

Luhmann and Epistemology

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Abstract

The research question of this paper is what epistemology is following Niklas Luhmann. Another way of framing the research question is what cognition is in Luhmann's theory of social systems. The aim of the paper is both to provide a solid analysis of what cognition is in the theory and to introduce the theory as such from an epistemological angle. First, the paper provides a short overview of the systems theory by Luhmann and then fleshes out science as a functional system. Then the paper describes and analyses Luhmann's epistemology, how systems through observations and observations of observations and self-reflection construct cognition. Finally, the paper discusses Luhmann as a constructivist in comparison with other constructivists and critics of his position. The conclusion is that Luhmann is an epistemic constructivist, respectively a poststructuralist correlationist that provides a solid theory of cognition with no solid ground of knowledge except observation of observation and out-differentiation of social systems. The contribution of the paper is foremost that it concretely fleshes out an understanding and discussion of Luhmann's systems theory from an epistemological angle which is nowhere else to be found.

Introduction

Luhmann is one of the most interesting and influential sociologists of the twentieth century,¹ but what is his claim to truth, or to put it in another way, how does he explain cognition (Erkenntnis, erkendelse) in his theory? This paper aims to describe and discuss Luhmann's epistemology, how he can go from a general systems theory of biological-, psychic- and social systems, describe a social differentiation in interaction systems, organization systems, and society, and describe at least ten different functional systems within society, and further one of them as the scientific

¹ See fx Harste (2021) about the Luhmann - Habermas debate.

system which again has differentiated out in e.g. philosophy, mathematics, psychology and sociology, and again within sociology differentiations between e.g. critical theory and systems theory, and again within systems theoretical sociology between e.g. structural functionalism and functional structuralism and from within the latter field claim to be able to describe all these levels and differentiation?

Luhmann defined himself as a kind of constructivist, as an operational constructivist (Luhmann 1995b), and as a radical constructivist (Luhmann 1998). We do agree that Luhmann is a constructivist, but we will discuss and define what kind of constructivist he is. To do that we must dive down to the most basic level of cognition in Luhmann's theory which is *observation* which he describes as a *differentiating designation* (Luhmann 1995b; 1998). The knowledge production in social systems is basically - and most surprisingly - nothing but observation and observation of observation. Luhmann formalized his theory of observation using the *form calculus* by George Spencer-Brown (1969) and merged the concept of *form* with Fritz Heider's (1959) perception psychological concept of *medium*. Luhmann also subscribed to Maturana's concept of *autopoiesis* (Maturana and Varela 1980). As was the case with the takeover and integration of the other concepts it helped him to formalize his theory further. In this takeover, Luhmann deontologizes the concept and uses it to explain how social systems, with the medium of language, became self-referential and self-producing systems (Tække 2013; 2019). This also let Luhmann take his point of departure in relation to his epistemology by claiming that: "Cognition is possible, not in spite of, but by virtue of the system not being able to make contact with the environment" (Luhmann 1992: 16)². We elaborate on this and provide an interpretation and description of Luhmann's epistemology and discuss it both regarding other sociological constructivists, critics of the constructivist position, and regarding clarifying the theory's position, and its claim to truth.

1.0 General systems theory

Luhmann (1995) links to and develops general systems theory in the move from the theory of open systems to a theory of closed systems seen as black boxes

² The English translation reads: "Knowledge is possible, not in spite of, but because the system does not have the capacity to establish a contact with the environment" (Luhmann 1995b: 7).

