) complained, Kenny’s attitude is the heritage of the “Wittgensteinian distinction between the ‘criteria’ which logically define a mental state and the inessential ‘symptoms’ that can be studied empirically” (p. 23). AQ2

Other theorists, such as Solomon (1976), similarly disregarded empirical research, behavioral data, and neurophysiological studies. Lyons (1980) seemed willing to adopt a more moderate and empirically minded view, but he was still entrenched in Kenny’s concerns and reduced bodily processes in emotion to by-products of evaluations. Overall, it seems fair to say that, for philosophical accounts of emotion at this time, “[m]ental states are *defined* by the rules which ordinary speakers use when applying mental states terms” (Griffiths, 1997, p. 23).

We can point to two main reasons why emotion theory lost the body. First, the disembodied stance of the 1960s and ’70s was an extreme reaction to the equally extreme attitude of the activation and behavioral theories of the 1940s and ’50s. According to activation theory (e.g., Duffy, 1941), emotions are motivational states defined in terms of different degrees of “energy” of the organism. According to behavioral theory, emotions are tendencies to behave in a certain way (Skinner, 1953). Both of these accounts entirely neglected the cognitive and/or evaluative aspects of emotion.

Second, in the 1960s, many scientists thought that the role of the body in emotion was limited to autonomic activity. For James (1884/1968), the body was richly differentiated, and there was an “immense number of parts modified in each emotion” (p. 21);² the muscles, heart, and the circulatory system all contribute to the generation of different emotional feelings (note the similarity with Descartes’ theory). Cannon (1927), however, argued that only the sympathetic activity of the autonomic nervous system is appropriate to account for the rapidity with which feelings arise in certain situations. Moreover, during Cannon’s time, most viewed this activity as uniform. Accordingly, for Cannon, differences in emotional feelings had to depend on something other AQ3

than autonomic processes.³ This view marked a crucial step toward the disembodiment of emotion. The role of the body in emotion started to be that of a mere *enhancer*—an affectively neutral support whose activation would, at best, influence the intensity of emotional feelings. AQ4

The well-known study of Schachter and Singer (1962) reinforced this idea, who concluded that the process of *labeling* one's bodily arousal is what confers affective specificity to emotion experience. This process is not driven by the body, but depends on how the subject interprets the surrounding environment. Interpretation, in turn, is not influenced by the state of the body; it is abstract, intellectual, and thus "purely cognitive." Schachter and Singer's view is sometimes seen as a hybrid between a cognitive and a physiological theory of emotion (e.g., Calhoun & Solomon, 1984). Whatever its status, there is no doubt that it influenced subsequent disembodied theories of emotion, according to which cognition (conceived in a disembodied way) is a necessary and sufficient condition for emotion (see Lazarus, 1966; Valins, 1966).

Thus, consider what Solomon (1976) wrote about Schachter and Singer's (1962) study: "[W]hat was 'discovered' was that the physiological changes and their accompanying sensations had nothing to do with the differentiation of emotion, a conclusion reached by Cannon thirty years before" (p. 95).⁴ Lyons (1980, p. 121) interpreted Schachter and Singer's study as showing that people do not consider themselves in an emotional state unless they are provided with suitable cognitions. In this view, arousal does not contribute in any way to one's emotional state. AQ5

The disembodied stance has been highly influential. Schachter and Singer's (1962) theory was later refined by so-called "causal attribution" theories (London & Nisbett, 1974; Ross, Rodin, & Zimbardo, 1969), according to which arousal needs to be attributed to a specific cause to acquire affective specificity. Other theorists, such as Reizenzein (1983) and Chwalisz, Diener, and Gallagher (1988), supported a weak form of arousal theory according to which somatic feedback, including that from autonomic arousal, is not necessary for emotional experience, but can only enhance it in certain circumstances.

Ironically, cognitive theories of emotion in the 1960s and '70s were more Cartesian than Descartes himself. The disembodied stance assumed a thorough head/body distinction, and tried to deny any role to the body in the differentiation, or even elicitation, of emotions. The experiments designed in those years to show that emotions are "cognitive" were based on a disembodied notion of cognition—one that placed cognition all on the head side of the head/body distinction.

