SELF: A DYNAMIC APPROACH

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ABSTRACT: According to the classical approach, the self was regarded as a pure unchanging spiritual entity, with a cognitive content which is the consequence of self-awareness that characterises human being. Against this classical conception, the convergence approaches of phenomenology, developmental psychology or neuroscience highlighted the fact that the self is the result of the ongoing dynamics of experiences we have as embodied agents, e.g. the dynamic coupling between the embodied agent and the world, the dynamics of the primal emotions and feelings, as well as the dynamics of neural processes. Hence, the self appears as an embodied self, embedded in a certain context having a pre-reflective character, resulting from the direct coupling of the person with the natural or social environment. In conclusion, according to the contemporary approaches, the self is a multifaceted phenomenon, which should be understood from the perspective of the various dynamic relationships mediated among body, brain, and environment.

KEYWORDS: self, embodiment, ecological self, dynamical system, enactivism, consciousness

1. Embodiment of the Self

According to the Cartesian dualist conception,[1] the self was characterised as having a pure spiritual nature, as it could exist independently from any physical substratum, beyond the laws governing the material world. The role of the self, in this conception, was to provide our mental life with unity and continuity, as it was the unchanging mental entity that does not modify along with mental experiences. In its quality of the centre of man's cognitive life, the self is the source of the first-person perspective, having the privilege of direct access to the individual's mental states, considered private therefore inaccessible to others. To the extent that the self is considered to be present in the unfolding of any mental activity, its existence cannot be doubted, which means that it provides certainty to our existence and knowledge.

[1] René Descartes, *Meditations on First Philosophy* (Cambridge: Cambridge University Press, 1996). Originally published in 1641.

Against the existence of a permanent substratum which guarantees our personal identity, David Hume[2] argued that, if we had a self, it would have to generate an impression that should be constant throughout our lives. But as such an impression, constant and invariable, does not exist, as we rather have the experience of the transient sequence of sensations, this means that it is wrong to think of self as a substantial, indivisible entity. Such a mistake comes from the fact that our imagination is the one that connects the various sensations received from the environment, creating thus the impression of continuity and unity. According to Hume, our mental life is a bundle of intuitions, beliefs or desires, connected by means of resemblance or causality relationships, which create the impression of identity. In this conception, there is no longer need to postulate a centre of our mental life, as the self is regarded as fiction.

The existence and the necessity of the self to man's mental life are also highlighted by Immanuel Kant.[3] He makes a distinction between man's psychological self, which is the object of his empirical consciousness, changing and varying along according to the diversity of impressions, received by sense organs, and the transcendental self (ego), which appears as pure apperception. According to this approach, the self is the one which unifies the data of experience which were firstly organised by intuition and given meaning by synthesis. The transcendental self (ego) is an *apriori* given that precedes all the experiences of the subject making thus possible the organisation and understanding of the sensible material provided by the senses. Thus, the transcendental unity of self-awareness is the one that provides all experiences and representations with the consciousness of belonging to the same subject, namely a shared identity, representing a pure identity-pole.[4]

The critique of the classical approach of the self was made by phenomenology once it questioned the Cartesian vision of the world, by contesting the idea that the natural world, the objective one, and the knowledgeable subject are radically separated. Claiming that the human being has an originary experience of the world, phenomenology denounces the approach of the world from the scientific perspective as an objectivising manner of understanding things, proposing instead an approach from the first-person point

[2] David Hume, *A Treatise of Human Understanding* (Oxford: Oxford University Press, 2009). Originally published in 1739.

[3] Immanuel Kant, *Critique of Pure Reason* (Indianapolis: Hackett Publishing, 1996). Originally published in 1781.

[4] Dan Zahavi, *Phenomenology of Self*, in *The Self in Neuroscience and Psychiatry*, eds. Tilo Kircher and Anthony David (Cambridge: Cambridge University Press, 2003), 56–75.

of view, which has as its starting point the human body. This approach starts form the distinction operated by Edmund Husserl,[5] between the objective body (*Körper*), the body as it is understood by science, and the lived body (*Leib*), considered the seat of experiences and the means by which we have a direct and implicit experience of the world. The role of the body, in the phenomenological acceptance of the term, is to open a perceptual field where things appear in a new configuration. Thus, owing to its sensorimotor capabilities, the body offers proprioceptive and kinaesthetic information, which is essential to the manner we experience the world. The position of the body, the implicit awareness of my body, present in all intentional act, as well as the information obtained via the movement of the body, open a subjective field where objects are perceived and become available through action.

