Beyond Coherence

Klaus Krippendorff
University of Pennsylvania, kkrippendorff@asc.upenn.edu

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Klaus Krippendorff
Annenberg School for Communication
University of Pennsylvania
KKrippendorff@pobox.asc.upenn.edu

Much has happened since the 1960s and 1970s when the idea of self-organization emerged and began to alter our conceptions of human nature, of social organization, and of a social science that had heretofore been wedded to linear causal explanations. The experience that systems could organize themselves has been revolutionary and constitutes a paradigm shift that is still ongoing. In the following, I will (A) distinguish between indigenously and self-organizing systems, (B) consider autopoiesis as a biological step towards selfhood, (C) propose a way to distinguish selves and Others, and, based on this, (D) suggest self-organization to be a social phenomenon. As the notion of self-organization reconceptualizes social organization and human experience, I will close with (E), suggestions for further work on self-organization.

Indigenously Organizing versus Self-organizing Systems

Among the phenomena that have been identified as self-organizing (Ashby, 1947; Yovits & Cameron, 1960; Foerster & Zopf, 1962; Maruyama, 1963; Varela, 1979; Ulrich & Probst 1984; Prigogine & Stengers, 1984; Eigen, 1988; Haken, 1988, Paslack, 1991) are:

- The replicable unfolding of unpredictable forms of organization, whether they are determined by recursive functions (fractals), the structural properties of a system's components (crystal growth), a combination of both (artificial life simulated on a computer), or by certain controlling parts of a larger system (DNA within living organisms).

- Statistically unusual yet sustainable forms of coordination (laser light, tornados).

- The spontaneous emergence of organization resulting from interactions among already organized parts (social organization, beehives, for a rudimentary example, or crowds).

- The rise of latent forms of organization which are unintended and beyond the constituent parts of a system's ability to monitor them (institutional hierarchies or organizational cultures like feudalism or postmodernism).

- A decrease of entropy inside a system relative to the entropy in the system's environment.

I was always uncomfortable speaking of such systems as *self*-organizing when they do not speak for themselves, when it is a theory that decides what they are. Let me be clear in how theorists are implicated in this characterization. First, observers distinguish between the system and its environment and then proceed to measure or describe what they consider its organization against a background of their own experiences. Systems so defined, especially their self, cannot possibly be divorced from the conceptions observers bring to them. Second, the "self" such systems is recognized mainly in the negative: The "unpredictability" of a system's organization, the "absence" of instructions (information about appropriate organizational forms) flowing across the system's boundary, the inadequacy of adaptational explanations when self-organizing systems are defined not to respond to their environment independent of their organization. Apparently, *the supposed "nature" of self-organizing systems results from their observers' actions and from their inability to locate a source for their organization outside it*. Here, "selves" are observers' attributes, not shared by the observed system. I prefer to call such systems *indigenously organized.*

Autopoiesis, a Biological Condition to Selfhood

A first step towards understanding systems that are capable of defining themselves has been taken by the biologists Maturana and Varela (1980, 1988). Ontogenetically, they argue, all living systems operate as recursive networks of interactions that draw and preserve their boundary, thus distinguishing themselves against the background of what they are not. Living systems organize themselves under continuous perturbations from their environment, which may well include their observer. Living systems incorporate matter from their environment, but regard anything that enters it under the perspective of their own (existing) organization. Thus, living systems are constituted in a network of interactions that produces all the components necessary to operate that network within

their boundary. Maturana and Varela call an organization (the particular form of their network of interactions) that is capable of this self-production *autopoietic[ii]*. An autopoietic organization is organizationally closed in the sense that it operates recursively on its organization without knowing its environment independent from how it operates. Its identity lies in the process of maintaining its own boundary. Unlike in the self-organization literature, this process is not the result of an observer's distinction. However, the autopoiesis of living systems would not be recognizable if the distinction would fail to acknowledge that boundary.