CURRENT EMOTION THEORY: REEMBODIED EMOTIONS OF A DISEMBODIED MIND

More recent accounts of emotion have abandoned the disembodied stance of cognitivism. For example, Frijda (1987) acknowledged the cognitive aspect of emotion, but also the role of the body in feelings and the differentiation of emotion, as well as the body's relation to appraisal and action tendencies. De Sousa (1987) has no doubt that emotion is where mind and body "make contact." Sue Campbell (1997) argued that feelings are formed through expression, including bodily expression. Griffiths (1997) criticized philosophers of emotion such as Kenny, Solomon, and Lyons for their neglect of empirical studies and for their related contempt for the role of the body in emotion. Goldie (2000), in his discussion of feelings, also considered bodily feelings. Solomon (2004), discussing his earlier work, admitted that, with respect to "physiological disturbances," he was "as dismissive as could be, relegating all such phenomena to the causal margins of emotion, as merely accompaniments or secondary effects" (p. 85). He now believes that "accounting for the bodily feelings . . . in emotion is not a secondary concern and not independent of appreciating the essential role of the body in emotional experience" (p. 85). A strong claim in favor of the embodiment of emotion comes from Prinz (2004), who argued that emotions are *embodied appraisals*—that is, bodily states that track meaning in the environment. Fear, for example, is the embodied evaluation that some aspect of the environment is dangerous.

In addition, some psychologists have recently adopted the tools of dynamical systems theory to model emotions (see Lewis & Granic, 2000). Scherer (2000), for example, argued that emotion is a system comprising five continuously interacting subsystems: (a) the cognitive subsystem with appraising functions; (b) the autonomic nervous system responsible for internally regulating the organism and generating energy resources for action; (c) the motor subsystem involved in the expression of emotion; (d) the motivation subsystem governing the preparation and execution of actions; and (e) the monitoring subsystem controlling the states of the other subsystems, and supporting feeling states. Importantly, Scherer explicitly acknowledged that arousal can affect the cognitive subsystem: "Feedback of increasing arousal from the physiological system or changes in the motivational system can affect attention deployment or change perception and judgment thresholds" (p. 76).

Similarly, Lewis (in press) argued that emotion, with its arousal and action constituents, constantly interacts with appraisal; in particular,

he claims that emotion and appraisal merge in what he calls an *emotional interpretation*, a rapid convergence of a cognitive interpretation of a situation and an emotional state on a timescale of seconds and minutes. According to Lewis' model, the emergence of an emotional interpretation begins as a fluctuation in the ongoing stream of intentional action; this fluctuation is triggered by a perturbation (external or internal), which eventually disrupts the orderliness of the current emotional interpretation. Rapid processes of self-amplification through positive feedback ensue, followed by self-stabilization through negative feedback and entrainment, leading to the establishment of a new orderliness in the form of a new momentary emotional interpretation and global intention for action. This self-stabilization phase is the precondition for learning, the consolidation of long-term emotion-appraisal patterns.

Lewis (in press) likened the whole process to a bifurcation from one attractor to another in an emotion-cognition state space, and presented a neuropsychological model of some of the brain areas and large-scale neural-integration processes involved. A crucial feature of his model is that the processes that subsume emotion and appraisal during an emotional interpretation are integrated in such a deep and complex way that it becomes impossible to disentangle the moment of emotion from the moment of appraisal. Thus, Lewis describes an emotional interpretation as an "emotion-appraisal amalgam."

These rediscoveries of the body by emotion theory mainly consist in reevaluating the role of the body in *emotion*, but without abandoning the disembodied conception of *cognition* (evaluation, appraisal) inherited from cognitivism. Emotions are reembodyed in the sense that their bodily aspects are rediscovered, but not necessarily in the sense that they are reinterpreted in relation to embodied approaches to cognition. For example, the dynamical approaches to emotion just mentioned still tend to see bodily constituents of emotion (arousal and behavioral) as separate and distinct from the cognitive components (appraisal).