Accepting the idea that a scientific explanation can provide only an understanding of the body from the perspective of its biological processes, Maurice Merleau-Ponty[6] shows that the relationship between man and the world should be approached from the perspective of the phenomenological body, which is an experiential structure that has a direct relationship with the world. According to Merleau-Ponty's phenomenological conception, the problem of the separation between the subject and the world, which appeared alongside Cartesian dualism, can be solved by accepting the idea that, ever since the beginning, we are in a world to which we are intimately connected. This means that we constitute the world we live in and we are also affected by what happens therein. In other words, the world is inseparable from the body, which means that the relationship between them is not cognitive, representational, but it is a dynamic one given by the skilful body. This is possible owing to the motor intentionality, which, by means of the intentional arc connects the lived body directly to the world, transforming the latter into the condition of realising the ipseity of the subject.

Claiming the existence of a dynamic relationship between the body and the world, phenomenology will contest the primacy of the reflexive consciousness, considered from Descartes onwards the fundament of our mental life, theorising instead the flow of our experiences as an interiority that is given to us in a direct, immediate way. According to Dan Zahavi,[7] phenomenology criticises the idea of self as being a persistent substratum of our mental life by postulating the existence

[5] Edmund Husserl, *The Basic Problems of Phenomenology: From the Lectures, Winter Semester, 1910–1911* (Dordrecht: Springer, 2006). Originally published in *Husserliana XIII.*

[6] Maurice Merleau-Ponty, *Phenomenology of Perception* (New York: Routledge, 2005). Originally published in 1945.

[7] Dan Zahavi, "Is the Self a Social Construct?" *Inquiry* 52, 6 (2009): 551–573.

of a pre-reflexive level of consciousness characterised by self-referentiality (Sartre) or self-affection (Henry), which would represent the minimal and primary form of self-awareness. This pre-reflective level, constituting from the immediate given of subjectivity and which no long appears as a transcendental structure or an objectivising flow of consciousness, forms ipseity, selfhood, or the minimal self.

From the experiential perspective, the minimal self represents what the philosophy of the mind called "what is like" or first-person perspective, meaning what makes me perceive experience as in such a way that only I can do it. Thus the minimal self represents what is proper to each experience lived from the perspective of a certain person. It is that mineness to be found in all experiences and which makes them be subjective and not objective data, e.g. information from the third-person perspective. To put it differently, the minimal self is the "*invariant* dimension of first-personal givenness throughout the multitude of changing experiences."[8]

Consequently, contrary to the Cartesian self, that was thought as existing independently from the material world and having a cognitive content, the minimal self is regarded as coming from the dynamics of experience we have as embodied agents existing in a world. This means that the minimal self, as awareness of the immediate experience, is a result of being embedded in a certain context. The consequence of the embodied and embedded approach of the self is its understanding from the perspective of the various dynamic relationships that constitutes the individual as an embodied agent. This means that approaching it involves understanding how the immediate awareness of one's own body contributes to the development of the first-person perspective, the importance of the dynamic relationship between the individual and the context it is embedded in, as well as the contribution the brain and the cerebral processes have to the dynamics of the agent's embodiment and embeddedness.

2. The Dynamics of Embodiment

The embodiment of self was the consequence of highlighting the importance of the body to the development of a minimal consciousness regarded as being prior and to lay at the basis of self-awareness. The phenomenology of the lived body emphasises its structures owing to which, ever since birth, we have a dynamic relationship with the world. Hence, the body schema is described as a phenomenal structure that comprises holistically functions, skills, sensorimotor possibilities and bodily skills, functioning at a sub-personal level without the need

[8] Dan Zahavi, *Subjectivity and Selfhood: Investigating the First-Person Perspective* (Cambridge: MIT Press, 2005), 132.

for the explicit consciousness of the body.[9] This means that the body schema does not involve a conscious control over the phenomenal body in order to get information about the world and how to act in this world. Therefore, it was considered as having a dynamic character, meaning that it modifies spontaneously, without involving the reflexive consciousness together with the outer changes that affect position, movement or the organic body functions. At the same time, the dynamic character of the body schema also makes its modification contain a potentially direct response to the changes in the environment. Thus, non-cognitive operations of the body, which are the consequence of the bodily skills, form the basis for the existence of primary awareness, which is prior to the reflexive awareness.

