

Originally published in Stewart, J., Gapenne, O. & Di Paolo, E. (2010)(eds). *Enaction: Towards a New Paradigm for Cognitive Science* (pp.145-164)
Cambridge MA: MIT Press.

Enaction, sense-making and emotion

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Abstract

The theory of autopoiesis is central to the enactive approach. Recent works emphasize that the theory of autopoiesis is a theory of sense-making in living systems, i.e. of how living systems produce and consume meaning. In this chapter I first illustrate (some aspects of) these recent works, and interpret their notion of sense-making as a bodily cognitive-emotional form of understanding. Then I turn to modern emotion science, and I illustrate its tendency to over-intellectualize our capacity to evaluate and understand. I show that this overintellectualization goes hand in hand with the rejection of the idea that the body is a vehicle of meaning. I explain why I think that this over-intellectualization is problematic, and try to reconceptualize the notion of evaluation in emotion theory in a way that is consistent and continuous with the autopoietic notion of sense-making.

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There can be only an individuality that copes, relates and couples with the surroundings, and inescapably provides its own world of sense.

A. Weber & F.J. Varela (2002, p. 117)

1 Introduction: Cartesian anxieties

Varela, Thompson & Rosch (1991) wrote that the enactive approach should free cognitive science from its “Cartesian anxiety.” In their characterization, this anxiety is induced by the idea that to know is to have a mind which possesses internal detailed and complete representations of the outside world, and that cognitive science needs accurately to reproduce such a mind’s representing powers. According to Varela, Thompson & Rosch, the therapy for this anxiety consists in replacing the idea that cognitive systems represent an independent world with the idea that cognitive systems enact or bring forth their own worlds of significance.

I think that much of current emotion science suffers from a related form of Cartesian anxiety that also needs an enactivist therapy. It is a widespread view in emotion science that the capacity to evaluate and more generally understand the meaning of a situation is a prerogative of cognition, understood as an abstract intellectual process; on this view, the body merely responds to cognition’s evaluations.¹ The two forms of anxiety are related, in that both depend on the view that the body’s function is to transmit information (about the environment and the body itself) to the cognitive-evaluative mind and then to execute motor actions, whereas the cognitive-evaluative mind selects and elaborates sensory information and tells the body what to do. In *The Passions of the Soul* (1988) Descartes recognized that the emotions involve an intimate unity of mind and body (see article XXX), and yet ended up treating them as bodily stirrings that merely inform the mind about the state of the body, and

¹ By “body” I mean here specifically the *non-neural* body. Yet note that in the psychology of emotion there is not much discussion of the neural processes that might subsume the capacity to evaluate either. Cognitive evaluations are thus very much “mental” in Descartes’ sense, although of course all emotion scientists would claim that cognitive evaluations are embodied in the brain or in some part of it.

that are not in themselves able to produce flexible and adaptive behavior. As Wheeler (2005, pp. 47-48) notices, Descartes treats the emotions very much like bodily sensations (e.g. hunger, thirst, fatigue) whose physiological changes are not sufficient to bring about an intelligent response appropriate to the situation; the intervention of the mind is necessary for the occurrence of any response of the latter sort. Much mainstream emotion theory similarly assumes that cognitive evaluations are necessary to trigger behavioral responses appropriate to the situation. The Cartesian anxiety that characterizes much emotion science is thus one in which cognition is constantly preoccupied with monitoring, evaluating and regulating the body, and with making sure that every action is performed out of (mental) reasons, not out of (bodily) passions.

To be sure, modern emotion science has proposed accounts of emotion that are even more intellectualistic than Descartes'. First, Descartes did endow some of the bodily changes accompanying the emotions with the capacity to produce quick-and-dirty adaptive responses (e.g. *Passions of the Soul*, XIII, XXXVIII), whereas some modern emotion theories deny that bodily changes are necessary for emotion altogether. On their account, emotions are intellectual judgments and belong entirely to the cognitive-mental realm; the bodily events that may accompany them are contingent byproducts. Second, some modern emotion theories assume that the bodily stirrings that accompany the emotions need to be *interpreted* by cognition in order to be experienced by the subject as a specific emotion with its own qualitative feel. Descartes posited a direct relationship between the bodily stirrings of the passions and the mind – he did not think that bodily stirrings need to be interpreted by the mind in order to bring about specific experiences. He described many different bodily processes that, once in contact with the mind, would induce specific experiences immediately, i.e. without the intervention of an interpreting mind.

As I see it, much emotion science tends to disregard the *meaning-generating* role of the body and to attribute this role only to separate abstract cognitive-evaluative processes. For reasons I will explain, I think that this tendency is problematic. In particular I think that emotion should be conceptualized as a faculty of the whole embodied and situated organism. Evaluations arise in this organism in virtue of its embodied and situated character, and the whole situated organism carries meaning *as such* – not by way of some separate abstract cognitive-evaluative faculty.