Thus, Scherer (2000) implemented the functions of appraisal, arousal, and behavior in distinct subsystems. Appraisal, although distributed over different stimulus-check components, and although influenced by arousal and motor systems, remains in charge of interpreting, monitoring, and controlling the body. Lewis' (in press) view is similar. Although he introduced the new concept of an emotional interpretation and acknowledged the complexity of its constituent processes, he saw appraisal and emotion as distinct psychological functions with their own constituents.⁵ In particular, he considered arousal, action tendencies, and feelings as constituents of emotion, but not of appraisal.

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We can contrast these views of cognition with the approach to cognition taken by dynamical cognitive science. According to Thelen and colleagues (2001) and Beer (2003), for example, cognitive capacities are emergent from a complex web of reciprocal influences among the brain, body, and environment. Here, the notion of emergence implies giving up the idea that one can identify specific cognitive functions with specific constituent subsystems whose role is to control the body. Rather, cognitive abilities are global and emergent capacities of bodily self-regulation that cut across the brain/body/world divisions.

Despite their appeal to dynamical systems, neither Scherer (2000) nor Lewis (in press) seemed willing to go this far. Scherer's partition of the emotional agent into five component subsystems is reminiscent of cognitivist models. In his model, cognition (appraisal) is a separate subsystem of emotion that cannot overlap with the arousal and motor subsystems. Lewis' model is more complex and allows for considerable overlap among the processes subserving appraisal and emotion. Nevertheless, emotion constituents (arousal, action tendencies, and feelings) and appraisal constituents (perception, attention, and evaluation) remain conceptually distinct at the psychological level and subserved by distinct subsystems at the neural level. As a result, we would argue, the integrated, dynamical form of the model is compromised, such that it leaves less room for a concept of *embodied appraisal* (Colombetti & Thompson, in press; Colombetti, in press).

Recent philosophical accounts of emotion also do not link their reevaluation of the role of the body in emotion to embodied views of the mind and cognition. Thus, Prinz (2004) revived the James-Lange theory, supported it with reference to recent empirical research, and thoroughly criticized cognitive theories of emotion for downplaying the role of the body. In particular, his view of emotions as “embodied appraisals” aimed at undermining the traditional and unquestioned appraisal/arousal dichotomy.⁶ Nevertheless, his theory of emotion does not encompass the theory of embodied cognition. Thus, he distinguished judgments from embodied appraisals, and presented judgments as good old-fashioned cognitive appraisals—as abstract and intellectual, and as causing bodily states in a linear way (see pp. 74, 98–100). Although Prinz reevaluated the body's role in emotion and claimed that this role is one of appraisal, he did not replace the traditional notion of appraisal with an embodied one. Rather, he replaced it with a similar notion of judgment, thus, in effect, repositing an old view in new words.

In our view, there is something missing in the rediscovery of the body in emotion theory. The common separations of appraisal and arousal,

and appraisal and action (and judgments and embodied appraisals) suggest that, for much of current emotion theory, the body still plays the role of an *objective concomitant* of emotion. It is the appraisal component that is seen to be in charge of providing personal significance, and thus, of accounting for individual differences in emotional responses.⁷ Whereas appraisal is seen in this way as the subjective element of emotion, arousal and behavior are seen as objective.

AQ8

This subjective/objective division is another aspect of the head/body division inherited from cognitivism. Although current emotion theory aims to move beyond the disembodied stance, it holds onto a disembodied conception of cognition (appraisal), and takes cognition so understood to be the source of the meaning of an emotion. The head is where mind and intelligence reside, while the body is mainly a channel for inputs to and outputs from the head. The body can influence appraisals, but only by “interacting” with them in a manner reminiscent of the Cartesian conception of mind and body as “making contact” at some particular location in the brain.

THE ENACTIVE APPROACH

In the remainder of this paper, we wish to sketch an enactive approach to emotion. In this section, we will outline the main features of the enactive approach in cognitive science, and then in the next section develop the approach in relation to emotion.