This fact is emphasised by proprioceptive awareness as well,[10] which designates the pre-reflexive awareness resulting not only from the position and the abilities of the body but also from its motor possibilities. Therefore, the motor system plays an important role in the development of proprioceptive self. On the other hand, this system, once the new-born starts moving, generates the proprioceptive sense of movement, which is the basis of the development of an incipient form of phenomenal consciousness and the qualitative mental states at the brain level. On the other hand, based on the motor commands, a feedback is formed which verifies whether the movement comes from the subject's body or from its environment, which involves "a non-observational and pre-reflective differentiation between self and non-self."[11]

Nevertheless, from the phenomenological perspective, proprioperception appears as a feature pertaining rather to the organic body as it is insufficient to explaining the dynamic relationship with the world. The lived body is characterised by the kinaesthetic sense which enables us not only to be aware of our position in a given space, but it also gives a perspective on the possibilities of action provided by the perceptual and motor structure of our body. From this perspective, kinaesthesis should be regarded as being a dynamic sense of the lived body, which ensures the integrity of information come both from outside and inside the body.

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[9] Shaun Gallagher, *How the Body Shapes the Mind* (Oxford: Clarendon Press, 2005), Shaun Gallagher, *Body Schema and Intentionality*, in *The body and the Self*, ed. José Luis Bermúdez (Cambridge: MIT Press, 1995), 225–244, Merleau-Ponty, *Phenomenology of Perception*.

[10] Gallagher, *How the Body Shapes the Mind*.

[11] Gallagher, *How the Body Shapes the Mind*, 175–176.

Regarded from the perspective of the relationship with proprioperception, kinaesthesis is thought by Maxine Sheets-Johnstone[12] to be a form of awareness higher than the former. Proprioperception is the immediate awareness of movement we feel at the level of bodily organs, and which has evolved, along with the development of organisms, into a kinaesthetic awareness. Thus, kinaesthesis represents the awareness of movement, meaning the ontological principle of animation underlying life, where cognition represents a stage in its evolution. Therefore, it is not enough to explain our cognitive activity starting merely from our quality of embodied agents, as it happens in classical phenomenology, but we have to take into account the dynamic dimension as well, which results from the qualitative variation of movement characterising our body. Thus, our body is seen as a tactile-kinaesthetic body, which, in an original way, has a kinaesthetic awareness.

To the extent that movement generates "an overall dynamic with distinctive qualities,"[13] kinaesthesis represents in fact the awareness of this felt qualitative dynamic. Hence, the origin of consciousness should be looked for in the tactile-kinaesthetic awareness which is the result of the spontaneous kinetic acts that characterise us ever since the moment we come into the world. Moreover, besides being the source of the qualitative dimension of our mental life, spontaneous movement is at the origin of our self. By means of movement, our sense of animate forms is created, meaning that we become aware of ourselves as agents of movement, and we constitute ourselves as subjects ("I"), with a capacity to act. In this way, the sense of self comes from the tactile-kinaesthetic body, which, by means of kinaesthesis, organises and provides coherence to the inner and outer sensations it feels. Thus primal animation appears to be the source of our self, by means of which, starting from our experiences, we constitute the world and give a meaning to it.

The analysis of the phenomenological structures of the lived body led to the idea that explaining cognition means the existence of more dynamic cycles where the embodied agent is involved. Thus, besides the dynamics of embodiment, which is the bodily pre-reflective awareness, we should also consider the sensorimotor dynamics that lies at the basis of the dynamic relationship with the

[12] Maxine Sheets-Johnstone, *The Primacy of Movement* (Amsterdam: Benjamins, 1999), Maxine Sheets-Johnstone, *Body and Movement: Basic Dynamic Principles*, in *Handbook of Phenomenology and Cognitive Science*, eds. Daniel Schmicking and Shaun Gallagher (Berlin: Springer, 2010), 217–234.