In this chapter I will elaborate on this view by adopting two converging strategies. In the next section I will illustrate the idea of whole-organism-generated meaning by drawing on the notion of *sense-making* in the autopoietic and adaptive system developed by Weber &

Varela (2002) and Di Paolo (2005). In particular I will interpret their notion of sense-making as *a bodily cognitive-emotional form of understanding* that belongs to all living systems, and that is present in a primordial form even in the simplest ones. In section 3 I will turn to modern emotion science and illustrate its tendency to overintellectualize our capacity to evaluate and understand. I will show that this overintellectualization goes hand in hand with the rejection of the idea that the non-neural body is a vehicle of meaning. I will explain why I think that this overintellectualization is problematic, and try to reconceptualize the notion of evaluation in emotion theory in a way that is consistent and continuous with the notion of sense-making presented in section 2. In section 4 I will mention issues that I think still need to be addressed in order to develop the theory of embodied meaning attempted here.

2 Emotion in enaction: Autopoiesis, adaptivity and sense-making

The enactive approach and the associated concept of enaction were introduced by Varela, Thompson & Rosch (1991) in order to describe and unify under one heading several related ideas. Many of these ideas were an elaboration of Maturana & Varela's (1980) theory of autopoiesis and its notion of autonomous system. Here I will focus on (one aspect of) a later development of the theory of autopoiesis, namely Weber & Varela's (2002) discussion of the origin of value in living systems, and (part of) Di Paolo's (2005) critique and elaboration of their view. What I am interested in is their notion of sense-making, which assumes that the whole organism is a vehicle of meaning. To be sure, they do not explicitly mention emotion or emotions, e.g. they do not say that sense-making is emotional, or anything similar. Yet I believe that their characterization of sense-making can be naturally understood as the recognition of the constitutive emotional character of enaction (more below).²

Weber & Varela (2002) address the difficult question of the nature of teleology in living systems: Is it possible to account for the purposes of individual organisms in the Newtonian mechanistic framework that dominates current science, including biology? Weber & Varela's solution is to make room for *natural purposes* in the living organism. This

² In their discussion of the place of emotion in enaction, Varela & Depraz (2005) announce that "emotions cannot be seen as a mere 'coloration' of the cognitive agent, understood as a formal and un-affected self, but are immanent and inextricable from every mental act" (p. 61). They also say that their analysis aligns perfectly with the phenomenological analysis of the relationship of emotion and movement offered by Sheets-Johnstone (1999). These papers do not mention autopoiesis or sense-making, but their views are consistent with the one I will defend here. This consistency makes me hope that I am not misinterpreting the original intentions of Varela and colleagues.

solution relies on the autopoietic nature of living systems. As Weber & Varela remind us, living systems are autopoietic in the sense that (i) they continuously regenerate the conditions of their own survival (e.g. they exchange matter with the environment, they maintain a certain temperature, etc.), and in so doing (ii) they establish the boundary between themselves and the environment, and thus constitute themselves as unities.

For present purposes, it is important that Weber & Varela explicitly say that (i) and (ii) are the processes whereby living systems necessarily establish a *point of view*, and moreover a *concerned* point of view that *generates meaning*. Here is how they illustrate the conceptual link between autopoiesis and this concerned meaning-generating perspective:

The key here is to realize that because there is an individuality that finds itself produced by itself it is *ipso facto* a locus of sensation and agency, a living impulse always already in relation with its world. There cannot be an individuality which is isolated and folded into itself. There can only be an individuality that copes, relates and couples with the surroundings, and inescapably provides its own world of sense. (Weber & Varela, 2002, p.117)

By defining itself and thereby creating the domains of self and world, the organism creates a perspective which changes the world from a neutral place to an *Umwelt* that always means something in relation to the organism.³ (*ibid.*, pp.117-118)

This idea amounts to the recognition that *meaning* is generated within the system for the system itself – that is, it is generated and at the same time consumed by the system. Importantly, meaning is not uniquely specified by the living system in isolation from its environment. Rather, meaning is always *relational* in the sense that it depends on the specific mode of co-determination, or coupling, that each system realizes with its environment; different couplings produce different meanings.

The point of view that, on this view, emerges within the living system is the system's concern for its own autopoietic organization. The living system, by definition, aims at regenerating its viability conditions and at maintaining its identity. This view implies that to be a living system is to be, necessarily, a system concerned with its own continuation. With

³ The term *Umwelt* was used by von Uexküll (1921) to refer to the features of an animal's environment that are salient for the animal itself. The *Umwelt* is the environment experienced by the animal, i.e. the lived or phenomenal environment.

respect to the environment, this means that the environment is never, for the living system, a neutral world awaiting to be internally represented and evaluated in order to become meaningful. Rather, the world is directly encountered *as* meaningful by the concerned living system. The world is always the living system's own meaningful *Umwelt*.

