

erations in different systems, new questions on systems research emerge. The social and the biological concepts of autopoiesis appear then as two facets of the same operational phenomenon. Based on these suggestions, promising perspectives for interdisciplinary research are opened. Empirical research on the field of the organizational studies, for example, has applied the concept of autopoiesis both in the biological and social sense

(see Magalhães & Sanchez 2009). David Eldridge (2002) has explained the empirical functioning of the judicial courtroom, also following the social and biological concept of autopoiesis.

« 52 » An interdisciplinary framework seems to be realistic; nevertheless, important challenges for this purpose can be identified, especially on methodological issues. The communication between disciplines

demands new research tools and analytical frameworks. The first step, however, is the recognition of the interdisciplinary nature of systemic research and the overcoming of the *obstacle épistémologique* placed by Maturana and Varela to their own invention.

RECEIVED: 27 JANUARY 2014

ACCEPTED: 28 OCTOBER 2014

# Open Peer Commentaries

## on Hugo Cadenas & Marcelo Arnold's "The Autopoiesis of Social Systems and its Criticisms"



### What Is Sociology?

Humberto R. Maturana  
Escuela Matriztica de Santiago, Chile  
hmr/at/matriztica.org

> **Upshot** • I discuss the foundations of what I have said in my work as a biologist on autopoiesis, molecular autopoietic systems and social systems. I argue that the theme of sociology should be to understand how is it that we come out of the social manner of living that is the foundation of our origin as languaging and reflecting human beings.

« 1 » I am writing this commentary because the contents of Hugo Cadenas & Marcelo Arnold's target article and its title evoke a criticism of what I have written about living systems and about social systems. I find that the article is misleading because it does not represent what I have said in my writings. For these reasons I want to reflect on sociology in detail here. This links in particular to the Results and Implications in Cadenas and Arnold's abstract.

### Living systems?

« 2 » As a biologist, my purpose has been and is to describe, explain and understand biological phenomena as I see them happening in the realization of the living of at least one living being as they appear to me as aspects of my daily living from one morning to the next in whatever domain of doings I may find myself.

« 3 » Accordingly, in what follows I present my reflections standing on a reflective ground defined by three basic unavoidable biological facts:

- The *first basic biological fact* is that we, like all living beings, do not know and cannot know that which we, calling valid at any particular moment in the experience of what we live, shall devalue later as a mistake or illusion or shall confirm as a perception when we compare it with another experience, the validity of which we choose not to doubt.
- To accept this first basic biological fact leads me to accept the *second basic biological fact*: We cannot claim to be able to say anything about anything that we distinguish as if that which we distin-

guish had any property or feature independent of what we were doing in the moment that we distinguish it.

- The *third basic biological fact* is that living beings as molecular entities are structure-determined systems. As such, anything that is external to a living system and that impinges upon it cannot specify what happens in it, and only triggers in it some structural change determined in its structure according how it is made at that moment. As a result of this third biological fact, whenever two or more living beings participate in a dynamics of recursive interactions, they enter in a process of coherent transformation, which I have called "structural coupling" (Maturana 1978). It gives rise to ontogenic and phylogenic evolutionary histories of congruent structural and behavioral transformations between the organisms and their ecological niches that arise with them. These histories last until the organisms separate.

« 4 » All this happens spontaneously in the biological domain, and all this constitutes the foundation of all that we do in

our living as biological-cultural human beings from one morning to the next, whatever we may be doing, thinking, desiring or reflecting. Therefore, I shall take our daily living as the operational and epistemological grounding of all that we human beings can say and that I shall say as I describe and explain my understanding of living systems and of the operation of what we call “social systems” in our daily living in our cultural present. I begun to think, speak and act in this understanding in 1965, when as a result of my work on color vision (Maturana, Uribe & Frenk 1968) I came to realize that which I described above as the first biological fact.