transforming their output to input in an environment which is unknown. This is also an interdisciplinary theory about cybernetics that describes how systems such as biological, social, psychic, and mechanical systems behave as self-organizing. Here Luhmann is one of the forces in the move from a first order cybernetics to second order cybernetics, to a theory not only about negative feedback but also including positive feedback where systems are seen as autonomous systems that always ask themselves and not possible to determine from the outside. On the level of the general systems theory Luhmann (1995) differentiates between biological, psychic, and social systems, but warns against analogies when it comes to comparing the different levels of systems formation, instead Luhmann postulates that we must go through generalizations. Following Maturana and Varela (1980) biological systems are autopoietic (self-producing) and structurally coupled to their environment and operationally closed around the functions that produce them. On the basic biological level of the cell, the components are incorporated into a network of integrated components in such a way that they constantly, through their interaction and organization, produce and reproduce the network of processes that produced them. They are always already adapted to their environment (structurally coupled to e.g. gravity and nutrition) and control in a non-linear causal way the interactions with the outside world (operationally closed around their reproduction modus). Luhmann (1995; 1995b: 5) takeover these concepts but deontologizes them from concepts only describing physicochemical conditions and uses them to explain how social systems within the medium of language became autopoietic systems; systems in their own right. Luhmann's epistemology deals with how cognition is possible in social systems and with the classic problem of cognition per se.

1.1 Observation – The basis of cognition

The most important concept in Luhmann's (2012; 1998; 1995b) theory regarding epistemology is the concept of observation. If you want to observe something, then you must select it by distinguishing it from everything else. The difference one uses to isolate the object of observation, is not possible to observe synchronically at the moment of observation, one simply signifies what one sees, and does not see at the same time, the difference that enables the signification. Luhmann (1998: 170) defines observation as a distinguishing signification. Luhmann formalizes his concept of observation following George Spencer-Brown's calculus of form, as the distinction

between indication and distinction (Luhmann 2012). If you draw a distinction, a marked inside is distinguished from an unmarked outside. The two sides and the distinction between them together produce a form (form = marked $\bar{\quad}$ unmarked). Spencer-Brown's (1969: 77-79) example is that when you draw a circle on a piece of paper, at the same time an inside (the indicated), an outside (the remaining excluded part of the world) appears, and the very difference between the indicated and the not indicated, namely the difference itself. Since it can be a bit of a hassle to draw circles in circles when it comes to describing observations where many observations are used, we will use another of Spencer-Brown's proposals (Spencer-Brown 1969: 4) to note binary distinctions with, namely the following distinguishing sign:

$\bar{\quad}$

The distinction mark indicates an inside (left side) and an outside (right side). What is written on the inside is indicated, while what is written on the outside is not indicated. However, if one crosses the distinction mark and also indicates a value on the outside, one gets a reflection value which together with the inside constitutes a concept of the basic distinction from which an observation observes. In this way, an observation is formalizable as a process that, by distinguishing, denotes one side of a form and not the other. The distinction is the observer, and it is asymmetric, or in other words, carries its motive in itself, by just designating one and not the other side of the form. It is a problem of cognition that we cannot observe the distinction that makes the observation possible while processing the observation. In line with Spencer-Brown (1969: 69), who has a concept in the form calculus called *reentry*, Luhmann explains how to observe the first observation reflectively by making a new observation. An observation of observation is a reentry of the form *observation* into the form of observation and is referred to as a second-order *observation*. However, a second-order observation is merely a new first-order observation, that is blind to its own basic distinction. However, there are a number of reflective gains in observing observation. First, one can now observe the distinction the first observation made use of, enabling reflections on its contingency. A new observation will, however, always, and forever be blind to its own distinction, so that we knowingly end up with an infinite regression of observations of observations and not with universal

knowledge. However, if we observe the distinctions we use when we analyze, we have the opportunity to observe ourselves as observers and discuss the distinctions we ourselves or others have made.

So, observation is only possible if the observer distinguishes the object of observation from everything else which is to indicate it. In the process of observing, it is not possible for the observer to also observe the distinction allowing the observer to make the indication. But in a new moment of time, the observer can reflectively observe the former observation and observe what might have been the distinction, (e.g., true/false), or another observer can make such an observation. This Luhmann defines a second-order observation. But as with the first-order observation, a second-order observation also is blind to its own distinction. As we shall see later in the paper this is a problem for any epistemology claiming to have a solid foundation of knowledge. There is only observation and observation of observation.