The name “the enactive approach” and the associated concept of *enaction* were introduced by Varela and colleagues (1991) in order to describe and unify under one heading several related ideas. The first idea is that living beings are autonomous agents that actively generate and maintain their identities, and thereby enact or bring forth their own cognitive domains. An autonomous system, instead of processing preexisting information “out there” brings forth or enacts information in continuous reciprocal interactions with its environment. “Inner” and “outer” are not separate spheres, connected only through a representational interface, but mutually specifying domains enacted in and through the structural coupling of the system and its environment.

The second idea is that the nervous system does not process information in the computationalist sense. Information does not flow through a sequence of processing steps in a hierarchically organized architecture (typically divided into a perceptual, a cognitive and a motor layer). Rather, the nervous system is an autonomous system. It actively generates and maintains its own coherent and meaningful patterns of activ-

ity according to its operation as a circular and reentrant sensorimotor network of interacting neurons.

The third idea is that cognition is a form of embodied action. Cognitive structures and processes emerge from recurrent sensorimotor patterns of perception and action. Sensorimotor coupling between organism and environment modulates, but does not determine, the formation of endogenous and dynamic patterns of neural activity. This activity, in turn, informs sensorimotor coupling, so that the whole embodied organism can be seen as a self-organized autonomous system that creates meaning

The fourth idea is that a cognitive being's world is not a prespecified, external realm, represented internally by its brain, but a relational domain enacted or brought forth by that being's autonomous agency and mode of coupling with the environment. This idea links the enactive approach to phenomenological philosophy, for both maintain that cognition bears a *constitutive relation* to its objects. Stated in a classical phenomenological way, the idea is that the object, in the precise sense of that which is given to and experienced by the subject, is conditioned by the mental activity of the subject. Stated in a more existential, phenomenological way, the idea is that a cognitive being's world—whatever that being is able to experience, know, and practically handle—is conditioned by that being's form or structure. Such “constitution” on the part of our subjectivity or being-in-the-world is not subjectively apparent to us in everyday life, but requires systematic analysis—scientific and phenomenological—to disclose.

This point brings us to the fifth and last idea, which is that experience is not an epiphenomenal side issue, but central to any understanding of the mind, and needs to be investigated in a careful, phenomenological manner. For this reason, the enactive approach has from its inception maintained that cognitive science and phenomenology need to be pursued in a complementary and mutually informing way (for detailed discussion of this point, see Thompson, in press).

In summary, according to the enactive approach, the human mind is embodied in our entire organism and embedded in the world, and hence is not reducible to structures inside the head. Meaning and experience are created by, or enacted through, the continuous reciprocal interaction of the brain, the body, and the world.

Within this web of reciprocal interaction, we can distinguish three permanent and intertwined modes of bodily activity: (a) self-regulation, (b) sensorimotor coupling, and (c) intersubjective interaction (Thompson & Varela, 2001). Self-regulation or organismic regulation of the internal milieu is essential to being alive and sentient. It is evident

in conditions such as being awake and asleep, alert or fatigued, hungry or satiated. It is also evident in emotion and feeling, in Damasio's (1999) sense of distinctive patterns of brain-body activity (emotions) and the felt experience of such patterns (feelings). Sensorimotor coupling with the world is expressed in perception and action. According to the enactive approach to perception as recently developed by Noë (2004), perception is not something that happens to us or in us; it is something we do. Perceiving is a kind of action, and involves tacit, skilful knowledge of how sensory stimulation varies as a function of movement (see O'Regan & Noë, 2001). Intersubjective interaction is the cognition and affectively charged experience of self and other. Our bodily structure and sensorimotor skills ground our ability to make sense of the other, and vice versa (Thompson, 2001, in press). The human brain is crucial for these three modes of activity, but it is also reciprocally shaped and structured by them at multiple levels throughout the lifespan.

One of the ideas from phenomenological philosophy especially relevant to the enactive approach is the idea that one's body is not simply another physical entity, but rather, a subjectively *lived body* (*Leib*). To experience one's own embodiment is to be a bodily subject of experience, a lived body. Phenomenological investigations of the lived body are investigations of the various aspects of bodily subjectivity—one experiences oneself as a subject of voluntary movement, as a subject of ownership (as aware of oneself as the one who is undergoing certain experiences), as a situated subject, as a perceiving and acting subject, as an affective subject, as a social subject, and so on (Gallagher & Marcel, 1999).

