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The origin and conservation of self-consciousness Reflections on four questions by Heinz von Foerster

Humberto Maturana Romesín

Santiago, Santiago, Santiago, Santiago, Santiago

Abstract

Purpose — To reflect on the nature of self-consciousness.

Design/approach — The purpose is achieved through the process of answering four questions proposed to me by Heinz von Foerster in the course of our conversations.

Findings — It is proposed that the nature of self-consciousness is the operational coherence between the ontogenic and the social dynamics of human beings in living systems that are a consensual languaging living systems. self-consciousness is a dynamic process.

Implications — The human language has become aware of our responsibility in the design of other-than-nature.

Originality/value — Self-consciousness is a dynamic process, and its origin is in language, and its ends in living beings.

Keywords Cybernetics, Robotics, Cognition, Philosophical concepts

Paper type Conceptual paper

Foreword: Heinz von Foerster

Heinz von Foerster was a friend for over 40 years and he was 75. The Santiago Seminar was not the occasion, it was for us a free gift, and we remained like that until his death. It was the continuation, on the biological side, of what we had begun in the phenomena of cognition, and it was for me a great honor to be with him, the great Master of the biology of knowing, whom I always regarded as our master. The model Chilean Heinz had and he learned from me. What he did was to bring the biology of knowing to the realm of the cybernetics of observing systems, and he did it with the elegance of a master. Heinz was a friend, and we had a great time together. We had a great time because we were friends, and we had a great time because we were friends, and we had a great time because we were friends, and we

medium in a manner that is contingent to the history of structural changes of its nervous system. Second, the conÞgurations of activity that arise in the sensory surfaces of the organism as it interacts with the medium trigger changes in the structure of the neuronal elements that intersect with them, so that the sensory effector correlations that the activity of the nervous system generates in the organism become recursively modulated by the course of the flow of the interactions of the organism with the medium. As a result, the flow of the sensory-effector correlations that the nervous system generates in the organism takes place following a pattern determined at every moment by the dynamic structure (dynamic architecture) of the nervous system at that moment, as this arises instant after instant as a result of its own dynamics, and through the interactions of the organism with the medium.

The organism encounters the medium at its sensory surfaces and acts on the medium at its effector surfaces. A sensory surface of an organism is any part of its structure (including the structure of the nervous system) that undergoes a structural change that is triggered as a result of its encounter with an operational dimension that does not arise as a feature of its internal dynamics, and that results in a perturbation that triggers in its turn a change of the flow of that internal dynamics of the organism, and hence, in its interactions. These operational dimensions can be of any kind, and those sensory dimensions that we usually associate with what we call our Þve or six sense organs, are only some of them. I claim that all the mysterious situations in which we seem to have "extrasensory perceptions", or which lead some observers to think that consciousness is the result of the operation of a non material agent, correspond to the encounter of the organism, or its nervous system, with operational dimensions that pertain to the domain in which the organism exists as a molecular autopoietic system. A fundamental result of all this is that the participation of the nervous system in the generation of the behaviour of the organism, changes in a manner that is continuously arising contingent to the flow of the encounter of the organism with a changing medium. This is a consequence of the mutual structural modulation between organism and medium that occurs at the level of the structural intersection of the sensory and effector surfaces of the organism while the living of the organism is conserved.

An animal lives its living in a continuous structural and operational transformation of its dynamic architecture that makes sense at every moment lived by it as a result of the conservation of the structural coherence of the dynamic architectures of the organism and the independently changing relational architecture of its niche. We human beings do not differ in this respect from other animals. What is peculiar to us is that the course of the continuous flow of our structural coupling is guided by the flow of our languaging. As languaging beings we ask ourselves about what constitutes our operation as a unity, and we also ask ourselves how the different systems or subsystems that constitute us become integrated in what we feel constitutes our unity as we reflect about ourselves.

I maintain that what integrates us in our living as a unity is not any particular aspect of our neurophysiological, hormonal, or molecular process, but our operation as organisms that interact as totalities in a relational space. The operation of an organism as a totality does not take place in a synchronicity of processes, it takes place in the historical flow of conservation of its manner of living in the systemic conservation of the relation of structural coupling in the flow of the interactions of the organism in its niche. The unity of a system, or the unity of an organism, occurs in the relational space in which it operates as a totality, and in which its manner of structural coupling as a totality with its corresponding niche is lived operationally as an integrated totality. Our feeling of unity as we operate as human beings arises as a conÞguration of sensoriality in that operation distinguished in our reflections. This is why when we adopt two or more manners of living in our relational space that we do not integrate as part of a single conÞguration of sensoriality in our interactions in that space, we may Þnd ourselves as living several disjoint identities. So I claim that the unity of the operation of an organism is not the result of some particular internal connectivity in the nervous system that gives to it its unitary character, but the result of the architectural coherences that have arisen from a history of conservation of its operation as a totality as an organism in which all has changed around the architectural dynamic that realises such totality in a domain of interactions (see Systemic Law number 2).