Di Paolo (2005) has recently noted that Weber & Varela's (2002) passage from autopoiesis to sense-making is too rushed, and in particular it does not allow for the emergence of various *grades* of meaning. As he argues, the autopoietic system as characterized by Weber & Varela has only one crude concern, namely to sustain itself against the forces that would otherwise induce its disintegration. In order to account for various degrees of meaning, *adaptivity* needs to be explicitly added to the notion of a living system. Adaptivity, understood by Di Paolo as the capacity of the organism to regulate and monitor itself with respect to its viability conditions, allows for the emergence of various degrees of concern. To illustrate this idea, consider the often mentioned example of a bacterium swimming uphill in a sugar gradient. If Di Paolo is right, the mere regeneration of the bacterium's conditions of continuation only allows for the emergence of a crude, all-or-nothing form of meaning: sugar is good, and lack of sugar is bad. If however the bacterium is conceived of as an organism able to regulate itself in relation to its conditions of viability, then the sugar gradient becomes a space of possibilities that establishes different degrees of value: concentration x of sugar is good, concentration y is better, concentration z not sufficient, etc. The introduction of degrees of value thus makes room for a notion of organismic *preferences*.

In sum, if we take Di Paolo's (2005) arguments as a valid and useful explicitation of the adaptive nature of the living system as understood by Weber & Varela (2002), what we have is a graded notion of natural purposes in the living system.⁴ The living system is by definition motivated to preserve its integrity (autopoiesis) and to satisfy its preferences (adaptivity). The explicit recognition of the adaptive, rather than merely self-maintaining, nature of the living system characterizes the system's point of view not only as concerned with its own continuation, but as able to discern gradations of value and motivated to achieve its ideal conditions of viability.

⁴ It is interesting to recall that Maturana & Varela (1980) had explicitly banned purposes from the autopoietic system. Thompson (2007, chapter 6) illustrates some of the reasons (including his own exchanges with Varela) for the shift of perspective that eventually led to the notion of natural purpose in Weber & Varela (2002).

Crucially the theory of autopoiesis aims at being not only a theory of the living system, but also of *cognition*. As Thompson (2007, chapter 6) explains, in fact, for Varela any autopoietic system is a cognitive system. Varela's notion of cognition encompasses all sense-producing and self-generating systems. On this view, for a system to cognize is to produce and consume meaning in virtue of its mode of organization and coupling with the environment.

This conception of cognition is very different from the one that has characterized, and still characterizes, cognitive science and much of mainstream philosophy of mind and of cognitive science. Even most supporters of the embodied and situated approach emphasize the role of the body in cognition as that of an *interface* indispensable for the acquisition of knowledge; or, for example, as that whose structure can explain the nature of perceptual experience (e.g. Noë, 2004). According to the view of cognition that emerges from the theory of the autopoietic and adaptive system, the body plays a role in cognition also thanks to its chemical and "self-regulatory" (as Thompson & Varela, 2001, call it) dimension. Metabolism is necessary for the emergence of values and preferences in living systems.

Varela's notion of cognition is very similar to accounts of emotion given by scientists such as e.g. Panksepp (1998) and Damasio (1999), who see emotion as playing an important role in self-regulation and adaptivity. For Damasio (1999) emotion is primarily an organismic process of self-regulation aimed at maintaining homeostasis. Emotion thus conceived also provides action-guiding values, drives and preferences. Panksepp (1998) sees emotion as a collection of meaning-generating and adaptive mechanisms underpinned by specific neural and endocrine processes; emotion allows the organism to adapt to life-challenging circumstances, is constitutive of action and organizes diverse behaviors, and modulates the activity of perceptual systems.

On this view of emotion, the account of natural purposes developed by Weber & Varela (2002) and Di Paolo (2005) as a theory of bodily sense-making is as much a theory of emotion as it is a theory of cognition. In these works the theory of autopoiesis becomes, more explicitly than in other texts, a theory of the origin of meaning in living systems. At this level of description, to cognize and to make sense in virtue of one's autopoietic and adaptive nature are one and the same process. This process can also be seen as emotional, in that it provides values and induces actions accordingly (motivation), and in that these values and actions are self-regulating and adaptive organismic processes.

