Parsons T. (1951) The social system. Free Press, Glencoe IL.
Russell S. (2019) Human compatible: AI and the problem of control. Penguin, London.
Silver D., Hubert T., Schrittwieser J., Antonoglou I., Lai M., Guez A., Lanctot M., Sifre L., Kumaran D., Graepel T. Lillicrap T., Simonyan K. & Hassabis D. (2018) A general reinforcement learning algorithm that masters chess, shogi, and Go through self-play. Science 362(6419): 1140–1144. https://doi.org/10.1126/science.aar6404

Manfred Füllsack is Professor of Systems Sciences at the University of Graz. His research includes: systems, complexity, networks, games and computational theory, work – its history, its sociology, its economy, and its philosophy, and computer-based simulations.

Funding: This contribution is not subject to any funding.
Competing interests: The author declares that he has no competing interests.

Received: 25 May 2021
Revised: 1 June 2021
Revised: 25 June 2021
Accepted: 25 June 2021

INTERVIEW

How Can Algorithms Participate in Communication?

Bruce Clarke
Texas Tech University, USA
brunoclarke/at/gmail.com

> Abstract • Esposito's theoretical approach indicates the fertility, first, of transplanting social systems theory into other fields, and next, of bringing classical cybernetic topics such as computation by algorithms back into Luhmann's multi-modal constructivist framework of differentiated system operations.

Handling Editor • Alexander Riegler

« 1 » In my commentary, I consider some key statements of Elena Esposito's interview from my vantage as an Anglophone and interdisciplinary non-specialist reader of Niklas Luhmann's text. The ultimate issue that I draw out is the one intimated in my title's adaptation of Luhmann's essay "How Can the Mind Participate in Communication?" (Luhmann 2002a). The short answer Esposito gives regarding algorithms may be summarized like so: algorithms participate in communication in the same way natural minds do, by manipulating the medium of meaning, but unlike minds, they do so without needing to construct an understanding of what they are doing.

"[W]hat I and a couple of friends found very interesting in the Luhmann–Habermas debate was the Luhmann side of it" (§2)

« 2 » Esposito observes Luhmann from within his dedicated academic discipline of sociology. Hers is a lucid insider's report on the theoretical workings and the current status of Luhmann's sociological theories. Esposito clarifies the differences in the circumstances of my own reception of Luhmann's work in English translation and provokes some thoughts on the status of Anglophone Luhmann scholarship.

« 3 » For instance, the published record of the debate between Luhmann and Jürgen Habermas was not a formative event for me, and its interest followed only after my initiation into social systems theory's cybernetic extraction. Having studied that connection at some length, I would summarize Luhmann's conceptual innovation in this way: Luhmann made an effective selection from the epistemological and otherwise philosophical versions of cybernetics coming out of the 1970s systems counterculture in the works of Gregory Bateson, Heinz von Foerster, George Spencer Brown, Humberto Maturana, and Francisco Varela (Clarke 2020a: 101–156), and set that synthesis quite neatly down within post-war sociology's disciplinary formations around Talcott Parsons's *The Social System* (1977).

« 4 » This major theoretical move foregrounds communication and meaning as the phenomena to be accounted for. One does not have to speak cybernetics (although it helps) to operate Luhmann's social systems theory at the level of its sociological themes. For instance, the term *autopoiesis* does not come up in Esposito's discussion. However, at the same time, one does have to speak constructivism. Luhmann's work enacts what is still the most far-reaching development of second-order cybernetics' epistemological themes, rivalling if not surpassing the conceptual evolutions of the second-order cyberneticists themselves, Varela included. If one could get beyond the factionalism that besets much of contemporary cybernetic discourse, one would find in Luhmann the full sociological and epistemological counterpart of the cognitive, neurological, and phenomenological work that Maturana and Varela mediated through von Foerster's Biological Computer Laboratory. In any event, this is the thesis at large in the essay collection I coedited a decade ago (Clarke & Hansen 2009).

"Luhmann has only a narrow group of followers in the English-speaking world" (§4)

« 5 » Matters appear somewhat more favorable in the British sociological academy, but for the normal run of American sociology departments, as near as I can tell, Luhmann's work still appears to be too heterodox. Lacking (like cybernetics more broadly) an institutionally solid disciplinary base of operations, Luhmann's Anglophone "following" is relatively dispersed. Rather, Luhmann's texts have circulated in literature, philosophy, and media studies departments, buffeted amidst other concurrent theoretical movements or fads, such as object-oriented ontology, speculative realism, the new materialism, Anthropocene studies, posthumanism, and the like.

« 6 » In the international Anglophone academy, sociologist Dirk Baecker (2021) and philosopher Hans-Georg Moeller (2012) anchor the field. Luhmann's theory is being ably developed for the environmental humanities by Hannes Bergthaller (2014), for critical theory by Anders la Cour and Andreas Philippopoulos-Mihalopoulos (2013), for media studies by Richard Grusin (2010), for new materialism and posthumanism by Anna Henkel (2016), for economic theory by Brian Massumi (2014), for politics and international relations by Hannah Richter (2020), and for literary studies by Mark Seltzer (2016). Beginning with *Critical Environments*, Cary Wolfe's (1998) work has deeply developed social systems theory alongside deconstruction, animal studies, and posthumanist discourse. My own work (Clarke 2008, 2014, 2020a,

2020b) brings systems theory together with narrative theory, posthumanism, and Gaia theory.

