not only allows but necessitates interdisciplinary cooperation and an appropriate terminology as well as at least openness to empirical work.

«14» To conclude, it might be helpful to point at the rather strange remark in §31, where they criticize Maturana and Varela’s proposition of “a utilitarian concept of social systems.” Although I do not share their view of their social systems in all details, it seems evident to me as an observer that without individuals who cooperate hoping to serve (directly or indirectly, immediately or with some postponement) their interests (and this means very basically surviving and reproducing), there would be no societyality and hence nothing like the enormous variety of social activities that we construct as social systems. Of course, we know that the old utilitarian conviction is wrong: it saw humans primarily as rational actors seeking to maximize their individual benefits. Since humans and their individual and social behaviours are to be constructed as much more complex, the theory of social systems has to integrate these highly complex biological systems.

«15» Keeping individuals within social theory does not at all imply a reductionist position. On the contrary, it is important to design carefully how individuals participate in social systems and to distinguish different levels of interactions and their properties. To explain the behaviour of social systems one has (a) to look at individuals who, with different parts of their capacities, act, interact, and communicate as components in various social systems. At the same time one has (b) to observe the organization of the social systems one is interested in as systemic properties that explain large parts of the behaviour of the systems that are independent of many of the particular components (Hejl 1995, and with respect to management Hejl & Stahl 2000). As I see the problematic relation between individuals and social systems, it is necessary to give up the dualism between holism (the level of systems) and reductionism (the level of individuals). This requires overstepping the borders and traditions of sociology as part of the humanities, an understanding of scientific explanations at least compatible with the mechanistic orientation of the natural sciences, and the readiness to interdisciplinary beyond a rather opaque adoption of terms and concepts.

«16» I would like to end with a question some readers may have been puzzled by all along: Why did Luhmann, a jurist with experience in administrative law, decide to propose a theory in which communication is the central activity? If we look at the judicial system, especially of judges and courts in the Roman-law tradition, it is clear that their main activity is communication and selecting meanings from texts. At the same time it is evident for all participants that, if there are conflicts, “communication within (the higher instances of) the system” will decide/select the meaning that is viable for the time being (Hejl 1997). The very last question then is: Why is access to these higher instances often a matter of political debate and struggle?

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Communication is Meaning-based Autopoiesis

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> Upshot • Autopoiesis based on meaning is a rich conceptual tool. It would be a pity to reduce it to a few general statements on self-reference in social systems.

«1» The “Results” presented in Hugo Cadenas and Marcelo Arnoldi’s target article are announced from the very beginning as a claim, namely “that it is justified to extend the concept of autopoiesis from its biological origin to other disciplines.” As envisioned by the authors in their conclusion, these results will most certainly open promising perspectives for interdisciplinary research and contribute to overcoming the many hesitations inspired by Humberto Maturana’s public position against such developments. In many of his writings Niklas Luhmann explains how and why he chose to include autopoiesis in his theory of meaning-constituting systems, building on what he calls Maturana’s innovation (Luhmann 1985b: 6). He invariably concludes with declarations such as: “In principle, I do not see a decisive difference between his theory and mine” (Luhmann 2013b: 77).

«2» Without questioning the validity of those sections of the target article where Luhmann’s vision of autopoiesis in social systems is confronted with criticism both from the original authors of the concept and from other social theorists, one could say that there is a missed opportunity in the section entitled “From self-reference to autopoiesis of social systems” (§§6–14). It would gain in convincing power if more effort was invested in describing how social systems operate as meaning-constituting systems (Luhmann 1995: Chapter 2; 1990: Chapter 2; 1987). Meaning is briefly mentioned in §7, §10 and §14. The sentence that introduces and the one that concludes §14 both allude to the distinction between life-based autopoiesis and meaning-based autopoiesis. Little more is offered.

«3» The following comments are limited to that one section of the target article. They are not meant to undermine the contribution made by the authors to refocusing the debate on the concept of autopoiesis and promoting a much needed development of interdisciplinary research using this concept.