What about the *emotions* of mainstream emotion theory (e.g. fear, happiness, anger, etc.)? Mainstream emotion theory typically sees emotion as a psychological faculty

constituted by various individual emotions that are more or less violent experiences and/or bodily stirrings, and that are distinct from non-emotional phenomena. In this section emotion has been characterized rather as the capacity that we share with other living systems to make sense of our environment in virtue of our being self-organizing and adaptive organisms. This is a broader conception of emotion, according to which fear, anger, happiness, guilt, anguish, etc. are only *some* of the many ways in which sense-making manifests itself in experience and in the body. To endorse the view that even the simplest organisms have values and preferences does not imply, of course, that all living systems have fear, anger, happiness, etc. (not to mention complex and/or idiosyncratic human emotions). The issue at stake is not how far down in the realm of the living systems we are happy to go until we decide to stop attributing emotions to organisms; the issue is, rather, what it is about living systems that makes the emergence of meaning possible. The theory of autopoiesis illustrated here places the conditions of possibility of meaning in the processes of self-generation and adaptivity that define living organisms and that, in the simplest ones, constitute a primordial form of bodily cognitive-emotional understanding. A corollary of this view is that the traditional distinction between emotional and non-emotional episodes falters. It remains of course possible and often useful to distinguish various forms of sense-making, but in the account defended here there is no room for emotionless cognition.

3 Enaction in emotion: Enacting appraisals

As part of its endeavor to dispel Cartesian anxieties, the enactive approach should underscore the continuity between the bacterium's sense-making, and what it means for me to understand the several meanings of my *Umwelt* and to regulate my behavior accordingly. This involves resisting the temptation to explain the way we humans make sense of our world by endowing our minds with abstract evaluative and meaning-generating powers. In this section I will show that this attitude is alive and thriving in emotion science. I will then say why I think this attitude is problematic, and I will replace it with an integrated view that is consistent and continuous with the theory of embodied meaning in the autopoietic and adaptive system delineated above.

In the area of emotion theory known as appraisal theory, my capacity to evaluate events in my environment and to regulate my behavior accordingly is explained with reference to the process of *appraisal*. Appraisal is usually characterized as a cognitive

process, and as separate from bodily *arousal*.⁵ Typically, appraisal is the process that evaluates and understands the environment, and that ultimately brings about specific emotions (e.g. to appraise something as dangerous brings about fear, to appraise something as offensive brings about anger, etc.). Bodily arousal is typically an effect of appraisal that does not exert any causal power on it – it is a *byproduct* of appraisal. Appraisal theories vary according to whether they consider arousal a *necessary* component of emotion, or merely a *contingent* concomitant. We will see that, even in the former case, arousal tends to play no role in differentiating among emotions, and thus in qualifying a subject’s emotional state.

Arnold (1960) introduced the notion of appraisal to overcome the difficulties of the most influential theories of emotion of her time. These difficulties concerned the role of the body in emotion and feeling, and the relationship between stimulus-detection and emotional response. According to James (1884), an emotion was a bodily event and the experience of that emotion – the feeling – the perception of that bodily event; “*the bodily changes follow directly the PERCEPTION of the exciting fact, and ... our feeling of the same changes as they occur IS the emotion*” (James, 1884, in Arnold, 1968, p.19). James famously insisted that “a purely disembodied emotion is a non-entity” (*ibid.*, p.23); if you imagine an emotion without its bodily symptoms, you will be left with a “cold and neutral state of intellectual perception” (p.23). James also believed that the body is richly differentiated and that there is an “immense number of parts modified in each emotion” (p.21); on his view, the muscles, the heart, and the circulatory system all contribute to the generation of different emotional feelings. Other influential emotion theories were activation theories (e.g. Duffy, 1941) and behavioristic theories (e.g. Skinner, 1953). The former identified emotion with activation or “energy” in the organism, and different emotions with different degrees of such energy. Behaviorism, on its part, saw emotions primarily as dispositions to behave in a certain way.

Arnold (1960) complained that none of these theories paid sufficient attention to how emotions are *elicited*. They were thus unable to explain why, for example, the same situation can induce different emotions in different individuals. What all these theories lacked, she remarked, was an account of how individuals *interpret* their environment. According to

⁵ When psychologists of emotion talk of bodily arousal, they usually refer to visceral and musculoskeletal changes. This is the notion of arousal with which I am concerned here. Neuroscientists on their part characterize certain brain areas (such as the amygdala, the anterior cingulate cortex, the insula, etc.) as importantly involved in emotional arousal. My arguments also apply to neuroscientific theories that neatly distinguish between brain areas specifically involved in cognitive appraisal, and brain areas specifically involved in arousal.

Arnold, emotions were first of all *personal* responses to the environment and had to involve a process of subjective evaluation – appraisal, as she called it.

In the heydays of cognitivism the notion of appraisal underwent a process of reification and appraisal became a box in the mind. For Lazarus (1966) appraisal was (and still is) a cognitive process that is *necessary and sufficient* for emotion. Lazarus's account of the relationship between appraisal and emotion is paradigmatic of the “disembodied stance” that characterizes his and other cognitive theories of emotion (see Colombetti & Thompson, in press). On his view, bodily arousal follows cognitive appraisals and is not necessary for emotion. The appraisal process does everything alone – it appraises the environment, it causes bodily changes accordingly, it reappraises the environment and the subject's possibility to deal with it, it causes other bodily changes, etc. Appraisal is here abstract and disembodied, in the sense that it is conceptually, causally and phenomenologically distinct from bodily arousal.