The theory of autopoiesis is a theory of systems that are free to develop any kind of organization within their boundaries, provided that this organization preserves its autopoiesis. The organization of living systems is indigenous except for the need to preserve their autopoiesis[iii]. Thus, the organization of living systems is indigenous. Although the preservation of a boundary is a prerequisite of selfhood, because autopoietic organizations can undergo considerable organizational drifts, I cannot yet see a self in them. Incidentally, Maturana and Varela do not use the term self-organization either, although for different reasons.

Maturana[iv] acknowledges that observers are autopoietic systems as well and that the observation of living systems consists in one autopoietic system being coupled to another. As the two systems interact, each under preservation of their own autopoiesis, coordination inevitably arises. Language is the most noticeable historical artifact of such coordination and it is indigenous to that coupling. Language brings forth what it speaks of and thus serves to coordinate that coordination. However, in claiming such generalizations, Maturana is careful not to contradict his own autopoiesis by speaking from the illusory position of a God-like observer. Instead, he speaks of his construction. The popular use of ocular metaphors that depict observers as spectators of things outside is clearly unworking. But what could another self then be?

Distinguishing Constructed Selves and Others

While autopoietic organizations cannot represent an environment they have no privileged access to, they can nevertheless organize themselves under conditions of continuous perturbation

from that environment. Within their organization, living systems can thus be said *to construct their own indigenous realities*, realities that are informed by their own history of responding to past perturbations. In trying to account for Others, it has been tempting to vacillate between two extreme assumptions, the assumption of a coherent ontology that is same for everyone and the assumption of us being solipsists. Both assumptions are anti-social in their ultimate effect. When two observers face each other, they cannot help but acknowledging each other's presence. How they see each other and enact their respective conceptions has profound consequences for what survives. The freedom to construct any reality they please is ultimately constrained by whether they preserve the autopoiesis of each[v].

This is where von Foerster's *Principle of Relativity* applies. The Principle suggests "*reject*(ing any) *hypothesis when it does not hold for two instances together, although it holds for each instance separately*" (1980b:307). For example, when two solipsists meet, their worldview falls to pieces as soon as they acknowledge meeting someone like them. And, as soon as they do construct another organism that is capable of constructing their own reality, neither can claim to play God and observe the Other directly and from no particular standpoint or perspective. Thus, as mutual observers, each must grant the other what they claim distinguishes them: the ability of maintaining a boundary, of organizing themselves indigenously, of constructing complementary "selves" and "Others," and of observing the consequences of enacting their constructions. This precludes the temptations of both, objectivism and solipsism, and brings us on a middle way.

I must point out the obvious, that the Principle of Relativity stated in language, a language that the two observers are presumed to understand (or coordinate their actions with). Von Foerster (1980b:307) points out that the Principle is not a hypothesis whose truth or falsity is decided by evidence. Rather, it offers a choice between conceiving themselves at the center of their own universe (solipsism) or playing God (objectivism), on the one side, and making the relation between Thou and I the central reference, on the other. This is also the choice of languaging in monologue and languaging in dialogue. The second alternative leads us to a recursive conception *self* as capable of making choices and becoming accountable to Others for all consequences arising out of

this conception (Shotter, 1984). It acknowledges observers and observed Others as linguistically capable agents and participants in the phenomena being described. And it invokes a paradigm shift for social inquiry. It should be pointed out that rejecting this choice is a choice as well, albeit one that significantly impairs our ability to understand social phenomena.

The complementary construction of self and Others is entirely consistent with what we know of our human biology, of our autopoiesis. However, it speaks against the belief in a scientific ontology, the illusion of being able to access an observer-independent objective world, and the illusion of being able to observe a reality without an observer. Instead, it renders even simple acts of observation, especially of Others, as *social phenomenon*. Under these conditions, accounts of observations then become less a matter of truth or falsity, as von Foerster points out regarding his Principle, but whether we, as selves and as Others, can live with them. These conclusions underlie much of social constructivist thinking. The key to enter the world of Others is to go beyond coherence.