« 5 » From this reflective starting point, I, together with Francisco Varela, referred to a living system as a molecular *autopoietic system* (Maturana & Varela 1973). The word autopoiesis was proposed to indicate and evoke a closed network of recursive processes of production of the molecular components of a system that specifies its borders in its operation as a discrete entity in the relational space in which it exists as a totality. Thus, when we first referred to living systems as “autopoietic systems,” we were claiming that they existed as networks of molecular productions that were closed in the sense that they produced their own borders determining their extension as discrete entities. However, at the same time they are open to the flow of molecules through them. It seems to me that this was well understood by Niklas Luhmann but that he wished to use the notion of autopoiesis in an operational domain different from the molecular one, as is apparent in his proposition that “social systems were autopoietic systems of communications.” When we talked in 1991, I pointed out to him that the notion of autopoiesis does not apply in the way that he wanted because communications do not interact and thereby produce communications like molecules. I asked him why he leaves human beings out of his proposition, knowing that human beings are the foundation of human social systems and that what we call “communications” occur as a reflective operation of human beings in conversations about what they do. He replied that he wanted to propose a predictive theory of social phenomena, and that human beings were unpredictable in their behavior. So I told him that I did not want to propose a

sociological theory, especially if the theory would leave out human beings as he proposed. Rather, I wanted to understand the spontaneity of the operation of those communities of living beings of any kind that in our daily life in our culture we would call “societies” or “social systems.”

« 6 » The word “social” and the expression “social system” were used in daily life to refer to some manner of living together of organisms already long before Varela and I proposed the notion of autopoiesis to speak of the molecular constitution of living systems as discrete entities. In the domains of biology and of our daily life, many different words were used and are still used to refer to the distinctions that we make between the different manners of living together that the different kinds of organisms may adopt. For example, we speak of symbiosis, parasitism, social systems, commensalism and communities. What kinds of things are we distinguishing with such different names?

« 7 » We human beings propose theories as systems of explanation of what we distinguish as happening in what we observe or do in the realization of our living. Theories are systems of logical deductions that we propose in order to follow the consequences that would arise in a particular situation if we transformed everything in it around the conservation of some set of basic premises that we choose to adopt – either because we accept their validity according to some logical argument or, *a priori*, because we like them. Yet, we cannot properly make a theory before having some notion of what characterizes the kind of systems or situations that we may be considering while everything else is changing around the basic premises that we think define the theory and that we have chosen to conserve.

« 8 » Accordingly, I want to ask the question: What do we wish to mean with the word “social”? More precisely, I want to address the common features that those systems that we call “social” in our daily living have in common – systems that we wish to conserve while everything else is allowed to change around them as we operate with the theory that we are proposing in order to understand the manner of operating that is evoked when we speak about those manners of living in human or in insect communities that we call social systems.

### Social systems?

« 9 » If we attend to the different kinds of manners of coexistence that we may observe in living systems, we will see that they differ in the nature of the biological processes that keep them near each other in the different degrees of closeness or of distance as they happen to come together. Expressions such as “multi-cellular,” “symbiosis,” “commensalism,” “parasitism,” “colonies” and “social systems” are used to distinguish those different classes or forms of nearness. And we know also that those different forms of living in nearness or distance entail different inner feelings and different relational doings and emotions. Furthermore, in our daily living we act as if we are aware that not all human relations are of the same kind, and that their nature as different manners of relating and of closeness depends precisely on the inner feelings and emotions that define them. Thus we speak of relations of work, authority, domination, subordination, alliances, etc. and we know that they differ from collaboration, friendship, etc. in the inner feelings that, as I just said, define them. Accordingly, this is why I have claimed that not all human relations are social relations. *Rather, the inner feelings, emotions and doings that constitute social relations are those of mutual care, collaboration, honesty, equity and ethics*, not as declared values, but as spontaneous manners of relating that result from our biological constitution as basically loving beings. Furthermore, we human beings can also consciously choose to adopt explicitly those manners of relating in our living together that we call democracy.<sup>1</sup> Yes, as reflective languaging beings we human beings can negate and reject, support and approve our feelings, emotions and doings, being consciously or unconsciously guided by some theory of our choice that we may have adopted according to what we may want or not want to do.

1 | Ximena Dávila Yáñez and I claim that there are five manners of relating, which we intentionally adopt for living together, that constitute what we want to be the case when we declare that we want to live in democracy. These are: mutual respect, honesty, collaboration, equity and ethics (Maturana & Dávila, in press).

«10» As I just said above, that which we call “social” in our daily living in our cultural present is our spontaneous biological coexistence in relations of mutual care and collaboration that are sustained by inner feelings of love. If we accept our understanding that the biological nature of social phenomena is collaboration in mutual care, what do we need a sociological theory for? What are our concerns that we feel that we need a special sociological theory to speak of our spontaneous biological living in mutual care and collaboration under the inner feelings of love? Let us reflect.

### Individuals?

«11» The basic statement that love is the emotion that constitutes social relations was made in Maturana (1985). The following reflections have been developed by Ximena Dávila Yáñez and me during our work together over the last fifteen years in Escuela Matriztica de Santiago. This is why in what follows what I write is the product of us both, and “we” refers to her and me.