Cognition is thus embodied in both a structural and a phenomenological sense. Cognition is structurally embodied in the sense that it is subsumed by neural, bodily, and environmental processes (including other embodied agents). This idea is related to the so-called "extended-mind" viewpoint, according to which environmental resources play a necessary, constitutive role in cognition (Clark & Chalmers, 1998; Clark, 2003). Cognition is phenomenologically embodied, because cognition—as a subjectively experienced mental activity—involves one's experience of oneself as a bodily subject situated in the world.

In the next section, we look at the implications of this conception of embodied cognition for the way appraisal and feeling are characterized by emotion theory.

A SKETCH OF AN ENACTIVE APPROACH TO EMOTION

The enactive approach implies that we need to move beyond the head/body and subjective/objective dichotomies that characterize much of

emotion theory. Appraisal is not a cognitive process of subjective evaluation “in the head,” and arousal and behavior are not objective bodily concomitants of emotion. Rather, bodily events are constitutive of appraisal, both structurally and phenomenologically.

This enactive proposal can be developed by drawing on Lewis’ (in press) concept of an emotional interpretation, mentioned in a previous section. According to Lewis, during an emotional interpretation, emotion and appraisal are amalgamated in a complex, self-organizing pattern, such that it is impossible to disentangle the moment of emotion from the moment of appraisal. One way to think about this idea is by comparison with enactive or dynamic sensorimotor approaches to perception and action (Hurley, 1998; Noë, 2004; O’Regan & Noë, 2001). According to these approaches, perception is as much a motor process as a sensory one. At the neural level, there is common coding of sensory and motor processes (e.g., Prinz, 1997; Rizzolatti, Fadiga, & Fogassi, 1996). At the psychological level, action and perception are not simply instrumentally related, as means-to-end, but are constitutively interdependent (Hurley, 1998). Perception is thus enactive; it is a kind of action (Noë, 2004; Varela et al., 1991).

If we set aside Lewis’ (in press) claim that emotion and appraisal are composed of distinct and separate constituents, then we can read him as presenting a logically analogous way of thinking about appraisal and emotion. At the neural level, brain systems traditionally seen as subserving separate functions of appraisal and emotion are inextricably interconnected. Hence, we cannot map appraisal and emotion onto separate brain systems. At the psychological level, appraisal and emotion are constitutively interdependent: One is not a mere means to the other (as in the idea that an appraisal is a means to the having of an emotion, and vice versa); rather, they form an integrated and self-organizing emotion-appraisal state, an emotional interpretation. Emotion is a kind of evaluation, and appraisal is part of emotion. In this enactive version of Lewis’ proposal, there is no appraisal constituent that is not also an emotion constituent, and vice versa. Arousal and action tendencies can thus overlap with appraisal. On this view, the bodily aspects of emotion are constitutive of the sense of personal significance traditionally provided by a disembodied appraisal. They are not an objective index of one’s emotional state, but rather, subsume the lived bodily experience of meaning and evaluation.

Consider also feelings. Lewis (in press) regarded feelings as constituents of emotion, and not of appraisal; when an emotional interpretation begins to emerge, feelings play an important role in modulating appraisals. This modulatory role is, in effect, a process of interaction between separate systems, because feelings are constituents of emotion,

but not of appraisal. Our enactive revision of Lewis' account requires a different conception of feelings. Feelings do not belong uniquely to emotion, understood as separate from appraisal. Appraisals are not feelingless. There are "feelings of appraisal," and such feelings are constitutive of emotion experience (Frijda, 1987). More generally, feelings are not separate constituents of emotion, but emergent features of the whole complex system (animal or person) as it enacts an emotional interpretation. This view strikes us as more phenomenologically accurate than views that treat feelings as separate, constituent elements of emotion.⁸

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From the enactive standpoint just sketched, emotions are simultaneously bodily and cognitive-evaluative, not in the familiar sense of being made up of separate-but-coexisting bodily and cognitive-evaluative constituents, but rather in the sense that they convey meaning and personal significance as *bodily meaning and significance*. To borrow Prinz's (2004) terminology,⁹ emotions are *embodied appraisals*.