[13] Sheets-Johnstone, *The Primacy of Movement*, 147.

world as well as the dynamics of the inter-subjective interaction, which explains how the self is shaped by the encounter with the others.[14]

The dynamics of the embodiment is given by self-regulation, which is important for our survival as biological beings. Starting from this, the human being is regarded as a autopoietic system, characterised by autonomy (i.e., their goal is only to maintain the internal variables constant), individuality (i.e., the effect of maintaining a constant internal organisation is the acquisition of an identity), internal unity (given by self-production processes and not from outside by the observer), and internalising feedback (the output, which is a response to changes in the environment, turns into input, thus they realise an environment-integrated system).[15] From this perspective, subjectivity is seen as being the result of movement characterising the body ever since birth as well as the sensations generated by the ongoing dynamic of the body.

Sensorimotor dynamics is given by the fact that between the embodied agent and the world there is no linear relationship of the input-output type, but an ongoing dynamic coupling of the sensorimotor cycles. This approach leads to the idea that the human being should be understood as a dynamic system, where the feedback of outputs turn into input, generating a flow of causal dynamic patterns, made of the loops among the sensory system, the motor processes, and the world. From this perspective, the human being appears as a complex dynamic feedback system,[16] made up of both internal dynamic relationships, pertaining to bodily processes, and the exterior ones that take into account the relationship between the body and the world. Therefore, the bodily self no longer appears as a private self, but it is the result of the complexity of dynamic relationships established between the embodied agent and the world.

The idea of circular causality characterising the relationship between the embodied agent and the world relies on an enactive conception on cognition. According to this view, perception, movement, and cognition are closely interdependent which means that within the sensorimotor cycle mediated by the nervous system what "one senses depends directly on how one moves, and how one moves depends directly on what one senses."[17] The integration of sensorimotor patterns into a coherent dynamics is carried out by the sub-personal

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[14] Evan Thompson, *Mind in Life: Biology, Phenomenology, and the Sciences of Mind* (Cambridge: Harvard University Press, 2007).

[15] Humberto Maturana and Francisco Varela, *Autopoiesis and Cognition* (Dordrecht: Kluwer, 1980).

[16] Susan Hurley, *Consiousness in Action* (Cambridge: Harvard University Press, 1998).

[17] Thompson, *Mind in Life*, 244.

mechanisms of the body schema, which organises perception and action directly, spontaneously, without the involvement of the reflexive consciousness due to bodily skills. Consequently, perception should not be understood in representational terms but as a "skilful bodily activity,"[18] which depends on the sensorimotor knowledge. Similarly, consciousness of the qualitative character of experience is not the result of cerebral processes but it has its origins in the patterns forming from the interdependence between the sensory stimulation and motor skills.

The conclusion that can be drawn from the presentation of what Evan Thompson calls the "dynamic sensorimotor hypothesis"[19] is that understanding the human being as an autopoietic system has as a consequence the need to postulate an autonomous selfhood, as a result of the self-organisation of the body and its dynamic coupling with the world. Moreover, this autonomous self, owing to its enactive relationship with the world, is the result of the dynamics between the perceptive experience and the sensorimotor knowledge. This sensorimotor selfhood appears from the operational closure of the dynamic sensorimotor cycle supported by the nervous system, which "is characterized by an invariant topological pattern that is recursively produced by the system and that defines an outside to which the system is actively and normatively related."[20]

3. From Embodied Self to Embedded Self

The embodiment of self emphasises the existence of a minimal embodied self-awareness, with which we are endowed since birth and which results from the dynamics of the body self-organisation as an autopoietic system. In addition to this, understanding the self involves underlining the importance of the relationship with the context where it occurs, which has a decisive role in the subsequent development of the self. Together with the internal constraints, the body is affected from outside as well, by the external constraints and perturbations, which thus become an important part of the self-production process as a dynamic system, that aims at being integrated in the environment. Thus, the self is not only the result of embodiment but also of the dynamic embeddeness in the natural and social environment.