1.2 Autopoiesis and observation

On this basis, a systems theoretician must ask which distinction she should choose. Luhmann answers, let's choose the distinction the system itself selects because autopoiesis, as a concept, focuses on the distinctions the object of observation itself produces. An organization, for instance, produces and reproduces itself through decisions why we can also say that it observes itself and its environment through decisions. Therefore, we can observe an organization through its decisions. An autopoietic system is a system that distinguishes itself from its environment (system $\bar{\quad}$ environment) through the basic processes that (re)produce them. This theoretical deontologisation means that the elements that systems consist of are processes of reproduction. These elements at the same time differentiate out the system from its environment and make it possible for an observer to observe it using the distinction between system $\bar{\quad}$ environment.

1.3 Communication sociology

Luhmann (1995: 271) describes social systems as systems that reproduce themselves in the medium of communication. Because social systems maintain themselves in the medium of communication, they are separated from everything

that does not communicate (their environment) (Luhmann 2000b: 10). To understand how social systems can be autopoietic – why only communication communicates – we must look at Luhmann’s definition of communication. In Luhmann’s theory, communication occurs when someone understands that something (and not something else) is uttered in one mode (and not in another) by someone else. This implies that all communication “requires a synthesis of three selections, namely information, utterance and understanding (including misunderstanding)” (Luhmann 1990: 3). *Information* is the difference between what is uttered and other possible meanings. The utterance is the difference between the particular mode of communication and other possible modes. Finally, *understanding* is how someone other than the person making the informative utterance understands, that is, relates to the utterance in a new utterance (Luhmann 1995: 140). The decisive factor is this last “recursive” selection because it implies that communication cannot be directed or even established by *one* person (understanding is always someone else’s understanding).

The problem with such an understanding of Luhmann’s concept of communication is that it is consciousnesses that perform the parts that produce communication, and that it, therefore, becomes problematic to observe communication as autopoietic. Luhmann (2002: 157) writes that in the perception of communication as autopoietic, it is important to strictly avoid any reference to consciousness. But it is difficult to see how such a reference can be avoided if it is one consciousness that selects an uttered information and another consciousness that selects the understanding. A more radical interpretation, therefore, seems necessary if one wants to follow the idea that only communication communicates. Such can only be achieved if all parts of the communication are selected in and by the social system.

Systems theoretically formulated, it requires a clear distinction between how each psychic system observes and understands the social, and how the social system itself observes and produces a social understanding. If the system reference for one’s analysis is a psychic system, e.g. how an employee in an organization perceives the organization, then the social becomes the environment of the psychic systems and is subordinated to the special selectivity and way of thinking of this system. If, on the other hand, the system reference is a social system, e.g. an

organization, on the other hand, it is the psychic systems that become the environment. To be able to distinguish in that way, a concept of the social is required which, as Luhmann writes, strictly avoids any reference to consciousness.

A more radical concept of communication can be achieved if one pays special attention to a communicative sequence. The social understanding that is selected in a communication is not the understanding that the contributing psychic systems select consciously, but the understanding that is selected in the communicative sequence. This means that how the difference between information and utterance is understood is socially manifested in the way in which the next distinction between information and utterance links back to the first. The fact that after a door is knocked on, a "yes" is said in a certain way, means that a relatively specific way of understanding the prior message is socially selected - regardless of what the two systems of consciousness have in mind. It is, therefore, possible to carry out communication analyses - e.g. organizational analyses - completely without dealing with what the employees think. As long as the system reference is the organization, it is the communication in the organization that is at the center of the analysis.

A communicative operation only comes into being with understanding. This also implies that communication only becomes part of a social system if a new communication links to it, either accepting its proposal of meaning or negating it. Such linkages (following one another) produce a system with a history of accepted and negated proposals of meaning, differentiating the system from other social systems with other communication histories (Luhmann, 1995). The selected unities of information, utterances and understandings are the medium of social reality. Combining information, utterance and understanding in different ways and in different sequences based on different criteria brings about different social systems.