« 7 » From *Essays in Self-Reference* (Luhmann 1991) to *Theories of Distinction* (Luhmann 2002c), Luhmann's most accessible writings available in English have tilted toward philosophical concerns in their direct engagement with issues at large in various doctrines of constructivism. For Luhmann, both knowing and being are shaped by the structural biases and temporal contingencies of systemic processes. This is the side of Luhmann that channels Spencer Brown's *Laws of Form* and von Foerster's second-order cybernetics, and that also negotiates gently but firmly with the disapprobation of Maturana and Varela when he leads the concept of autopoiesis off the biological reservation. In other words, the non-sociological sources of Luhmann's text are both determinative of its particular shaping of systems concepts and a line of interest in their own right. This movement beyond the borders of sociology is the current and proper milieu for the application of Luhmann's theory, not only as a specialized discourse, but even more so as an epistemological treatise with fundamental application to issues of knowledge and meaning in all fields.

"Paradoxes can be found in every functionally differentiated subsystem [...] The entire structure of systems theory is an effort to take this condition seriously" (§§11f)

« 8 » I read this passage as rehearsing Luhmann's approach to constructivism (see, in particular, Luhmann 2002b), which in contrast to Maturana's original theory sees autopoiesis as operating in both psychic and social systems by bringing distinctions forth from the unmarked state, i.e., the plenum of possible observations prior to an observer's selection. However, any distinction is already an implicit paradox in need of unfolding, in that the "unity of the distinction" holds together two incompatible elements, for instance, lawfulness and unlawfulness. The system then selects one side of the distinction to perform as an indication at that particular moment of operation. Functionally differentiated subsystems make this condition particularly visible because of the specificity of the code that distinguishes them, and by which they then produce their dedicated selections. Paradoxically, then, in the legal system, for instance, the guilty may be adjudged to be innocent, and the innocent may suffer the penalties reserved for the guilty. Legal verdicts emerge from and return to paradox as a matter of course.

« 9 » Turning for a moment to Luhmann's theory proper, constructivism as such is not so much a "radical" concern about individual constructions of reality. Rather, "[c]onstructivism describes an observation of observation that concentrates on *how* the observed observer observes" (Luhmann 2002b: 140). Here is an ineluctable philosophical commitment to facing the paradox that the foundation of all knowledge is "a reality that remains unknown." The formal incompleteness of any possible event of knowing renders all cognitive productions contingent upon social interaction with other observers. The regularities that emerge from this process – i.e., relatively stable constructions of knowledge – can go only so far in restraining the epistemological instability generated by a multiplicity of interdependent observers. No one observer can resolve the world into a unity. Moreover, this very lack, this epistemological finitude in every observation, counsels each observer to accept the finitude of their own constructions as the price of doing the business of knowing the world. For, on the one hand, "[t]o see what others cannot see (and to accept that they cannot see what they cannot see) is, in a way, the systematic keystone of epistemology – taking the place of its a priori foundation" (Luhmann 2002b: 143). However, on the other hand, and by the same token, to take the self-referential mainspring of epistemological constructivism seriously also means that one accepts that one cannot see the blind spot of one's own primary distinctions. Understanding prospers especially when the willingness to submit one's own observations to the critical eye of another observer, bound by the same finitude, drives the system along. Mutuality keeps the conversation upright, allowing all parties at hand to contribute to the social occasion of meaning-making, or in Francisco Varela's (1987) image, to "laying down a path in walking."

"If we consider the digital realm as a form of communication, then it is relatively independent from the different subsystems" (§14)

« 10 » As I read Esposito's argument, for which a book-length treatment will appear next year (Esposito in press), social systems theory's operational differentiation between psychic and social systems provides a superior account of the way that contemporary digital communications with "intelligent" systems can dispense entirely with complex replicas of (psychic) selfhood (not to mention with the trope of "intelligence") as it functions statistically across an impersonal dataverse. As she has explained, "self-learning algorithms are able to work efficiently with data that not only are very numerous and complex, but also lack a structure recognizable to and understandable for human logic" (Esposito 2017: 251). Discussing such "smart" algorithms, she notes that what these systems can produce is precisely not artificial intelligence, but rather, artificial communication. And in whatever way matters may rest regarding such processes in relation to notions of intelligence, *artificial communication is observed communication*, a consequential yet non-psychic event within a social system. To have effect within social systems, algorithms need no psyches. However, they must have connections. Thus, "To be able to act as communication partners, algorithms must be on the web" (Esposito 2017: 259). The contemporary technosphere shows its aspect as a reservoir of communication partners for which humans handle – precisely, *construct* from moment to moment – the medium of meaning whose evanescent or hardy structures enable the coupling of individual minds into larger conversations.

« 11 » Following Esposito's argument, for contemporary digital technology, the milieu of computation is also a medium of meaning, not for *its* own operations, but for *ours*.