The dependence between the dynamics of embodiment, on one hand, and, on the other hand, the relationship between the embodied agent and the world is

[18] Alva Noë, *Perception in Action* (Cambridge: MIT Press, 2004), 2.
[19] Thompson, *Mind in Life*, 254.
[20] Thompson, *Mind in Life*, 260.

emphasised by the way in which James Gibson[21] understands proprioperception. According to him, proprioperception, as a sense by means of which information about the self are acquired, and exteroception, which refers to the sense by means of which we acquire information about the surrounding world, are complementary. Proprioperception, understood as egoreception, is the results of the dynamics of information that come from all our senses, which are activated by the movements of the body. This means that senses, while revealing information about the external world, provide information about the self, meaning that "one perceives the environment and coperceives oneself."[22] Therefore, at the concrete level, proprioperception and exteroception are but two complementary aspects, one of a subjective nature and the other of an objective nature, of perception.

This I we become aware as we discover the world is the ecological self,[23] which involves the awareness of situating the embodied agent in a certain context. The origin of the ecological self is what Gibson[24] called "visual kinesthesis," that is the awareness produced by the optical flow of our visual system, which once it perceives the information about the space and the objects to be found in the space surrounding us, provides information about the position and the movement of the perceiver. Thus, the embodied agent gains the awareness of differentiating itself from the environment which is static, perceiving itself as a source of movement and cause of the changes in the environment. Moreover, visual proprioperception contributes to consolidating the sense of agency of the perceiver, by means of the role it has in acquiring some motor skills in infancy, being the grounding of the other kinaesthetic systems, as it „comprises an innate feedback loop which informs the organism of its relation with the natural environment."[25]

Besides the optic flow, which appears in various shapes, such as occlusion or looming, to establishing the ecological self other modalities contribute such as vestibular proprioperception, somatic proprioperception, and touch. To these, the quasi-conscious motor intentions are added. They are in a permanent dynamics

[21] James J. Gibson, *The Ecological Approach to Visual Perception* (New York: Psychology Press, 2007). Originally published in 1979.

[22] Gibson, *The Ecological Approach*, 126.

[23] Ulric Neisser, "Five Kinds of Self-Knowledge," *Philosophical Psychology* 1, 1 (1998): 35-59.

[24] Gibson, *The Ecological Approach*.

[25] George Buttherworth, "An Ecological Perspective on the Self and its Development," in *Exploring the Self: Philosophical and Psychopathological Perspectives on Self-Experience*, ed. Dan Zahavi (Amsterdam: John Benjamins, 2000), 24.

providing the subject with the sense of agency, as an active agent who lives in a world that is perceived according to their intentions and needs.[26]

Besides the kinesthetic character of its origin, another feature of the ecological self is that "the nature of its ongoing interaction with the environment"[27] is specified by objectively information. Moreover, although it manifests since the earliest infancy, it does not involve self-awareness, which develops in the following age-stages, as new skills are acquired. In other words, the ecological self does not involve the awareness of self-representation as it has an unreflective nature.

Another important characteristic of ecological self, seen as an emergent and changing structure resulting from the interaction with the environment, is the close connection with the affective dimension of the embodied agent.[28] Thus, the minimal embodied self-awareness is considered to be the consequence of feelings and emotions we feel since the very moments of life. The feeling experience is what makes us aware of our own body ever since birth and which "elevates organisms from mere responders to volitional actors,"[29] contributing to perceiving us distinctly from other entities in the world. Thus, newly-born are not only "sensing" the world, but they are also experiencing it, having the awareness to differentiate them from the surrounding world.

Along with the awareness of agency, a process of "objectification of the self"[30] develops by means of which self becomes and object of reflection. This process relies on the co-dependence between the perception of the world and self, as it was theorised by Gibson,[31] according to whom the newly-born, owing to the sensory system they are endowed with since birth, can identify affordances in the environment and starting form this, still owing to the perceptive apparatus, they can get information about self. Hence, their interaction with inanimate objects and their tendency to analyse the consequences of the actions on their own body are in fact means to externalise their own emotions and feelings, with a view to analysing them by means of perceptive sense organs. By this process of "early

[26] Ulric Neisser, "The Self Perceived," in *The Perceived Self: Ecological and Interpersonal Sources of Self-Knowledge*, ed. Ulric Neisser (Cambridge: Cambridge University Press, 1993), 3–24.