This disembodied conception of the evaluative faculty goes hand in hand with what I have called *corporeal impersonalism* (Colombetti, in press), or the assumption that one's non-neural body does not contribute to subjective, personal understanding – in short, is not a vehicle of meaning. Corporeal impersonalism is evident in Lazarus's conception of bodily arousal as unnecessary for emotion and understanding, but it is found also in theories according to which bodily arousal *is necessary* for emotion. According to Schachter & Singer (1962), for example, bodily arousal and cognitive appraisals are both necessary for emotion. On their view, however, bodily arousal is not emotion-specific; it is “a general pattern of excitation of the sympathetic nervous system” (p. 379) that only contributes to the *intensity* of emotion. Crucially, bodily arousal needs to be *interpreted* in order for a specific emotion – e.g. fear, anger, happiness, etc. – to arise (according to related subsequent “causal attribution theories,” arousal needs to be *attributed to a specific cause*). In other words, bodily arousal plays a role in the differentiation of emotion only through the mediation and interpretation of appraisal, typically conceptualized as separate from bodily arousal. This view is characterized by corporeal impersonalism because, in order for the subject to experience her bodily arousal as a specific emotion experience, the mediation of a non-bodily interpretive capacity is required. Without such mediating interpretation, bodily arousal is non-specific, unintelligible and meaningless to the subject.

Corporeal impersonalism also comes out in Schachter & Singer's claim that when one knows the causes of one's bodily arousal, no need to interpret it arises (“Given a state of physiological arousal for which an individual has a completely appropriate explanation, no

evaluative needs will arise and the individual is unlikely to label his feelings in terms of the alternative cognitions available”; Schachter & Singer, 1962, p. 398).⁶ Because for Schachter & Singer arousal and appraisal are both necessary for emotion and emotion experience, it follows that when one knows the causes of one’s bodily arousal, no emotion and emotion experience arise.

To be sure, the experiments that Schachter & Singer carried out to provide evidence for their theory have been criticized several times. Their theory of emotion however still influences contemporary conceptions of emotion. At present most emotion scientists believe that only some emotions have distinctive bodily signatures, and that cognitive appraisals provide further differentiation (for a sophisticated version of this view, see e.g. Cacioppo et al., 2000). This compromise still presupposes corporeal impersonalism, because it implies that some aspects of emotion and of meaning in emotion experience do not come from the body.⁷

What exactly is wrong with these views? There are two senses in which, I think, corporeal impersonalism and the disembodied stance are problematic. First, they are *phenomenologically* implausible in that they do not do justice to many instances of lived human experience. Second, they are *structurally* implausible, in the sense that they presuppose a brain/body dichotomy that is nothing more than the materialistic version of Cartesian mind/body dualism – namely, a brain/body dualism that, like Descartes’ mind/body dualism, fails to elaborate on the implications of the rich interconnectivity of the brain, the body and the environment. In what follows I shall illustrate these two forms of implausibility and try to offer a reconceptualization of appraisal that is consistent and continuous with the theory of embodied meaning in the autopoietic and adaptive system presented in the previous section.

⁶ This claim refers specifically to some of the results of Schachter & Singer’s (1962) controversial experiments. They found that subjects who had been injected with adrenaline and who had been adequately informed about the physiological effects of the injection, did not label their bodily arousal as an emotion.

⁷ An appraisal theorist at this point might want to defend herself by saying that she does not hold a view of cognition as some ethereal Cartesian mental substance, and that of course appraisal depends on the brain (see footnote 1). The problem with appraisal theory, however, is precisely that it relies on an unclear notion of cognition. At a closer look, the view that cognition, *and not the body*, specifies which emotion one is having, is mysterious. How can cognition determine a specific emotional feeling? How can a cognitive appraisal, whose relation to the brain and the body is left unaccounted for, induce a specific experience? What does it mean, ultimately, to claim that cognition distinguishes among emotions and specifies which emotion one is having?