AQ10

We can elaborate these ideas by considering some possible objections to the enactive approach. Someone might object that emotions do not require the body, but only brain processes that represent bodily states. If there are or can be such "merely brainy emotions," then emotions are not embodied in a strong sense, but really only or mainly in the head.

James (1884/1968) already considered this possibility. He noticed that there are cases of anxiety "in which objectively the heart is not much perturbed" (p. 29, footnote). He did not think, however, that this possibility provided evidence against his idea that emotions are perceptions of bodily processes. His point was that, in any given case, brain anxiety must involve brain areas that represent bodily processes. Similarly, Damasio (1994, 1999, 2003) claims that emotions can be activated through so-called "as-if body loops"—brain mechanisms that trick the brain into believing that the body is undergoing a change, when in fact it is not. Damasio, however, supported the idea that emotions and feelings are thoroughly embodied. He has argued that bodily representations in the brain need to be constantly updated by the body (the "body proper," as he calls it). In particular, biochemical activity is created anew in the body and cannot be fully represented neurally (see Damasio, 1994, p. 158).

For various reasons that concern both the functioning and possibility of as-if body loops, the possibility of merely brainy emotions poses no threat to the idea that emotions are embodied. Damasio's view is that as-if body loops are at play in emotion together with real bodily loops. The former tend to "overwrite" the latter in exceptional cases, such as spinal cord lesions and the so-called locked-in syndrome, in which subjects are conscious and have feelings, but remain locked in a

totally paralyzed body (they are capable only of eye movements).¹⁰ Even in these cases, as-if body loops are not likely entirely to replace “real emotions,” because as-if body loops are entirely neural, and thus cannot simulate the biochemical activity of the body and the brain-body communication that takes place via the bloodstream. As-if body loops are thus only one player in the web of causal intricacies underpinning emotions.

Damasio’s () view, ultimately, is that feelings depend both on bodily representations in the brain and on activity in the body proper, and that feelings come in degrees, depending on how much bodily activity the brain can map. In normal conditions, brain and body are continuously interacting, and there are brain areas that correlate to parts of the body. Were the body proper to interrupt its communication with the brain, and were bodily representations in the brain to activate, emotional experience would then arise as if the body proper had really informed the brain about its state. Yet, because of the variety of ways in which the body proper and the brain are related, it is likely that the brain will not—or not always and not for a long time—be able to provide an entirely accurate map of the state of the body. Thus, a “brainy emotion” might feel some fractional amount of a bodily emotion, depending on how much of the bodily state it can represent and how much input from the body it receives.

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Studies of the emotional lives of subjects with spinal cord lesions support this view. The intensity of their feelings seems to depend on the location of their lesion; the higher the lesion, the weaker the feelings (Hohmann, 1966; Chwalisz, Diener, & Gallagher, 1988). The fact that people with very high lesions still have feelings is no evidence for disembodied emotions. As Damasio (1999) pointed out, spinal cord lesions do not prevent feedback from cranial nerves, facial muscles, and facial viscera. Facial expressions can therefore still provide the feedback needed for the feeling. In addition, the vagus nerve, which enters and exits the brain at the level of the brain stem, carries much information about the viscera; in other words, this nerve functions at a much higher level than the ones damaged by spinal cord lesions. The brain and body are also still connected through the bloodstream, which may allow hormones and other peptides to support background moods and rather slow, long-term emotional changes. Even when the vagus nerve is lesioned, cranial nerves and the bloodstream continue to provide bodily feedback to the brain.

Finally, and more generally, bodily representations in the brain depend on the coevolution and codevelopment of brain and body. The possibility of bodily representations in the brain is intelligible only in a framework that assumes embodiment and embeddedness as the

default case. A bodily representation would eventually cease to represent in its normal way were it not embedded in a web of processes linking it to the world and to the possibility of action in the world (see Hurley & Noë, 2003).

Given these points, it should come as no surprise that the possibility of merely brainy emotions also does not negate the phenomenological dimension of embodiment. Brain anxiety, for example, is still accompanied by the feeling that the body is upset. It was for this reason that James (1884/1968) did not see the possibility of brain anxiety as a threat to his theory.