1.4 Differentiation

With modern oral language, it became possible to communicate about communication which made the social systems into self-reflexive systems and at the same time separated them out from their environment. The out differentiation from the non-communicative environment functionally created the distinction between

system] environment and created society as all that reproduced itself through communication differentiated out from what does not communicate. To cope with increased internal complexity society historically has differentiated internally into different forms of differentiation and types of systems (society, organization and interaction) (Luhmann 2012; see also Tække 2022). Luhmann described modern society as functionally differentiated which means that society is separated out in a number of functional systems like the economic-, political-, the court- and the scientific system. Modern society does not have a center but is differentiated into functional systems that use different function-specific communication media and associated codes and programs for observation. Examples of functional systems are economy (with the symbolically generalized communication medium *money*), politics (with the medium *power*), the law (with the medium *right*), science (with the medium *truth*), and religion (with the medium *faith*). Luhmann's description of society is based on the difference between system and environment, and not on the traditional difference between part and whole. Such an understanding is too ontological for Luhmann. Instead, an epistemologically oriented theory of system differentiation is formulated. Functional differentiation involves repeating the difference between system and environment within the social system (Luhmann 1995: 7). Society will act as the internal environment for functional systems in a specific way for each of them. Each functional system takes on a specific aspect of societal complexity, orienting itself only on its own system] environment difference, and reconstructing society using only this outlook. The functional systems can thus relieve themselves by assuming that the other requirements for the reproduction of society are met by other systems (Luhmann 1995: 192).

As noted, each functional system operates using a symbolically generalized communication medium and associated codes and programs for observation. The medium simplifies, motivates, and focuses the communication, and the code sets criteria for measuring success and failure. The code is binary and structures the system's operations. The binary code indicates a communicative preference by opposing a positive and a negative value. The positive value defines a motive, a basic effort for the individual functional system's communication – a motive that then finds its counterpart in the negative value of the code. "Codes indicate the medium

responsible for their functional areas and thus limited but loose coupling of possibilities” (Luhmann 2012 vol 1: 217). They attribute communicative processes to the relevant functional system. Programs work on the organizational level of systems formation and specify how to use the code. Codes cannot be forgotten, whereas on the program level both remembering and forgetting are possible.

1.5 The scientific functional system

In Luhmann’s theory the science system has the medium *truth* and the code true] false, and a secondary coding which is reputation. Since the system’s out-differentiation, science organizations have been building system-internal programs for the handling of codes so that contributions can be accepted or negated in communication (Luhmann 1994). The main programs of the science system are theories, and its function is the production of knowledge and societal self-descriptions, and like other systems, it provides opportunities for careers. The science system has structural couplings through the universities to education, economy, mass media, and politics, for instance (Luhmann 1992b). These programs also include guidelines for repeating scientific experiments, the reference system, and the blind peer-review procedure for journal articles. According to Luhmann (1998b: 38), printing provides a transition to a knowledge technique that depends entirely on writing, and immediately leads to second-order observation. In Western scientific papers, a style is laid down for the day, which is typically based on the status of the research, thereby saving further reflections. Any reflection is replaced by a scurrilous pedantry (the programs) that is controlled by editors and reviewers. Furthermore, Luhmann believes that this can be accomplished as a first-order observation: it still extracts only its account of the momentary state of research out of a historical state that it can change. Second-order observation does not occur before the theory of knowledge and cognition, reflecting on the current state of research – and explicating what it can offer in the way of something new (ibid.) – which of course also occurs in the form of articles in journals. But however how improbable, the science system was differentiated out to handle what is true and what is untrue in society. The forms in the medium are theories and the system produces truth in a totally internal and idiosyncratic process using the distinction between code and program: “The code must [...] as distinction be differentiated in a further context from