[27] Neisser, "Five Kinds," 41.

[28] Philippe Rochat, "The Self as Phenotype," *Consciousness and Cognition* 20 (2011): 109–119.

[29] Rochat, "The Self as Phenotype," 110.

[30] Philippe Rochat, "Early Objectification of the Self," in *The Self in Infancy: Theory and Research*, ed. Philippe Rochat, Advances in Psychology Book Series 112 (Amsterdam: Elsevier Science, 1995), 53-72.

[31] Gibson, *The Ecological Approach*.

objectification of self," the infant transforms the internal affective dynamics of self, by projecting these emotions and feelings onto objects, in an external relationship, of perceptive analysis of such dynamic aspects of self. Thus, the internal dynamics of emotions is transformed into an external dynamics where these are experimented as characteristics of external objects.

To sum up, according to Rochat, the origin of ecological self should be looked for in the perception of body effectivities, which is the grounding of our ability to make plans in order to achieve a goal. This perceptual ability, which is innate, makes possible for the bodily skills to adjust to and to integrate in the requirements of particular situation in which the agent is. This means that the ecological self "is an emergent property of any biological system that does not merely respond to stimuli, but acts, explores, and invents new means to achieve functional goals."[32] The discovery of the causal efficiency of the agent in the world cannot be separated from the exploration of feelings, which are the consequence of the embodiment of the newly-born. Thus, an equally important role in the early development of self-knowledge is played by the exploration of the emotional experience dynamics of the newly-born, by projecting them onto the objects in the surrounding world onto which they exert the agent skills.

Last but not least, an important role in the emergence of the embedded self is played by the experience of living in society. The interaction with the others represents a dynamic cycle where the "dynamical process of 'self-othering'"[33] contributes to the emergence of an interpersonal self. This type of self is described by Neisser[34] as resulting not from the inferential understanding of some isolated aspects of the interaction with others, but from the direct perspective of the unreflective ongoing relationship which is established within the intersubjective interaction. Just like the ecological self, which it manifest with, the interpersonal self has a kinesthetic nature, being specified and developed by the flow of expressive gestures of the others. Nonetheless, the interaction with the others is considered to be at the origin of the emergence of some skills, otherwise impossible to develop, such as the body image, which is the result of the intersubjective and inter-modal interaction between proprioperception and the perception of the other's facial expression in response to our actions.[35] Consequently, the dynamics of intersubjectivity is regarded as the source of a

[32] Rochat, "Early Objectification," 59.
[33] Thompson, *Mind in Life*, 251.
[34] Neisser, "Five Kinds."
[35] Gallagher, *How the Body Shapes the Mind*, 73.

sense of self, which comes together with the awareness of the context where the agent is embedded.

4. The Neurological Dynamics of Self

The importance of the brain to cognition is given not merely by the fact that the latter's development depends on higher cognitive processes, but also on the contribution it has to the emergence of the embodied self. In other words, the brain is no longer regarded as the seat of abstract thinking, but as playing an important role both in the dynamics of embodiment and in the dynamic interaction between the body and the environment.

Thus, Varela and Thompson[36] speak of three "cycles of operation" that would be characteristic to higher primates, to which the brain has a decisive contribution. The first cycle, of organismic regulation, refers to the connection between the neural processes and the haemodynamic ones of the internal organs. Due to the fact that the haemodynamic processes determine inevitably emotional states, the latter become "inescapable affective backdrop of every conscious state."[37] Hence, the organic self is regarded as the result of the dynamics of the affective processes, being characterised, due to the changing feature of feelings, by discontinuity. The next cycle, the one of the sensorimotor connection, carries out the coupling between organism and environment whereby the organism becomes a situated agent. The neural patterns that emerge temporarily ensure the coordination between the sensory and the motor systems, determining their reciprocal conditioning. The last cycle, the one of the intersubjective interaction, which relies on the "mirror neurons," carries out the dynamic coupling with the others and the understanding of the meaning of the others' actions as well.