«12» We may say that an organism acts as an autonomous individual when we think that it does what it is doing without emotional contradiction in the pleasure of doing what it is doing, whatever it may be. In the case of those insects that we call social insects, the manner of living together occurs in the doings of each member of the community as a spontaneous result of its individual growth in the nurturing circumstances of the care given to it by the older members of the community that it integrates with them as they act themselves as autonomous individuals. This manner of living is the evolutionary result of a history of conservation of the mother-offspring relation of care prolonged in the ontogeny of each insect and conserved from one generation to the next in their historical coexistence in communities that became extended networks of collaborative mutual upbringing in mutual care. This collaborative mutual upbringing and care was established and is sustained by a flow of hormones, neuropeptides, nutrients and many other kinds of molecules that act in the process of growth and cellular differentiation of each insect through an interchange of food. At every instant and circumstance, it determines in each of the insects the course followed by the physiological and

the anatomical changes that the insect may be undergoing at that instant-circumstance according to its participation in the realization of the dynamic architecture of the social community that it integrates at that instant. Nothing that an observer could call a plan, blue print, purpose or aim is involved in this process. In other words, every organism member of the community does what it does at every moment according to its structure or dynamic architecture as it is arising according to its present participation in it. This particular manner of generating and conserving instant after instant the sensory, operational and relational coherences in a community of social insects through a food interchange that continuously results in the realization of the adequate dynamic architecture of each insect and of the social community at every instant is called *tropholaxis*.

«13» An insect becomes a member of the social community to which it belongs, as it grows in it as an individual that participates in a recursive fashion in its realization and its conservation, through caring for the growth of other individuals in the same manner that it was cared for. Is what occurs with social insects very different from what occurs in the human communities that we call “societies” or “social systems” to which we belong? No, and at the same time, yes. No, what happens with social human beings is not very different from what happens with social insects in the sense that in both cases a “social system or social community” is generated and conserved through relations of collaboration and mutual care that arise in the evolutionary expansion of the mother-offspring love relation. But, yes, it is very different because what happens with social insects is a living in spontaneous collaboration in mutual care sustained as a dynamic loving relation through a network of interchange of hormones, neuropeptides and nutrients; while the mutual care that realizes and conserves us as social human being members of the social community or social system into which we may integrate arises in the expansion of the mother-child relation of loving care for the whole life. This care relation arises as the continuous result of living in the recursive flow of coordination of feelings, doings and emotions in the creation together of the worlds of daily living that they generate as they live as languaging

and reflective beings in networks of conversations, through a languaging process that we, Dávila and I, call “logolaxis.”<sup>2</sup>

«14» Logolaxis is the flow of the networks of conversations that in us human beings play the same role as tropholaxis in insects for the generation and conservation of the harmony of the acting dynamic architecture of the individual organisms and the social and non-social systems and communities into which they integrate at any moment of their living. That is, we reflective human beings live the networks of our conscious and unconscious coordinations of inner feelings, doings and emotions in a logolaxis of mutual care and collaboration that constitutes our body and “soul” as loving social beings. So, the networks of conversations through which we generate and realize the worlds that we live as human beings coordinate and guide unconsciously the course of the continuously occurring anatomo-physiological transformation of the dynamic architecture of the ecological organism-niche unity of our social and non-social living, depending on the inner feelings, doings and emotions that guide us in all that we do while our living lasts.

«15» We are usually not aware of the extent to which our inner feelings and emotions that guide the nature of our doings in the networks of conversations that constitute the realization of our living guide the course of the continuous transformation of our anatomy and physiology according to the living that we are living. In social insects, tropholaxis guides the forms of living that are basically conservative in that they appear to repeat from community to community within each species that we recognize precisely due to such repetition. In humans, logolaxis can in principle exhibit unlimited variation. Humans can generate an open-

2| In social insects the coherence of their behavior is obtained through the flow of hormones, peptides, nutrients and other molecules transmitted from one insect to the other while they share food – a process that is called tropholaxis; the same occurs between human beings through language in a process that we have chosen to call logolaxis. Dávila and I have written about this in a book that is in the process of being published, called *The Tree of Living* (Maturana & Dávila, in press).

ended diversity of networks of conversations, which may be changing continuously. This diversity of conversations in our human existence – our social conversations as conversations of mutual care and collaboration under the inner feelings of love – makes our existence possible as the evolutionary result of conserving the conversations through our children's learning from one generation to the next. This has been the case since the origin of our living in languaging in a family of bipedal primates, i.e., for at least some three million years in the mutual care of sharing food in the *loving tenderness of sexual intimacy*.