Appraisal theorists themselves acknowledge that it is not clear what appraisal is (e.g. Roseman & Smith, 2001). It is unclear for example whether it refers to a conscious process, an implicit one, or both. This ambiguity leaves room for interpretations of Schachter & Singer's (1962) theory that fail to do justice to human lived experience. Consider their view that bodily arousal is uniform, and that emotions are differentiated by the intervention of the cognitive appraisal that evaluates the situation and interprets arousal accordingly. Now, it seems highly unlikely that affective specificity always depends on one's capacity to interpret, or find the cause for, one's bodily arousal. One often finds oneself in a state of bodily arousal for which one has no explanation, yet this state of arousal does not feel emotionally neutral. I often wake up groggy, depressed or energetic without knowing why. Sometimes I know right away that that my state is due to cyclic hormonal fluctuations, yet my emotion does not dissolve because I have found that my arousal has no "emotional cause" (I wish it would!). Other times I do attribute the cause of my emotional states to some emotional source – e.g. last night's fight with my housemate. In these cases it is often my bodily arousal, already felt as a specific emotion, that guides my interpretation and reminds me of the cause of my emotion – not vice-versa as Schachter & Singer's view seems to imply.

There are also studies that have shown that uninterpreted arousal (arousal for which subjects do not have an explanation) is not meaningless or experienced as emotionally neutral. It actually seems that unexplained arousal tends to be experienced as a negatively toned affective state (Marshall & Zimbardo, 1979; Maslach, 1979). Interesting cases reported by Damasio (2003, pp. 67-79) suggest that specific behaviors and experiences can be induced by direct manipulation of bodily arousal. In one case, a woman started to show facial expressions of sadness, and then to cry and sob, as soon as an electrode stimulated a specific part of her brainstem. Once the electrode contact was removed, the sobbing stopped together with the feeling of sadness, and the subject reported she did not know why she had felt so awful. In another case, following brain surgery a patient would suddenly burst into crying or laughter without apparent cause. Sometimes these bursts took place in quick succession, leaving the patient "barely time enough to take a breath and say that he was not in control, that neither laughter nor crying were really meant as such, that no thoughts in his mind justified this strange behavior" (Damasio, 2003, p. 78).

As we saw, Schachter and Singer also claimed that when one knows that the source of one's bodily arousal is not emotional, no necessity for interpreting it ensues and bodily arousal is thus not accompanied by any emotion experience. This idea also looks implausible when confronted with lived human experience. Knowing that my euphoria at the party is

caused by alcohol, for example, does not reduce it; or knowing that my exhilaration is due to physical exercise does not eliminate it, etc. Here too there are studies that cast doubt on Schachter & Singer's claim. Frijda (1986) observed that subjects knowingly receiving adrenaline can still experience emotion (e.g. anxiety), especially if they are predisposed to it. Reizenstein (1983, pp. 249-250) mentioned several studies showing that subjects who clearly knew the source of their arousal reported genuine emotions. Also, attempts to make subjects believe in the wrong cause of their arousal (so-called "misattribution manipulation studies") can fail for subjects particularly prone to certain emotions (see Reizenstein, 1983, for further references).

The view according to which arousal is a mere byproduct of appraisal (as in Lazarus) is also, I think, phenomenologically implausible. It seems to me that appraisal is experientially integrated with arousal, in the sense that I appraise the meaning of a situation *through* my being embodied and situated in it, and through the specific state of my body. In other words, bodily arousal seems to me to be part of the experience of appraisal. Mainstream emotion theory typically conceives of emotion experience as the feeling of one's body being aroused, and of appraisals as feelingless processes. Yet there are feelings of appraisal, and such feelings are part of emotion experience. Consider my anxiety during a job interview. I am sweating, my hands shake and my breath is short. Yet I am not reflectively paying attention to my bodily arousal because I am focusing on the interviewers' questions. There is a sense, however, in which the interview-situation is evaluated and experienced as anxiety-provoking *through* the state of my body. Not only do I notice the shortness of my breath and my fingers shaking while I speak, but the interviewers' questions are, so to say, "felt in my heartbeat." The whole experience (including the experience of the room in which the interview is taking place, of the interviewers' attitude, of my own demeanor, etc.) includes a sense of my bodily arousal, is "colored" – for lack of a better term – in a certain way through my arousal.

What is this sense of bodily arousal through which I live the experience of the interview? The notion of *the lived body* is useful here. In phenomenology, the lived body refers to the pre-reflective bodily self-consciousness that constitutes perceptual experiences (see Thompson & Zahavi, 2007, for a clear illustration of this complex notion). The lived body is the backdrop against which my perceptual experiences take place. For example, while typing on this computer I experience the whiteness of the virtual sheets, the smoothness of the keys, the hardness of the chair, etc. and at the same time I am aware of my body as that through which these experiences are made possible. In the case of an emotion

experience like my anxiety during the interview, I am also similarly aware of my bodily arousal as that through which I am living the situation as anxiety provoking. As far as I know, the notion of the lived body appears mainly in accounts of perceptual experience. Yet it need not be restricted to perceptual experience. Patocka (1998), for example, emphasizes the striving and affective character of the lived body, and he talks of experiences of our environment as “physiognomic impressions” (see also Thompson & Zahavi, 2007, for a related discussion of Husserl’s *affectivity*).

