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SILVANO ZIPOLI CAIANI

*Università degli Studi di Milano*

*silvano.zipoli@unimi.it*

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# THE ECOLOGICAL MEANING OF EMBODIMENT

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## *abstract*

*Today embodiment is a critical theme in several branches of the contemporary philosophical debate. The term embodiment refers to the role of an agent's own body in his situated life, suggesting the existence of a bodily root for several experiential and cognitive abilities. A metaphor, that of the root, which aims at establishing a constitutive participation of the body in what we usually consider the domain of the mind. As other philosophical concepts, the notion of embodiment, as well as the idea of embodied mind, lacks of an explicit and shared definition, therefore, is possible to find many different uses of it. Works concerning "embodiment" cover many fields of research such as those concerning the nature of abstract thought (Lakoff & Núñez 2000), artificial intelligence (Clark 1998) and social cognition (Sinigaglia 2009). The aim of this paper is to define a path linking considerations from the phenomenological tradition with recent theoretical developments and experimental evidence. This will make it possible to show that the identification of the bodily roots of experience has the consequence to involve a series of theoretical and experimental consequences leading towards an enactive and ecological approach to perception.*

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## *keywords*

*Ecological theory of perception; affordance; agency; embodiment*

## 1. Phenomenological roots

For the *phenomenological* debate, the notion of embodiment coincides with the rebuttal of what is usually considered the *Cartesian dualism*. In spite of the fact that Descartes' ontological distinction is traditionally considered to be the origin of the dualistic stance in philosophy of mind, it should be noted that the French philosopher also considered the problem posed by the interaction of what he called *res extensa* and *res cogitans*. In a famous passage of his Sixth Meditation, Descartes rejects the idea that our bodily dimension and our mental dimension can be described as two independent things:

"Nature also teaches me, by these sensations of pain, hunger, thirst and so on, that I'm not merely present in my body as a sailor in a ship, but I'm very closely joined and, as it were, intermingled with it, so that I and the body form a unity." (Descartes 1986, p. 56)

However, the fact that perceptions and sensations reveal that our subjective experiences and body form a unity is, exactly, what a dualistic stance is not capable to explain.

After Descartes, the way to understand the relationship between body and consciousness finds a new style in the nineteenth century with the establishment of the framework of phenomenology. The role of the body in shaping human experience emerges as a critical background assumption within several parts of Husserl's thought. The constitutive function of the body turns out to be relevant for Husserl starting from the early lectures of 1907 (Husserl 1997). In this work, particularly in section 3, Husserl's analysis of perception is concerned with the perspectival appearance of every perceived object due to the spatial location of the perceiver, so that the *noematic* constitution of the perceptive referents can only be defined moving from the assumption of an *embodied subject* (for a more detailed analysis, see also Zahavi 1994). Certainly, the most critical Husserl's work concerning embodiment is the second volume of the *Ideas*. Exploiting the possibilities allowed by the analytical character of the German language, Husserl suggests that intrinsic qualities characterizing our bodily experience could be expressed using two different conceptual frameworks: as a *physical object* (*der Körper*) and as a *lived phenomenon* (*der Lieb*). According to this view, embodiment is not a concept pertaining to the experience of an autonomous physical thing (*der Körper*); rather it pertains to the *first person* experiential domain, as well as it concerns also to the way a direct interaction with

the world is personally lived by the subject through his bodily-related phenomenological modalities (*der Lieb*).

Accordingly, through the introduction of *kinesthetic constraints*, relating the sense of bodily position, weight, movement of the muscles and joints with the appearance and the variation of conscious phenomena, the body becomes the medium of all possible *object-directed* perception (Husserl 1989, p. 61). As the *bearer of the zero point* of orientation, each thing that appears, or is supposed to be able to appear, has *eo ipso* an orienting relation to the body and its kinesthetic functions (Giorello & Sinigaglia 2007). According to Husserl (1970), if the *self is originally embodied*, the relationships and the interaction with the surrounding environment assume the role of critical condition for the possibility of any subjective *lived* experience. The role of the body lies in the assumption that an *un-thematic* “being-in-a life-world” functions as the condition of possibility for all phenomena; so that the presence of a system constituted by corporeal features and kinesthetic dynamics emerges as the *transcendental condition* of all possible objective experiences. This leads Husserl to state that, in order to be intelligible, even God, considered as a necessary limiting concept, must “see the things precisely through sensuous appearance” (Husserl 1989, p. 90), that is, through the kinesthetic regularities allowed by the possession of a body endowed with a specific shape and sense organs analogous to those of a human being. In this manner Husserl attributes a critical importance to human embodiment, making *corporeality* a critical constraint of a purely intellectual understanding of what he calls the *life-world*.