Admitting the fact that there are more dynamic relationships that characterise the embodied agent leads to underlining the role of the brain in there mediation and to the emergence of a sense of self within this process. Thus, according to Todd Feinberg, self, defined as "unity of consciousness in perception and action that persists in time"[38] is the result of three dissociated hierarchical systems: the anatomically central/medial interoself system, exterosensorimotor system, and the integrative self system which mediates between the first two. The interoself generates a sense of self based on the internal homeostatic and affective

[36] Evan Thompson and Francisco Varela, "Radical Embodiment: Neural Dynamics and Consciousness," *Trends in Cognitive Sciences* 5, 10 (2001): 418–425.
[37] Thompson and Varela, "Radical Embodiment,"424.
[38] Todd E. Feinberg, "The Nested Neural Hierarchy and the Self," *Consciousness and Cognition* 20 (2011): 4.

processes. The exterosensorimotor system contributes to the emergence of self by experiencing the external stimuli as subjective feelings that do no come from the body but from outside the body. While the integrative system, which is consists of the heteromodal association cortices, presents as a "convergence zone," where the internal needs of the body are adjusted to the external environment conditions.

Besides the role to mediate among the various cycles of the embodied agent, another important feature of the brain in constituting the self and the consciousness is its dynamic nature. According to the findings in neuroscience, at the grounding of the brain functioning lies not only the local causal interaction among the neurons located in neighbouring regions but long-range connections among its parts, no matter how far are ones to the others. In this context, the brain appears to be a dynamic organ where reciprocal loops are established among its regions, which that lead to carrying out large-scale dynamics that results in performing various mental processes.

Such an approach is "the dynamical core hypothesis"[39] according to which consciousness is the result of the ongoing interaction among several groups of neurons located in different regions of the brain, which form a functional cluster in hundreds of milliseconds. This functional cluster, which relies on the capacity of thalamocortical system to integrate neural loops, undergoes permanent change, allowing other groups of neurons to join the process. Thus, consciousness no longer appears to be located in a certain part in the brain, but rather to be a distributed neural process, determined by the integration of neuronal groups into a dynamic core. Notwithstanding, self is not considered as having an unreflective nature resulting from the primary consciousness, but it is considered as requiring higher-order consciousness, being defined as „consciousness of consciousness."[40] According to this view, we can talk about a self only in the case of beings endowed with language, which as a system characterised by syntax and semantics, makes symbolic thinking and conceptual memory possible, both important to the emergence of higher-order consciousness.

The idea that the origin of self should be looked for in the higher mechanisms of cognition was proved wrong by the emphasis on the importance of feelings in self-regulating and self-awareness of any biological being. According to such a theory, biological organisms should be regarded as complex systems, which aim at preserve their balance despite both the internal and external perturbations

[39] Gerald M. Edelman and Giulio Tononi, *A Universe of Consciousness: How Matter Becomes Imagination* (New York: Basic Books, 2000).

[40] Edelman and Tononi, *A Universe of Consciousness*, 194.

and constraints.[41] To this purpose, they develop self-monitoring and control mechanisms whose role is to react to any type of change. The consequence of the dynamics between the control mechanisms, necessary to maintain the equilibrium of the organism, and the internal and external perturbations, is the emergence of feelings, hence, the emergence of subjectivity and consciousness. Thus, consciousness appears as a biological phenomenon, which depends on the ongoing relationship between the embodied subject and the context they are situated, being the result of the process of resistance to variance which characterises the body. It results from the above that "self is shaped and maintained only as a result of ongoing actions and reactions,"[42] which means that the origin of consciousness should be looked for in the dynamics of feelings, which generate a minimal level of self-awareness, which does not involve self-reflection or the ability to manipulate symbols.