Yet, there is another reflection that I wish make. As the living system and the nervous system in it exist and operate as closed systems, all that happens to the living system occurs as an aspect of its closed internal dynamics blind to what occurs in its relational operation as an organism. Indeed, all that happens to an organism as it operates as a totality in a relational space, through its sensory-effector correlations, happens in its nervous system as changes of relations of neuronal activities in the closed dynamics of a closed neuronal network. So, what for an observer may occur in different operational domains, for the nervous system all occurs in the same operational domain; namely, in its operation as a closed network of changing relations of neuronal activities. That is, for the nervous system there is no external or internal world, and the distinction that we as observers make of an external and an internal world is a manner of explaining what an organism lives as it operate as a closed system while we observe it as if it were an independent entity in a relational space, being at the same time aware that what we say also applies to us.

So, although I have spoken of the medium in which an organism exists as if it were a domain of entities independent of my operation as an observer, I have done so while proposing what I say as an explanatory construct using the operational coherences of my living to propose generative mechanisms of the operational coherences of my living to show how other operational coherences of my living would arise if those operational coherences were to operate. In what follows, of course, I continue doing so.

Fluidity of the relational matrix of existence as it arises in the distinction of an observer

An organism lives only as long as its interactions with the medium result in the continuous realisation and conservation of its living. No doubt the previous statement is tautological, as are the following ones:

(a) a living system is a living system as long as its living is conserved through its continuous structural change in its interactions in a changing medium; and

(b) a living system remains alive only as long as in its interactions with the medium a niche arises in which its autopoiesis is conserved; and

(c) while living a living systems always Þnds itself operating in the domain of interactions in which its living is conserved.

These statements are tautological because they use the consequences of the generative process that they describe as a sufÞcient proof of the operational validity of the generative process that they describe. It is the tautological nature of these statements what permits the observer who does not distinguish in his/her experience between perception and illusion to explain scientiÞcally his/her experiences with the coherences of his/her experiences, and generate through this process new domains of operational coherences in his/her living. Moreover the operational validity of the tautological explanation of the experiences of the observer with the operational coherences of his/her experiences is what makes the idea of an independent reality vacuous.

Let us see what occurs in the interactions of an organism in the medium that contains it:

1. While an organism lives, its structural dynamics implies at every instant a changing matrix of architectural and operational coherences such that if it is present in the aspect of the medium in which it operates, it may go on in the realisation and conservation of its living.

1. Living systems live their living as a continuously changing present in which they either encounter in the medium in which they exist a conÞguration of dynamic relations which is adequate for the conservation of their living as the realisation of its niche, and they go on living, or they do not encounter such conÞguration of relations, and they die. The conÞguration of congenial dynamic relations in the niche does not exist as such prior to the moment of its arising with the operation of the organism.

2. As in the history of living systems the organisms and the medium in which they realise their living change together congruently, the dynamic structure of a living organism necessarily continuously implies the matrix of dynamic architectural and operational coherences in which its living is realised and conserved mentioned above.

3. Since the matrix of dynamic architectural coherences implied by the dynamic structure of the organism is not Þxed because it changes with the changing structure of the organism, any particular organism lives and conserves its peculiar manner of living only while its multidimensional structural coupling with the medium is conserved in the tangent encounter of the organism through the flow of its behaviour with the matrix of structural and operational coherences in which its living is realised and conserved.

4. An organism exists as a continuously changing present of an evolutionary history in which organisms and medium have changed together congruently. As a result of this all living organisms Þnd themselves at every moment endowed with a bodyhood that as a dynamic architecture continuously generates a flow of sensory effector correlations that either conserve their living as they interact in a changing medium or they die.

5. The structure of an organism is not Þxed, it is indeed a dynamic architecture that is at any instant the present of an evolutionary and an individual ontogenetic history of structural change that has taken place as a continuous flow of changes around the conservation of the dynamic structural conÞguration that realises its living.