Within the phenomenological tradition, Maurice Merleau-Ponty, more than Husserl, focused his attention on the role of the body in the construction of subjective experience. Capturing the idea of phenomenal body with the concept of *corps propre* (i.e., one’s own body), Merleau-Ponty has emphasized the role of the agentive character that accompany the human embodied nature. In his early work *The structure of behavior*, Merleau-Ponty states that the world experienced by a subject emerges from the interaction between states of consciousness and the environmental conditions, so the subject can primarily be conceived as living “in a direct commerce with beings, things and his proper body” (Merleau-Ponty 1983, p. 189). According to this view, *le corps propre* appears not only as a material thing, that is, a potential object of study for experimental sciences, but can also be considered a *constitutive* element of the perceptual world, that is, the *permanent envelop* shaping any experiential (motor) activity.

For Merleau-Ponty the body is the origin of the subjective experience of space and represents its necessary condition of existence so that “there would be no space at all” for an ideal disembodied subject (Merleau-Ponty 2002, p. 117). Accordingly, to conceive a space it is necessary that “we have been thrust

into it by our body” (p. 164), that is, that we have provided us with a first model of spatial features through a direct experience of movement in the environment. As such, he claims the body is a crucial experiential element, the source of several independent *phenomenological constraints* that affect our experience of external surroundings (Merleau-Ponty 2002, p. 87, 511). According to Merleau-Ponty, conscious perception is a way through which one is able to interact with the environment; that is an aspect of the process by means of which a subject reaches his goals. The body, as a condition for every perceptive experience, can be compared to a sort of *selective device*; a spatial form in front of which the world shows up only through “important figures against indifferent backgrounds” in virtue of its being polarized by the tasks and the aims that characterize motor intentions and action execution in an ordinary existence. This leads Merleau-Ponty to argue that originally a conscious life is not a mere matter of an abstract and disembodied “I think”, but it is grounded in the ensemble of motor possibilities of one’s own body, that is in the “I can” that always goes with the execution of actions. Accordingly, the sense of *agency* is not the byproduct of a pure ideal conscious life, something that, as it were, *governs* the movements of one’s own body in function of a goal reaching. Instead, in order to perceive an object, or intentionally act toward it, is necessary that the target of one’s actions exists for his body, namely, that it belongs to the range of *possibilities of action* that pertain to the body itself. The motor experience of our own body cannot be considered as a mere case of knowledge, instead motor experience gives us a primary access to the world, representing both the condition and the limiting constraint of the human conscious life.

Husserl’s and Merleau-Ponty’s works shows that phenomenology, from its early stage, has conceived the body as a critical locus for the constitution of an objective experience. As noted by Gallagher & Zahavi (2008), for the phenomenological tradition the body, since it is implicated in the constitution of an objective phenomenal world, turns out to be a *transcendental principle* whose analysis appears of critical importance to the understanding of human cognitive abilities. A phenomenological analysis necessarily reveals that no objective experience can be conceived without tacitly assuming that a lived body always accompanies all possible variations through which phenomena inhabit our consciousness. As a result, the body emerges as a functional constraint that imposes its structure over different domains of human experience. Although Husserl’s analysis deals only with the recognition of a kinesthetic function of human embodiment, it should be noted that Merleau-Ponty has the merit to have build up this conception, conceiving the body not only as a mere apparatus for movements through the space, but also as the bearer of human intentions and actions. An intuition,

that of Merleau-Ponty, that makes it possible the introduction of what has been called the *ecological theory of perception*.