Social Phenomena and the Necessity of Second-order Understanding

Social phenomena, like money, a family, the Internet or a corporation are *constituted in the understanding its human constituents have of it*. If enough people question the value of money, it can no longer serve as such. If the members of a family no longer see themselves as members of that family, the family has ceased to exist. If nobody knows how Others use the Internet, there can be no Internet the way we know it now. Corporations reside in networks of commitments that are continuously enacted within them. Social constructions so conceived are indigenous social forms and cannot be understood without a conception of how Others are involved.

Participation in social phenomena requires not just an understanding of that phenomenon (e.g. as a technology, as a means to an end) but also an understanding of other participants' understanding of that phenomenon. The understanding of Others' understanding of social phenomena is an understanding of understanding and radically different from an understanding of the causal objects of the natural sciences. I have called the understanding of understanding a

second-order understanding. By contrast, bureaucracies, hierarchical command structures, and user instructions succeed only when there is no difference between an authority's understanding and their subjects' understanding, when their understanding is the same. Under these extreme conditions communication reduces to the application of a code, words mean the same as for everyone, and human agency is reduced to deciding on efficient actions. Whenever this is so, the assumption that we all live in the same coherent universe may not get us into difficulties and second-order understanding reduces to a first-order understanding of how deviate from that norm or are impaired. Indeed, first-order understanding is encouraged wherever control is intended or hegemony is believed to rule.

Consistency is the criterion of first-order understanding. The natural sciences have taken the construction of just one uni-verse as their aim and thus specialize in this kind of understanding. For example, when theories are encountered that contradict with one another or data turn up that fail to support a given theory, natural scientists are propelled to seek new theories that overcome such inconsistencies. Triangulation too is a well-known scientific method that eliminates propositions that do not fit. The natural sciences are dedicated to preserve coherency of their construction of a uni-verse. Natural science methods cannot but standardize reality for everyone and marginalizes otherness. Indigenous forms of organization, autopoiesis, the human ability to construct selves and Others, the dialogical nature of languaging have no place in consistent constructions and are denied in first-order accounts of nature.

Second-order understanding is, as I have suggested, an understanding of Others' understanding. It grants Others to have the very abilities we claim for ourselves: to observe, to construct, to live with Others, and to understand their worlds. The Principle of Relativity would suggest that, in the social domain, we must not merely respect but celebrate the possibility of diverse and equally valid reality constructions. Second-order understanding must embrace logics different from our own in our own and live with inconsistencies across these realities -- as long as they do not violate the autopoiesis of their constituents[vi]. Second-order understanding becomes manifest in social theories that leave adequate openings for the constituents of the theorized

phenomena to enter their own theories into them. Social theories need not and, where they do respect the otherness of Others, cannot be logically coherent.

Logically coherent social theories may well serve purposes of social control – much as causal theories can be used to construct mechanical devices. Coherent theories of self-organization fail to acknowledge the autopoiesis of the human constituents of these phenomena and their attendant freedom to organize themselves indigenously. The celebration of coherency at the expense of multi-logical constructions of selves and Others therefore entails the danger of oppression.

Let me amplify the argument against coherence as a criterion for theories in the social domain, which the title of this article promised. Bohm (1996) borrowed the metaphor of the laser as "coherent light" from physics to talk about coherence of human action toward common aims and considers coherence one result of dialogue. I am aware of the dual meaning of the word "coherence" -- coordination of action on the one side, and the absence of contradictions on the other. Bohm is never so clear about the difference. I am leery about the entailments of using physical metaphors in explanations of social phenomena, precisely because it erodes the very human agency that the idea of autopoiesis and of self-organization seeks to recover from centuries of oppressive theorizing. If coherence is the aim, oppressive regimes are quick to follow.

Cherishing incoherences would be a far more respectful aim for the participants in social phenomena as well as for social scientists attempting to account for them. It would honor the necessarily indigenous nature of human understanding. It would grant selves to emerge in the making of choices. It would encourage dialogue -- especially in holding individuals to be accountable to each other for their actions. It would consider interventions in the unfolding dynamics of social reality part of that reality. It would also see social scientists as necessary participants in the very social phenomena they try to understand.