The importance of the affective dimension of biological beings to the emergence of the sense of self is also emphasised by Jaak Panksepp.[43] He considers that we should look for the origin of consciousness in something prior to the cognitive structures of the brain that are sufficiently developed at birth and that require their maturation in time. Thus, he speaks of a primitive form of consciousness, the affective consciousness, which is the result of the dynamics of affective feelings, developed from the sensations perceived by the sense organs, homeostatic processes, as well as the responses the brain provides to external or internal stimuli, which together are indispensable to any organism in order to survive. Starting from here, feelings are regarded as being located behind the unfolding conscious life, each of them being represented at the level of the brain by a certain type of neural circuit, which generates particular neurodynamics. The representation of basic emotions by the brain allows for their integration with the action neural schemata, which are the result of bodily motor processes. The interaction between sensorimotor action circuits and emotional circuits generates our first representation as organisms that exist and act in a world, which represents the "primal self." Therefore, the neural origin of primal self is identified

[41] Antonio Damasio and David Rudrauf, "The Biological Basis of Subjectivity: A Hypothesis," in *Self-Representational Approaches to Consciousness,* eds. Uriah Kriegel and Kenneth Williford (Cambridge: MIT Press/Bradford Books, 2006), 423–464.

[42] Damasio and Rudrauf, "The Biological Basis," 441.

[43] Jaak Panksepp, "The Periconscious Substrates of Consciousness: Affective States and the Evolutionary Origins of the Self," in *Models of the Self*, eds. Shaun Gallagher and Jonathan Shear (Thorverton: Imprint Academic, 1999), 113–130, Jaak Panksepp, "Affective Consciousness," in *The Blackwell Companion to Consciousness*, eds. Max Velmans and Susan Schneider (Oxford: Blackwell Publishing, 2007), 114–129.

in the periaqueductal gray (PAG) region that exists ever since the beginnings of the development of the brain and that ensures the integration "of a diversity of basic emotional systems (fundamental value schema), various simple sensory abilities (perceptual schema), and primitive but coherent response systems (action schema)."[44]

Similarly, Antonio Damasio[45] considers that the grounding of the sense of self is the dynamics of the body feelings. The proto-self is the result of primal feelings recorded in our nervous system; therefore it does not involve a centralised neural structure as it is unconscious. It presents itself as a collection of neural models undergoing continuous change and reflecting the state of the body at a certain moment.

Based on this proto-self the core self emerges, which, besides sensorimotor images, has a cognitive content as well. The core self emerges as a result of the dynamics of successive changes in the body, which at the cognitive level generates a representation of the surrounding objects and how they affect the body. To put differently, the core self involves several images: an image of the organism (determined by the successive changes in the body, which result in changing the proto-self), an image of the object which affects the sense organs of the body, and an image of the organism's response (which has an affective content). Thus, by becoming aware of the external objects, we become aware of us and of our capacity of agency and ownership. Consequently, the self is regarded as a "dynamic process"[46] of integration of neural processes which originate in the dynamics of body representations at the brain level.

5. Conclusion

The conclusion one can draw from the convergent approaches of phenomenology, psychology or neuroscience is that the self can no longer be regarded, in the Cartesian manner, as having a pure unchanging spiritual nature with a cognitive content, which is the result of self-awareness that characterises the human being. The self comes rather from the ongoing dynamics we experience as embodied agents as well as from the dynamic relationships existing between the embodied agent and the world. Hence, the self appears as an embodied self embedded within a certain context, having a pre-reflective character, which is the result of the

[44] Panksepp, "The Periconscious Substrates," 116.

[45] Antonio Damasio, *The Feeling of What Happens: Body and Emotion in the Making of Consciousness* (San Diego: Harcourt, 1999), Antonio Damasio, *Self Comes to Mind: Constructing the Conscious Brain* (New York: Pantheon Books, 2010).

[46] Damasio, *Self Comes to Mind*, 173.

direct coupling of the person with the natural or social environment. Another distinctive feature of embodied and embedded self is its affective dimension, which is highlighted by the importance of the dynamics of the emotions and primal feelings at its development. Last but not least, an important contribution to the development of the self is that of the brain as a dynamic organ, whose role is to represent and integrate the different sensations coming both from within and from without the organism. To conclude, the self is a multifaceted phenomenon that should be understood from the perspective of the various dynamic relationships that are established among body, brain, and environment.