## 2. Perceiving the environment

Focusing the attention on the major theoretical frameworks in cognitive science, it is interesting to note that a consideration concerning the influence of bodily features within the processes of perception has been developed mainly as a reaction to the computational conception in cognitive science (Dreyfus 1972). After years in which the *functionalist paradigm* has been the only game in town, the idea of an embodied dynamicism is today emerging with the support from substantial empirical evidence. As perceptual experience is shaped by action execution, it seems necessary to assume a more general theoretical framework within which the interconnection between the *perceiving subject* and the *environment* is adequately emphasized. This seems to be the case with some critical aspects of the *ecological approach* to perception as introduced by James Gibson (1979). It can be considered a gestalt theory of cognition based on numerous experimental outcomes (for a review, see Chemero 2009), which shows how certain aspectual values are *directly* perceived via a process of pattern recognition. Instead of adopting the idea that visual representations result from the hierarchical processing of sensory stimuli, Gibson argued that perception is already structured in ways that specify the layout of the environment through the perception of *salient* features so that the perceived world is always awareness of a system rich in meaning. Accordingly, a perceptive experience is not the final stage of a synthetic activity involving the unification of basic qualitative elements, but is an internally structured process based on the notion of *affordances* instead of that of *elementary qualities*.

An affordance is an invariant combination of objective features based on the subject's possibilities of action and interaction with the environment in accordance with his physical constitution and intentions. Gibson's critical idea was that the human perceptive ability becomes tuned to such possibilities of action and that there is no need to invoke something like an internal *neutral representation* as an additional entity mediating between perception and action. On the contrary, in this view, perception emerges as an *action-oriented* process based on those features characterizing the body of an agent in its interaction with the environment within which an organism lives and evolves. Basically, this approach holds that the perception of events and things subserves not only internal representational functions (e.g., imagery, memory, reasoning) but action-related functions as well (e.g., action planning). In other words, Gibson ecological conception states that the interaction between action and perception is based on the very intuitive principle according to which *we must perceive in order to move*, as well as *we must move in order to perceive*.

According to the affordance hypothesis, the perception of some objective properties is related to the subject's motor possibilities, so that the perception of specific features should be correlated and anticipated by specific behavioral reactions. As a result, in a study performed by Klatzky *et al.* (1995), authors showed how cognitive processes that eventually produce arm movements to interact with an object actually initiate before the contact with target. The authors refer to a process of advance action specification as a form of planning that involves reaction to *direct* perceptive stimuli in preparation for movement on the basis of *parameterized components* (such as force, precision etc.) with the aim of tuning action with objective characteristics. In a study performed by Craighero *et al.* (1999), subjects were asked to grasp a bar, oriented in different ways in conjunction with the presentation of visual stimuli that were congruent (or incongruent) with selected properties of the object to be grasped, such as its spatial orientation. Results of this series of experiments converge to show that grasping reaction times to congruent visual stimuli are usually faster than reaction times to incongruent stimuli. Data indicate that the preparation to act on an object facilitates the processing of perceptive stimuli that are congruent with the object toward which the action is direct and that the same occurs also when participants are suddenly instructed to inhibit a prepared movement and to respond with a different motor effector.

Within the field of cognitive studies, many other experimental results show that a relationship exists between the dynamic properties of the body and the environment. Among them there are the experiments performed by Mike Tucker and Rob Ellis (Tucker & Ellis 1998; 2001; 2004; Ellis & Tucker 2000) whose results are consistent with the view that a seen object *potentiates* different sensory-motor *parameterized components* related to the action afforded by the same object. In addition, results support the view that intentions to act operate on the basis of the recognition of *potential actions* elicited by a visual scene. For example, in a study by Tucker and Ellis (1998) participants were invited to judge whether pictures of affordable objects were presented in a normal *vertical* orientation, or were inverted, by pressing either a right or left key. Even though the *horizontal* orientation of the object was irrelevant in the assigned task, when associated with the object's proper *affordances*, this variable influenced participants' motor acts involved in the execution of responses by pressing keys. In particular, if the hand of response was the same normally required for reaching or grasping the represented object, participants were faster in executing the task than in the incongruent case. According to these data Tipper *et al.* (2006) have demonstrated that affordance recognition is not completely automatic, but is determined by the action-related nature of the stimulus properties that are attended to.