Implications of Self-Organization

If we are willing to consider self-organization as a phenomenon that involves human beings, who, by choosing to construct a world and live in it, demonstrate to themselves that they have selves different from that of Others, then we have to learn to live with diverse reality constructions, with many concurrent and potentially incommensurate logics, not just our own. I am suggesting that coherent constructions of reality, scientific theories for example, prevent us from engaging in the kind of dialogue through which we can experience the different worlds of Others. Dialogue is never complete. In dialogue, participants remain open to redefine themselves in response to each other. Inter-individual incoherences are the fuel that drives dialogue – not towards coherence, but towards preserving its indeterminacy from an outside. In dialogue, whether as stakeholders or as social scientists, we cannot help but being co-organizers of the very system we wish to understand as self-organizing.

To further theories of self-organization, I am recommending that other theorists do what I have tried in the forgoing:

- To keep indigenous organization separate from self-organization. Indigenous organization can occur in entirely deterministic systems, self-organization cannot.

- To replace theorists' attribution of abstract selves by a notion of self as capable of distinguishing itself from other selves. This, I have argued, takes place in language.

- To take self-organization as a social process, one that is constituted in the understanding that its constituents have of it. Understanding different selves is a second-order understanding.

- To consider multiple and incommensurable logics to be an essential ingredient of social realities. Acceptable social theories must then remain open to the theories held by the human constituents of the theorized phenomena. In the social domain, coherence cannot be an aim.

- To admit our accountability -- not just to our scientific peers -- but foremost to those affected by our hypotheses. This means reentering social theories into the very process they claim to describe and allowing the constituents of that process to have a voice in what such theories may set in motion (Krippendorff, 1996; 1998).

- To assure that theories of social phenomena do not violate the autopoiesis of their constituents, or better still, that they do not usurp the choices their constituents have to continue the process or leave it. This speaks against deterministic theories of self-organization.

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Endnotes

[i] This paper is the abbreviated version of a presentation to a panel on "Using Self-Organizing Systems to Theorize Human Organization and Experience" at the 1998 ICA Conference in Jerusalem, presented July 22, 1998.

[ii] Maturana and Varela (1980) are not concerned with the fact that living systems are at least in part genetically determined. They are correct in saying that to understand how living organisms reproduce presupposes an understanding of their ability to live. This ability requires a circular form of organization, one that could be said to continuously unfold its own history into a future. In that process, it must merely withstand environmental perturbations.

[iii] Here, von Foerster's (1980a) theory of eigen-behavior can explain the emergence of indigenous forms: Within finite domains, all recursive operations, which are repeatedly applied to its own results, eventually converge to a smaller set of behaviors, if not to one that is repeated over and over again. This has also been shown by Ashby (1956:73-85). The behavior that eventually emerges is the sole result of the operation being repeatedly performed. It is indigenous to it, and called its eigen-behavior (or eigen-value if it is a state). Within a network of interactions, autopoietic systems converge to eigen-organizations that are the products of these interactions as well as of the history of the perturbations experienced. Indigenous or eigen-organizations are relatively stable and are responsible for how the system continues its autopoiesis, including how it interacts with its environment. It is that system's reality. Von Foerster summarizes these considerations in a Postulate of Cognitive Homeostasis: "The nervous system is organized (or organizes itself) so that it computes a stable reality" (1980b:306).

[iv] Personal communication.

[v] A construction that is unable to preserve the autopoiesis of its beholder – suicide, fatal mistakes, or actions on illusions with mortal consequences – ceases with their host.

[vi] When the autopoiesis of a living system is violated, it ceases to exist as that system. To the extent social constructions are predicated on the understanding its constituents have of it, the constituents must remain accountable for their actions to other participants. This presumes a self that only autopoietic systems can construct within their organization.