Let us now consider alleged cases of “purely cognitive” and/or “disembodied” feelings, often discussed in the cognitivist era and still assumed in current emotion theories. In our view, such feelings are not a real empirical and phenomenological possibility, but only seem to be given the assumption that mind and body (and/or brain and body) are distinct, as well as the disembodied stance toward cognition.

Valins’ (1966) study of the effect of “bogus bodily feedback” on feelings is sometimes used to support the idea that emotions and feelings do not require bodily processes, but only cognitive ones.¹¹ Valins addressed Schachter and Singer’s (1962) view that feelings depend on both physiological arousal and cognitive interpretations of one’s surroundings; the former determines the *intensity* of feelings, whereas the latter determines specific *emotional qualities* (e.g., anger, joy, fear, etc.). Valins wanted to test a more radical hypothesis, according to which it is possible to have emotions without physiological arousal altogether.¹² According to this view, cognition alone (understood according to the disembodied stance) would be sufficient for emotion. In his experiment, Valins showed pictures from *Playboy* magazine to male subjects while they listened to what they thought was their own heartbeat. In fact, the pictures were paired with prerecorded sound tracks and provided what Valins called “bogus internal feedback.” The study showed that the pictures paired with faster heartbeats were judged to be more attractive. Valins concluded that bogus internal feedback is sufficient to trigger a feeling (“liking,” in this case).

What exactly does this study show with respect to the embodiment of feelings? Notice first that, as Valins himself admitted, the bogus feedback might modify the state of the body, either by increasing or decreasing its arousal. Hence, the study does not rule out the possibility that feelings of attraction depend on real bodily arousal. Nevertheless, even if bogus feedback had no effect on the body, Valins’ study would not support the idea that feelings are disembodied. We can make this point with respect to both the phenomenological and structural embodiment of emotion.

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On a phenomenological level, the experience involved in Valins' study is the experience of a concretely perceived sound. To be embodied, an experience does not need to be an experience of internal bodily processes. A perceptual experience is an embodied experience because it is an experience of the body in the act of perceiving. From this perspective, the study merely shows that the preferences of the subjects can be influenced by sensory stimulation. Film directors and advertisers know this fact well.

What about structural embodiment? According to LeDoux (1996), Valins' study validates the existence of as-if body loops, because it shows that the elicitation of emotion does not require real bodily loops. This analogy is misleading. The bogus feedback is a real sound that activates brain centers through actual sensory systems. For the experiment to take place, there must obviously be a source of sound and a perceiving body. We believe that a better way to interpret the study is as supporting the idea that emotional experience can depend on structures that extend beyond the boundary of the skin. We can use technology to modulate our emotions. From this "extended mind" perspective (see Clark & Chalmers, 1998; Clark, 2003), the biological brain and body can incorporate other external players in the web of processes subserving emotions and feelings.¹³

Here is another example of extended embodiment. Damasio (2003) stated that "mirror neurons" are an as-if body mechanism. Mirror neurons are activated both when one sees a goal-oriented action, and when one performs the same action (Rizzolatti et al., 1996). Mirror neurons are thus activated as if the individual seeing the movement were actually performing the movement. The existence of mirror neurons suggests that perception and action share a common neural substrate, and that this shared substrate evolved as a means to make sense of the actions of others (Gallese, 2001). Gallese, Keysers, and Rizzolatti (2004) argued that mirror-neuron mechanisms are at play in empathy or the understanding of the emotions of others. For example, studies with humans have shown that increased activity in the insula occurs both when one feels and manifests disgust, and when one perceives someone else expressing disgust. Gallese and colleagues speculate that analogous mirror mechanisms provide the neural basis for emotional contagion, as well as for empathy. There is evidence that the anterior insula activates during both the observation and the imitation of facial expressions of basic emotions.

Overall, such mirror mechanisms reveal the mutual interdependence of the three aspects of embodiment mentioned earlier—self-regulation of the internal milieu, sensorimotor coupling, and intersubjective inter-

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action. Our face-to-face understanding of one another involves a similarity of bodily structure and sensorimotor skills, the capacity for visceral reactions, and bodily proximity.