The other sense in which corporeal impersonalism and the disembodied stance are implausible has to do with how the brain and the non-neural body relate to each other. We have seen that the psychological mechanism of appraisal is typically conceived of as separate from arousal. Arousal, on its part, is typically a set of events in the non-neural body. Because appraisal is separate from arousal thus conceived, it follows that appraisal must depend on the brain, or on some part of it.

From the point of view of the organism, however, the separation of appraisal and arousal is fuzzy. As Lewis (2005) points out, for example, systems for appraisal largely overlap with systems for arousal (and with other traditional constituents of emotion such as feelings, action and attention). His analysis of the subpersonal processes that lie beneath appraisal and emotion, including arousal, reveals a distributed network of self-organizing and mutually influencing brain and bodily processes, each of which subsumes various functions. The amygdala for example plays a dual role in appraisal and arousal; the anterior cingulate cortex is involved in planning, attentional orientation and emotion experience; bodily arousal (ANS and endocrine activity) maintains the organism’s homeostatic equilibrium, contributes to emotion experience, enhances attention, and prepares for action. Lewis in particular points out that there are phenomena of *emotional interpretation* during which systems subsuming appraisal and emotion, including arousal, become deeply integrated via reciprocally constraining processes of positive and negative feedback (self-amplification and self-stabilization).

Lewis’s account is many ways analogous to Freeman’s (2000) model of sensorimotor integration, in which appraisal and arousal are also structurally integrated within the whole embodied organism.⁸ Freeman points out that sensorimotor integration is continuously modulated by the amygdala – a part of the brain traditionally considered important for

⁸ For a discussion of Lewis’s and Freeman’s models in the context of the enactive approach and in relation to phenomenological accounts of protention and affectivity, see Thompson (2007, chapter 11).

arousal. The amygdala contributes to deciding what is relevant for the organism and how the organism should act. Freeman characterizes this process not as a hierarchical one of evaluation and control of the organism on the part of the amygdala, but as a self-organizing process in which perception, action and the amygdala modulate one another in the service of the organism's viability.

On the resulting view, it is hard to see why only some systems should be those in charge of evaluating and understanding, whereas others should be merely reacting and deprived of any meaning-generating role. In the integrated model that emerges from Lewis's and Freeman's discussion, it is the whole situated organism that subsumes the capacity to make sense of the environment and to act in it. Bodily arousal is here *constitutive* of the process of interpreting a situation (understanding) traditionally conceived of as the function of a disembodied, or merely brainy, appraisal.

In sum, in this section I have argued that to conceptualize appraisal as a cognitive process separate from arousal implies a disembodied view of appraisal that is both phenomenologically and structurally implausible. Appraisal should be conceived of as experientially corporeal and as structurally embodied, consistently and coherently with the theory of embodied meaning in the autopoietic and adaptive organism presented above. From the enactive standpoint defended here, bodily arousal is not merely a response to the subject's evaluation of the situation in which she is embedded. It is rather the whole situated organism that subsumes the subject's capacity to make sense of her world.

4 Looking ahead: Co-existing bodily appraisals, irrationality and neurochemical harmonization

I would now like to emphasize that the view sketched here allows for different ways to generate meaning within the same organism. In particular, one thing that distinguishes the bacterium's sense-making from mine is that I have available different sources of bodily meaning. Following Jonas (1966), Di Paolo (2005) puts this idea in terms of the emergence of "new forms of life" as organisms increase in complexity:

This new form of life is not contrary or indifferent to metabolism. Made possible by the latter, it will mostly be at its service, but it may also be independent of it to the extent that the adaptivity of metabolism does not dictate a unique way of doing what is necessary for its continuation. Within this independence, the new form of life will

be able to generate, via a process of adaptive closure analogous to metabolism, its own set of values, thus making the process irrevocable and resulting in the *coexistence of different identities in a same organism*. (Di Paolo, 2005, p. 446, italics in original)