> "In the interaction with machines [...] we are dealing with a situation in which the communication partner is an algorithm that does not understand the content, the meaning, or the interpretations, and works not despite, but because of this." (Esposito 2017: 254)

Bodies, minds, and societies bring technical objects and technological mediations into their midst to expedite the circulation of energies, materials, and their own periodic events of understanding.[1]

References

Baecker D. (2021) A sociological reading of George Spencer-Brown's Laws of form. In: Kauffman L. H., Compton A., Conrad L., Cummins F., Dible R., Ellsbury G. & Grote F. (eds.) Laws of form: A fiftieth anniversary. https://ssrn.com/abstract=3678663

Bergthaller H. (2014) Limits of agency: Notes on the material turn from a systems-theoretical perspective. In: Iovino S. & Oppermann S. (eds.) Material ecocriticism. Indiana University Press, Bloomington: 37–50.

Clarke B. (2008) Posthuman metamorphosis: Narrative and systems. Fordham University Press, New York.

Clarke B. (2014) Neocybernetics and narrative. University of Minnesota Press, Minneapolis MN.

Clarke B. (2020a) Gaian systems: Lynn Margulis, neocybernetics, and the end of the anthropocene. University of Minnesota Press, Minneapolis MN.

Clarke B. (2020b) Machines, AIs, cyborgs, systems. In: Vint S. (ed.) After the human: Culture, theory, and criticism in the 21st Century. Cambridge University Press, Cambridge: 91–104.

Clarke B. & Hansen M. B. N. (eds.) (2009) Emergence and embodiment: New essays in second-order systems theory. Duke University Press, Durham NC.

Esposito E. (2017) Artificial communication? The production of contingency by algorithms. Zeitschrift für Soziologie 46(4): 249–265. ▸ **https://cepa.info/7141**

Esposito E. (in press) Artificial communication: How algorithms produce social intelligence. MIT Press, Cambridge MA.

Grusin R. (2010) Premediation: Affect and mediality after 9/11. Palgrave Macmillan, Basingstoke UK.

Henkel A. (2016) Posthumanism, the social and the dynamics of material systems. Theory, Culture & Society 33(5): 65–89.

la Cour A. & Philippopoulos-Mihalopoulos A. (eds.) (2013) Luhmann observed: Radical theoretical encounters. Palgrave Macmillan, Basingstoke UK.

Luhmann N. (1991) Essays on self-reference. Columbia University Press, New York.

Luhmann N. (2002a) How can the mind participate in communication? In: Theories of distinction: Redescribing the description of modernity. Edited by William Rasch. Stanford University Press, Stanford CA: 169–184. ▸ **https://cepa.info/7141**

Luhmann N. (2002b) The cognitive program of constructivism and a reality that remains unknown. In: Theories of distinction: Redescribing the descriptions of modernity. Stanford University Press, Stanford CA: 128–152. Originally published in 1990. ▸ **https://cepa.info/2712**

Luhmann N. (2002c) Theories of distinction: Redescribing the descriptions of modernity. Edited by W. Rasch. Stanford University Press, Stanford CA.

Massumi B. (2014) The power at the end of the economy. Duke University Press, Durham NC.

Moeller H.-G. (2012) The radical Luhmann. Columbia University Press, New York.

Parsons T. (1977) Social systems and the evolution of action theory. The Free Press, New York.

Richter H. (2020) Re-thinking poststructuralism with Deleuze and Luhmann: Autopoiesis, immanence, politics. In: Rae G. & Ingala E. (eds.) Historical traces and future pathways of poststructuralism: Aesthetics, ethics, politics. Routledge, New York: 183–203. ▸ **https://cepa.info/7130**

Seltzer M. (2016) The official world. Duke University Press, Durham NC.

Varela F. J. (1987) Laying down a path in walking. In: Thompson W. I. (ed.) Gaia – a way of knowing: Political implications of the new biology. Lindisfarne Press: Great Barrington MA: 48–64. ▸ **https://cepa.info/2069**

Wolfe C. (1998) Systems theory: Maturana and Varela with Luhmann. In: Critical environments: Postmodern theory and the pragmatics of the "outside." University of Minnesota Press, Minneapolis MN: 40–83. ▸ **https://cepa.info/7131**

1| Portions of my commentary on Esposito's §14 are adapted from Clarke (2020b: 99–102).

Bruce Clarke is the Paul Whitfield Horn Distinguished Professor of Literature and Science in the Department of English at Texas Tech University, and Baruch S. Blumberg/NASA Chair in Astrobiology at the Library of Congress. His research focuses on systems theory, narrative theory, and Gaia theory. His latest book is *Gaian Systems: Lynn Margulis, Neocybernetics, and the End of the Anthropocene* (2020). Clarke co-edits the book series *Meaning Systems*, published by Fordham University Press. Since 2019 he has co-directed the website "Gaian systems: Planetary cognition lab" at https://www.gaian.systems.

Funding: No external funding supported the writing of this commentary.
Competing interests: I declare that I have no competing interests.

Received: 9 June 2021
Revised: 10 July 2021
Accepted: 12 July 2021