CONCLUSION

Since the enactive approach was proposed in the early 1990s (Varela et al., 1991), the sensorimotor aspect of embodiment has received increasing attention in cognitive science, thanks to important advances in dynamic sensorimotor approaches to perception (Hurley, 1998; Noë, 2004; O'Regan & Noë, 2001). The intersubjective aspect of embodiment, including its ties to sensorimotor processes, is also currently of great interest (e.g., Gallese, Keysers & Rizzolatti, 2004; see also Thompson, 2001, in press). Emotion and feeling, however, have received much less attention in cognitive science, even from advocates of the embodied approach to cognition. In this chapter, we have tried to correct this imbalance by using the enactive approach to bring emotion theory and embodied cognitive science closer together.

We have argued that the enactive approach has important implications for emotion theory. Emotion theory is still largely caught in the head/body dichotomy inherited from cognitivism and often looks at the body as an objective, impersonal structure, rather than as a subjectively lived body. We have argued that emotions are simultaneously bodily and cognitive-evaluative: They convey meaning and personal significance as bodily meaning and significance.

Our proposal at this point is only a sketch, not a detailed account. Much work remains to be done, both in theoretical and experimental psychology, and in phenomenology (where there is still no detailed phenomenological analysis of specific emotions and their relation to the lived body). In particular, dynamic systems theorists of emotion can benefit from revising their accounts of appraisal and feeling to incorporate embodied accounts of cognition, while enactive theorists can benefit from expanding their accounts of cognition to include emotion and feeling. Only through this joint effort can emotion take its rightful place in an integrated view of mind in body and body in mind.

ENDNOTES

1. Rather than with the obscure expressions “material notions” (proposed by Jon Solomon; see Calhoun & Solomon, 1984, p. 49), or “formulae in matter” (proposed by H. G. Apostle; see Aristotle, [version, 1981], 403a).
2. All quotations from James (1884/1968) refer to the reprinted version.

3. Today we have a different view of bodily arousal and of its role in emotion. We know that there are more than 70 different types of peptides, each of which has a different function (Panksepp, 1998; Pert, 1997). LeDoux (1996) speculates that each emotion might depend on a specific peptide.

4. Note that Schachter and Singer (1962) explicitly stated that their study did *not* rule out the possibility of physiological differences among emotional states (p. 397).

5. Nor is he willing to give up the idea that emotion and appraisal are made up of distinct components. See our commentary (Colombetti & Thompson, in press), and Lewis' reply (Lewis, in press).

6. He wrote that the notion of embodied appraisal "marks . . . a major reconciliation. The tradition that associates emotions with appraisals is generally presumed as at odds with the tradition that identifies emotions with changes in physiology" (Prinz, 2004, p. 78).

7. For example, Lazarus (2001) claimed that appraisal has to do with "personal meaning," and he writes that "an *appraisal* connotes evaluation of the personal significance of what is happening in an encounter with the world" (p. 40). Roseman and Smith (2001) stated that "[d]ifferences in appraisal can account for individual and temporal differences in emotional response. . . . Because appraisal intervenes between situation and emotions, *different individuals who appraise the same situation in significantly different ways will feel different emotions*" (p. 6).

8. For an account of feelings along these lines see Watt (1998) and Varela and Depraz (2000).

9. But not his theory, which, as we discussed in a previous section, maintains a traditional disembodied conception of judgment.

10. See Damasio (1994, pp. 155–158; 1999, p. 281; 2003, pp. 115–116).

11. LeDoux (1996) also mentioned the study as providing evidence for the existence of as-if body loops as characterized by Damasio. See below for a criticism of this interpretation.

12. Schachter and Singer's (1962) conclusion reflects a disembodied stance, because they concluded that arousal does not contribute in any way to affective specificity. Nevertheless, some still considered arousal necessary for a nonspecific sense of relevance and for determining the intensity of feelings.

13. See Clark (2003, pp. 189–195) for a defense of the idea that the "extended mind" view does not imply disembodiment.

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