It is thus possible to find clashing bodily appraisals within the same organism. A case in point is the one of behaviors traditionally deemed “irrational.” Irrational behaviors by definition are not in accordance with our judgments – as when John experiences fear and jumps away as he sees a spider despite the fact that he judges it as innocuous (an instance of irrational fear), or as when Mary lights up her cigarette while judging that it is bad for her health and she should quit smoking (a case of akratic action, or of weakness of the will). How does the present view account for the deemed irrationality of these behaviors? This is a difficult question, and a complete answer would require a well-developed theory of rationality, concepts, and responsibility. I would like to point out, however, that the present view can accommodate these scenarios as instances of co-existing meanings or bodily appraisals in the same organism. Importantly, many of the behaviors that are traditionally deemed irrational (e.g. irrational fears and addictions) are not unintelligible and do have scientific explanations, such as evolutionary and neurophysiological ones. These explanations often reveal a striking bodily intelligence, and to deem those bodily happenings irrational would mean to overlook some of the organism’s “reasons.” P.S. Churchland (1998) points out that, from the point of view of the organism, it is unlikely that there is a principled distinction between voluntary and involuntary actions, or between being in control and being out of control. She notices that some desires or fears can be very powerful, and that we have more self-control in some circumstances rather than others; hormonal changes, for example, make certain patterns of behavior highly likely. There are neurochemical explanations of phenomena of lack of volition, such as alien hand syndrome, obesity or Tourette syndrome. In many cases, chemical intervention and behavioral therapy can affect these phenomena and re-establish control. The resulting view is one in which “rationality” amounts to a range of optimal values for the relevant chemical and neural parameters. As P.S. Churchland puts it, when values fall within the optimal range, the agent’s behavior is in her control; when they fall within the suboptimal range, the agent is unable to control her behavior. In between, there are many grey areas.

From this perspective, John’s and Mary’s irrational actions are instances of lack of control (i.e. failed or incomplete harmonization of different bodily judgments), yet actions

that obey their own intelligible rules. Importantly, it is possible to bring clashing appraisals into harmony, with the help of chemistry and/or through practice. At present we do not know exactly how to define the optimal range of integration, and as P.S. Churchland points out, there is not going to be one universal specification because in-control individuals are likely to have different temperaments and different cognitive strategies. This point is analogous to Di Paolo's remark reported above that there are many ways to preserve metabolism. Further work on this question would need to discuss more specifically how neurochemical harmonization is realized. Also, the view developed in this chapter cries for an account of how human judgments and values (e.g. social values) relate to organismic values and sense-making. In this chapter I have claimed that, as enactivist theorists, we should resist the temptation to separate the appraising mind from the appraised and/or merely reacting body; also, I have argued that appraisal is phenomenologically and structurally embodied. Yet I have not said anything about how to move from a theory of organismic sense-making towards human evaluations and social values. This will be food for future thought.

My last considerations regard the notion of *valence*, which is mentioned both by Weber & Varela (2002) and Varela & Depraz (2005). I think that acknowledging the co-existence of different forms of sense-making and bodily meaning in complex organisms has important implications for this notion. The notion of valence is used in emotion science to refer to the positive and negative character of emotions and/or their aspects, such as feelings, behavior, appraisal, etc. (Colombetti, 2005). Weber & Varela (2002) mention valence to refer to initial forms of meaning-generation in the autopoietic system: "Stimuli from outside enter the sphere or relevance of such a unit only by their existential meaning for the keeping of the process of self-establishment. They acquire a valence which is dual at its basis: attraction or rejection, approach or escape" (p. 117). In a similar vein, Varela & Depraz (2005) also conceive of valence as a basic organismic disposition, "a tension that takes several forms: like-dislike, attraction-rejection, pleasure-displeasure" (p. 70).

I think that whereas this duality is useful to describe the behavior of simple organisms, it is constraining when it comes to describe the variety of experiences, behaviors, appraisals, etc. of complex organisms. The main problem with the notion of valence is that it is typically characterized as a dimension whose poles are mutually exclusive, which logically rules out the possibility of conflicts and mixtures. Yet our life is dominated by mixtures and ambivalences (for arguments see Colombetti, 2005) – something that depends on the co-existence of different values and meaning-generating processes in complex organisms. The question is whether it is possible to enrich the current notion of valence (perhaps by replacing

it with a notion of “multidimensional valence,” as some emotion theorists including Varela & Depraz suggest), or whether this notion should rather be abandoned. A story of how to move from a theory of organismic sense-making towards human judgments and social values might prove useful to provide a theoretical framework within which it is possible to decide on this issue, and perhaps to characterize the idea of a “multidimensional valence” in more detail.

I hope that the suggestions of this chapter can provide the impetus for further work on enaction and emotion. The work on sense-making illustrated here, together with other works in phenomenology and enactive cognitive science, are unpacking the many ways in which the body makes up the mind. At the same time, emotion is becoming increasingly important in the study of mind and cognition. Several philosophers argue that emotion can be rational, and psychologists and neuroscientists agree that emotion is centrally involved in cognitive processes such as e.g. decision-making, memory and attention. It is thus time to develop a view of agency in which emotion – including its bodily, experiential and behavioral aspects – is not a secondary and circumscribed phenomenon. In its endeavor to provide a new paradigm for cognitive science, the enactive approach should dispel the Cartesian anxiety induced by the idea that the mind’s task is to hold the reins of the body via ongoing cognitive-evaluative processes. To acknowledge that emotion and the body are constitutive of the capacity to understand and act adaptively is, I believe, a crucial step in this direction.

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