### Sociology?

« 16 » The different kinds of social insects occur as different manners of living together in mutual care that occur in the same manner in the different communities of each species because the kinds of individuals that compose them repeat through their manner of upbringing and their participation through tropholaxis in the generation of their behavior as individual organisms. All this makes the behavior of the individual members of any particular insect social community essentially predictable, easily replacing each other in their operation in the social community because they are basically similar. Contrariwise, our manner of living as languaging and reflective human beings that learn the particular form of living together in the loving mutual care of the social community in which they grow in logolaxis may be different in the different kinds of social living that we may generate in our cultural-biological existence. We human beings as reflective languaging beings live in a continuous openness to live in different manners our individual lives through reflections in which we can always ask ourselves if we want to do or think what we are doing or thinking. Also, if we dare to do that, we can also always look at our inner feelings, doings and emotioning, and change them through our reflections in the knowledge that our bodyhood will also change accordingly.

### What about our molecular autopoiesis?

« 17 » Our human anatomy and physiology occur in the realization of our molecular autopoiesis in the ecological organism-niche

unity that we integrate; yet our humanness as persons that exist as totalities operating as social beings interacting with each other happens in the relational space. And we, as we speak about ourselves, exist in the relational doings of a reflective conversation as persons that explain the nature of their existence as observers to other persons that listen as observers too. Whenever we reflect, whenever some elements form a totality through their interactions, an intrinsically new sensory, operational and relational domain arises that could not have been deduced from what was before. It is because new sensory, operational and relational domains appear in our living from our doings, from the independent happenings that occur in our ecological niche unity, and from the new domains that arise in our reflections in a manner that cannot be deduced from what was happening to us before, that it is intrinsically impossible to create a predictive theory in relation to what will happen in the course of our social living as we operate in it according to our desires. If we want predictive behavior in a human domain, we must agree on a common project, or submit, either unwillingly or willingly, to some tyranny.

### What is sociology?

« 18 » I feel that I do not fully understand what is the actual concern of sociologists as they do their sociological reflections; I also feel as a biologist that if I were to declare myself a sociologist my concern would be to understand how can we contribute as human social beings to overcoming our fundamental addiction to the pleasure of being served and to recovering the pleasure of mutual respect, collaboration honesty, equity and ethical social living.<sup>3</sup> Furthermore, as a result of our reflections on tropholaxis and logolaxis, Dávila and I think that if we were to declare ourselves sociologists, our con-

3 | In Maturana & Dávila (in press) Dávila and I claim that *democracy*, as a manner of living, not as a political declaration, is the human manner of social living. As such it entails the daily presence of mutual respect, honesty, collaboration, equity and ethical living, not as principles but as a matter-of-course coexistence in mutual care. And we claim that if any of these manners of relating fails, all fail.

cern as such would be to understand the origin of the rational-emotional contradiction that has interfered with the conservation of the basic harmony of our social existence in the loving relation of collaboration and mutual care that was the ecological organism-niche unity in which we arose as languaging and reflecting human beings.

« 19 » In other words, if social beingness appears spontaneously in our biological history as a manner of living together in recursive mutual care as a result the expansion of mother-offspring care, then the theme of sociology cannot be to understand the nature of the social phenomenon. This is because we know that when we speak about social systems, we are speaking about sensory, operational and relational biological communities of organisms that live in collaboration and recursive mutual care. The theme of sociology should be to understand how is it that we come out of the social manner of living that is the foundation of our origin as languaging and reflecting human beings.

« 20 » How was it possible and is it still possible in our human social history that we have repeatedly fallen and we are still repeatedly falling out of our social beingness, even though we are aware and know that our social beingness is the basic foundation of our humanness?

Humberto Maturana Romesín received a Ph.D. in Biology from Harvard University. He showed that living beings are molecular autopoietic systems, and that if one follows the consequences of the fact that living beings do not distinguish in their experience between perception and illusion, one can show that: language as a biological phenomenon occurs as a flow of living together in coordinations of coordinations of consensual behaviors; and cognition as a biological phenomenon occurs when an organism operates adequately to the circumstances of its living, conserving its autopoiesis as a consequence of the operational-relational coherences with its niche that are proper to it in the present of its living as a feature of the history of the evolutionary structural drift to which it belongs

RECEIVED: 4 JANUARY 2015

ACCEPTED: 12 JANUARY 2015