«4» Sadly, when introducing the notion of meaning in §7, the authors take many short cuts. For example, they propose that “the social system itself is a ‘selection’ between different possibilities that meaning offers.” Such a declaration gives little weight to the extended analysis provided in Luhmann (1982b) – which is the reference quoted – where the framework is clearly identified from the beginning as a “general theory of meaning-generating systems.” Meaning
forces the system to make a selection since a choice has to be made “among the totality of possibilities for relationship or references to other things indicated in the meaning actually given” (Luhmann 1995: 134). Furthermore, the history of a social system can be seen as a history of how selections were made. But to go further than that and insist that a system “is” a selection could lead the reader astray in the context of this target article.

5 Viewed as the operation of a social system, a selection is an event. What happens is worth noting: meaning is “constituted.” In §7, Luhmann (1982c: 70) is the reference offered at the end of the third sentence, which is about self-selection and boundary-formation. Here again, Luhmann’s introduction of meaning-constituting systems is omitted. In Luhmann (1982c: 70), “self-selection” is discussed, but not in relation to boundary-formation (which appears rather on page 71). One can read instead that social systems “constitute themselves through processes of self-selection.” To complete this sentence, Luhmann then adds: “just as living creatures constitute themselves through processes of autocatalysis.” Here, meaning-based autopoiesis in social systems and life-based autopoiesis are introduced side by side.

6 Luhmann – and this will prove to be a powerful conceptual insight – defines autopoiesis “as a general form of system-building using self-referential closure” that can be observed in systems including, but not limited to, living systems (Luhmann 1986: 172). In Luhmann’s theory, psychic systems – constituted on the basis of a closed self-referential nexus of conscious states – and social systems – constituted on the basis of a closed self-referential nexus of communications – are interpenetrating meaning-constituting systems (Luhmann 1995: 59; 1990: 23f). At the very end of the section of the target article under scrutiny, in §14, the reader will be told swiftly about these two levels of system formation in two sentences, one at the beginning of the paragraph, one at the end. Luhmann’s major conceptual innovation is presented in §14 as moving the problem of autopoiesis “from the plane of the physical space” to the realm of meaning. We also find in §11 a puzzling sentence indicating that “the autopoiesis of society operates the autopoiesis of individuals,” this being done “at a different level from the organic level.”

7 Once it has been established that life and meaning are to be distinguished as two different kinds of autopoietic organization, attention can turn to the fact that meaning is “constituted.” Luhmann comes up, as the authors rightly point out in §7, with a definition of meaning as the unity of the difference between the actual and the possible. Such an approach to meaning is developed by Luhmann with explicit references to Edmund Husserl and, according to him, the best way to examine the constitution of meaning is the phenomenological method (Luhmann 1990: 83). He criticizes Husserl, though, for using the word “constitution” as “a central category that remains ambivalent” (Luhmann 1990: 69). He notes that Talcott Parsons uses the word without defining it. He also explains that he chose the term “constitution” to describe the “being-possible-only-together” of order (the system) and the full complexity of the world:

8 When better equipped to appreciate the central place occupied in Luhmann’s theory by meaning and its constitution, the reader might grasp more quickly, when proceeding to §8 and 9 of the targeted article, why it matters so much whether a self – as element, as process or as system – is capable or not of referring to itself as a self. Luhmann considers that his contribution to the theory of self-referential systems requires nothing less than “a new paradigm” (Luhmann 1995: 10). Indeed, it could be somewhat unsettling for some to realize that in Luhmann’s theory, a self includes self-reference “within itself” (Luhmann 1995: 446).

9 What is missing in §8 is a clear statement that self-reference allows a self to switch from self-reference to hetero-ref-
ferences by means of internal operations in search of connectivity. Luhmann explains that self-reference "includes the capacity to determine itself internally through a combination of 'self-identity' and 'self-diversity' and at the same time to leave room for external co-determination" (Luhmann 1995: 290). Meaningful internal references as well as external ones are constituted inside the system, since meaning does not exist in the environment. The system cannot operate in the environment, as pointed out a bit later in §9, and the distinction between self-reference and hetero-reference (or other-reference) has to remain a system-internal difference.