Thus, when a person focuses his attention to the shape of an object, action affordance effects are observed (*action compatibility effect*); but when a person is engaged in discriminating an object's property unrelated with any action possibility, such as color for example, no affordance effects are observed. This shows that the shape is associated with action, such as grasping; but that color is irrelevant to action and doesn't afford any significant measurable motor activity.

Along this line of research many theoretical frameworks in cognitive science have recently been developed with the aim of introducing a new paradigm about the common underpinning of action and perception. Among them it must be cited *The Theory of Event Coding* (TEC) (Hommel, Müssele, Aschersleben and Prinz, 2001) holding that the cognitive representations of events and objects subserve not only functions such as perception, imagery, memory and reasoning, but also action-related functions. TEC claims that the cognitive codes that represent perceptual objects are *identical* to those representing action plans in that both refer to external entities. According to TEC, it makes sense to assume that the representations underlying perception and those underlying action planning are coded together, so that it's possible to assume the existence of a *common representational domain* for perceived events and intended actions. The limit of an integrated view on information processing such as TEC is that, even though this conception makes intelligible the relation between bodily interaction with the environment and perceptual sensitivity, it doesn't give any genetic explanation about the existence of such a commonality between representations that makes it possible to link action and perception.

In order to overcome difficulties such as these, it is possible to avoid the postulation of theoretical entities such as mental representations and computational processes, limiting the analysis to a description concerning the interaction between the subject and the environment. Perception and action can be understood as a *factual* coupling of action and environmental features so that in this view the perceived world emerges as a meaning-leaden system based on the presence of *affordances*, that is, on perceptive aspects meaningful to animals because based on the recognition of practical action possibilities that are spread all over the environment. Within this approach, agents and environment are modelled as coupled dynamical systems forming a non-decomposable evolutionary unity whose behaviour cannot be modelled as a set of separate parts. This can be viewed as a co-determination of the organism and the world where it lives in, according to which the body and the ecological niche where it is situated enact each other through their structural coupling. Given this view, it follows that the concept of biological evolution, instead of being a process whereby organisms

modify themselves to solve problems posed by an autonomous environment, can actually be assumed as a process through which living beings and their habitat preserve their coupling <sup>1</sup>.

### 3. Conclusion

Assuming that our mind has an embodied character requires us to abandon the Cartesian view according to which the mental is a distinct dimension from that of the body. According to this, the phenomenological tradition and the ecological approaches to cognition converge on the proposition that subjective experiential consciousness has to be explicated in relation to the human embodied nature, showing a full sense of the term “embodiment” that encompasses *static* as well as *dynamic* corporeal features in relation with the environment.

It should be noted that although Husserl has recognized the role of the bodily possibility of movement as a pre-condition for perceptive experience, his view lacks of emphasizing the role of practical skills in shaping perception. Differently, Merleau-Ponty has focused the attention on the role of the agitive character that accompany human embodiment, introducing the constitutive role of practical skills for experience.

The phenomenological analysis of human embodiment cannot be divorced from the assumption of an ecological approach that makes it possible to emphasize adequately how the interaction between the body and the environment shapes the subject’s perceptual experience. The human body is always a situated thing whose functioning is strictly influenced by the character of its habitat. Movements, actions and goals ascribable to an embodied being are always the result of a body-environment coupling; accordingly it seems reasonable to expect that every perceptive experience of the environment will be shaped by the recognition of those salient features defined by goals and motor possibilities in the surrounding environment. Just this combination of *flesh*, *actions* and *environment* is the distinctive character of our being in the world.

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<sup>1</sup> (see also Chemero, 2009)



**THE AUTHOR**

Silvano Zipoli Caiani studied philosophy in Florence, he has been visiting scholar at the University of California Berkeley and took his PhD at the Università degli Studi di Milano, discussing a thesis on the embodied roots of language usage and understanding. His research is addressed to explore the interactions between action and perception, with a special focus on the development of an enactive theory of interpersonal understanding.

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