In these circumstances, an organism with a nervous system operates continuously generating in its structural dynamics sensory effector correlations that lead to the realisation and conservation of its living only if its interactions occur as encounters in the medium with the changing architectural matrix implied by its dynamic structure. As the structure of the organism changes, its sensory effector correlations change too, and the organism remains alive only as long as the changing sensory effector correlations that it generates continuously result in the conservation of its autopoiesis in the on going flow of its encounter with the medium. All the sensory effector correlations that take place in the organism giving rise to the different behaviours through which it lives, arise in the encounter of the organism with the medium in its niche. This process takes place as a choreography of interactions that result in the conservation of the living of the organism as a consequence of a history of structural coupling in which organism and medium have changed together congruently. If as a result of the independent structural dynamics of the organism and the medium the niche in which the organism conserves its living is not realised, the structural coupling of the organism and the medium is not conserved, and the organism dies. An example of this can be easily seen when one observes a person skiing downhill. The body dynamics of a skier occurs as a flow of sensory effector correlations that arise moment after moment as a responses to the sensations that he or she lives in his or her encounter with the medium, flow of sensory effector correlations that courses in a path generated at every instant according a reactive dynamic pattern acquired in his or her history of practice. As this happens, the skier remains sliding down in harmony with the terrain as long as the flow of sensory perturbations that he or she lives remain coherent with the learned pattern of response. If there is some instant in the encounter of the skier with the medium that stops being congruent with the flow of that pattern, the skier falls.

One of the fundamental consequence of the observation that organism and medium change together congruently in structural coupling for the understanding of how the organism operates, is that it becomes apparent that the usual belief that the two not intersecting phenomenal domains in which the organism exists are connected logically, cannot be sustained. In the flow of living the phenomena of those two phenomenal domains arise correlated through the intersection of their realisation in the structure of the organism, but they remain otherwise logically independent. No doubt an observer of an organism that attends to what happens in these two domains without being aware that they do not intersect, may believe that he or she makes a deduction when after many observations he or she can claim that a particular event that occurs in the physiological domain will be followed by another particular event in the behavioural domain. What the observer is doing in that case, however, is not a deduction; he or she is grasping a generative correlation.

Structural coupling

An organism, as all molecular entities do, operates in the present as a dynamic architecture. It is not energy, information, or processing of information what constitutes living: living is the continuous realisation of the dynamic molecular architecture that autopoiesis is in the flow of a continuously changing present. Energy, information, processing of information, or computations, are explanatory notions that we observers invent to deal with the different regularities of the continuous flow of architectural changes that constitute the worlds that we bring forth in the realisation of our living as the kind of organism that we are as human beings. As we living systems exist in a continuously changing present, our architectural (structural) changes do not occur in relation to an outcome. As our present arises instant after instant in a flow of structural changes that follows a course that arises moment after moment in the conservation of living in dynamic congruence with the medium, our architectural dynamics and the architectural dynamic of the medium necessarily remain dynamically congruent as long as living is conserved. Consequently, the operation of the living system in dynamic congruence with a changing medium is the simple outcome of a history of structural coupling in the conservation of living that course as a process which has no purpose or design.

At any instant of our living, our living is the present of a history in which the operational coherences of all processes occurring in the living of a living system, in the biosphere, or in the cosmos, have no purpose, aim, or meaning in themselves, they just are. It is we, observers that do not see the coherences of the dynamic architectural matrix of existence that the living of a living system entails, who attempt to connect any moment of the present of a living system with some imagined event in its future through the invention of explanatory causal notions such as purposes, aims, or intentionality. We ascribe these notions to the operation of living systems or of the cosmos in the belief that they connote features of the operation of the living system or of nature. Notions such as aim, purpose, or intention, are valid in the domain of human reflections about the course of human doings which, when used as explanatory notions, obscure the generative dynamic architecture of the biological matrix of existence of living system that gives rise to the events that appear for an observer as its future.

The living of an organism in its physiological domain, is the actual realisation of the particular form of molecular autopoiesis proper to it, and the living of an organism in what we see as its behavioural domain, is the relational living that it lives as an organism of a particular kind as a present of a particular history of structural coupling in a network of multidimensional relations of structural coupling, in a more or less local or expanded biosphere. We see some particular organisms such as an elephant, a mouse, a tree, a human being, ..., and yet in their distinction we see, mostly unconsciously, some aspects of the matrix of relations of structural coupling in which they exist integrated as singular individuals. We human beings are not different or special in this respect in relation to other kinds of organisms. What is peculiar to us is that we are self-conscious and self-aware beings that live as individuals in structural coupling in the network of the fluid multidimensional worlds that we continuously bring forth through languaging, both as stable and changing domain of existence.

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