- **10** Self-reference not being introduced along those lines in §8, it is more difficult for the reader to realize that Luhmann makes use of the very same conceptual apparatus when describing the self-referential operation of communication in a social system. When the reader is told in §10 that communications "involve three selections," there is no mention that information is hetero-reference, utterance is self-reference and understanding requires distinguishing the two internally. The unity of the three selections is co-created inside the system, and does not exist anywhere else. To make things more difficult, §9 has been inserted in between, and the reader is hastily introduced to the three forms of self-reference: basal self-reference (the self is an element), reflexivity (the self is a process) and reflection (the self is a system). At the end of §9, the reader is then abruptly told that basal self-reference is "the condition that characterizes the autopoiesis of the system."

- **11** Table 1 is an attempt to fill in the blanks and to show how concepts taken from the section under scrutiny, such as basal self-reference (§9), recursive networks (§12), connections (§13) and communication (§10) fit with Luhmann's statement that "basal self-reference is a constitutive requirement" for autopoiesis (Luhmann 1995: 443).

- **12** When the authors write in §14 that "communication emerges as the unit of information and utterance," we are not told the whole story. Something is missing. What we read in Luhmann is rather that information and utterance "are forced into unity" (Luhmann 1990: 12) and that communication requires the production of an emergent unity" (Luhmann 1993: 774). The gap observed here goes deeper than a choice of vocabulary between "unit" and "unity." Luhmann does use the two words together in the following sentence: "The unity of a communication is due to the system that reproduces itself by producing units of this kind through a network of units of this kind" (Luhmann 1996: 261). He clearly states in this paper, two paragraphs before the sentence quoted here, that his intention is to relate the concept of communication to a self-referential domain.

- **13** In the last paragraph (§14) of the section under scrutiny, the word "meaning" is repeated six times, with an emphasis on "the meaning of communication" and "meaning in the consciousness" and "in the communication." Luhmann's warnings about the fact that meaning is constituted and that there are no bits of meaning waiting to be picked up by a system in the environment do not seem to have been really heard. When a meaning-constituting system makes one selection, it neutralizes and sometimes negates the possibilities that are not actualized in that selection. But it does not eliminate them as possibilities. "The world is not reduced to only what is actually being attended to each time a selection is made," says Luhmann, "It still remains as the horizon of references, as the horizon of further possibilities, and thus as the domain from which followup selections or further choices are made." (Luhmann 1987: 177)

- **14** If the intended purpose of §§6–14 was to start with the notion of self-reference and to move from there into a closer examination of the autopoiesis of social systems, then the reader has been offered a bumpy ride. To study the workings of meaning-based autopoietic processes may not be an easier path, but it is worth undertaking since it could very well be the condition of possibility for interdisciplinarity.

**The Concept of Autopoiesis: Its Relevance and Consequences for Sociology**

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> **Upshot** I discuss two aspects of Cadenas & Arnold’s target article. The first concerns some clarifications of the sociological importance of the concept of autopoiesis and the second the criticisms of this concept and its applications in the social sciences.

- **1** The concept of autopoiesis is indeed a successful case of abstraction, generalization and respecification (in the sense of Stichweh 1987: 447, quoted by the authors: §50) involving two disciplines very distant from each other: biology and sociology. This concept is important not so much because it “explains” something that has remained unclear so far, but rather because it obliges the social sciences to rethink their tradition and to exclude many of the concepts that are still taken for granted today.

- **2** First of all, defining social systems as systems recursively reproducing their own elements through their own elements re-opened the old question of what the elements of social systems are. As we know, traditionally there have been two answers: individuals or actions – social actions. In both cases, there have always been problems. On the one hand, defining social systems on the basis of individuals always raises the problem of what is meant by this concept of an individual – its body? Its consciousness? But to describe or even explain how the law, families or formal organizations work, starting with the idea of a set of individuals seems to be challenging. On the other hand, the concept of action has never been defined satisfactorily either. Action refers to the actor and to its intentions, and also to all that can condition them. At the same time, however, nothing of what is social can be explained in terms of someone’s intention or will. Therefore additional concepts became necessary, such as the idea of unintended consequences of action (Merton 1936) or evolutionary theory.

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