the programs of the system, that specify under what conditions something is right or wrong, if it must be marked true or untrue. And only this distinction between code and program gives the medium the form that instructs the operations that couple and decouples the medium into truthful sentences during operation" (Luhmann 1992b: 184). So, "Truth is a coded medium" (ibid.: 185). Science might produce knowledge, but it does not produce news and public opinions, which are provided by the mass media: "Whatever we know about our society, or indeed about the world in which we live, we know through the mass media" (Luhmann 2000b: 1). The point here is that what we know we know from the mass media – not from research journals. Following Luhmann we only have observations consisting in distinctions, why: "science is not the authentic realization of truth, but a social system with its own standardized forms of communication, just like all other social systems. Its *truth* is merely a communicative construct among many others" (Moeller 2012: 42). Still Luhmann (1998; 1992) claims that his approach is epistemologically seen solid and that it has a better epistemic claim on what we can say about reality than other theories and the tradition.

2.0 Cognition as construction

Luhmann's theory is in the family of constructivism why his epistemology must describe cognition as construction. Luhmann (1998) discusses whether constructivism offers something new because Kant already was what we today would call a constructivist. Kant saw reality as a reflection of our cognitive apparatus and believed that it is our cognitive apparatus that constitutes the world of phenomena (see Collin 2021: 17; Bryant 2016: 72). Luhmann also discusses why one begins to label constructivism as *radical*. Again, with Kant as an example, he shows that there are in fact weak forms of constructivism - where one gives up with a form of argumentation that goes like: "cognition cannot be understood completely constructively, because in the end there must be a relation to reality" (Luhmann 1998: 164). Luhmann asks if such withdrawal is necessary, and turns to subject theory in form of idealism, to point out that the problem is the result of the idealism's conviction of unity in the difference: cognition $\bar{\cap}$ real object. The question is how cognition can ascertain an object outside itself, that is, how to cognize independent of cognition when there is no cognition-independent access to reality? For Luhmann,

this is clearly something other than constructivism, because it for him means that: Cognition only is possible because *it does not have access to reality outside itself*. He gives the example that the brain is externally indifferently coded (it converts stimuli, e.g., light according to a completely internal code to the images we experience). In addition, the same applies to social systems (they are without external interference when they produce information (ibid). As we saw in the former section psychic systems do not direct social systems). This means that Luhmann in his theory moves "from though possible" to "because impossible" which Luhmann finds is a liberating radicalization. The question that follows is how disconnection is possible. (Subject theory did not reach this question as it was based on unity in the difference: cognition $\bar{\mid}$ real object). Luhmann states that there is no direct access to the cognition of other subjects. In idealism, one dealt with the problem through recourse to one's own consciousness to find principles for how others cognize (ibid: 165). In Luhmann's theory, one thus goes from the distinction subject $\bar{\mid}$ object to the distinction system $\bar{\mid}$ environment. Both distinctions are based on a difference and allow the one side to re-enter the other side: The system $\bar{\mid}$ environment distinction provides disconnection through operational closure in different systems, which means that differentiation replaces the premise of a common world with a theory of observation of observation (ibid: 166). For Luhmann social systems are differentiated out reproducing themselves autopoietically through communication only able to communicatively observe observations. If they had not been closed around their communicative reproduction, they would disappear into the environment.

2.1 Cognition and observation

Because of the internal social differentiation, the systems also self-isolate via selectivity in enabled operations differentiated from each other (Luhmann 1998: 166). No system can operate outside its own borders, not even cognition.: "the system would never be able to build its own complexity and its own knowledge if it repeatedly mistook itself for its environment" (Luhmann 1995b: 7). Therefore, cognition rests on observation and observation of observation, and observation, as we already have touched on, is defined by distinction and designation. Observation always takes place when something is distinguished and designated in dependence on this distinction (Luhmann 1998: 167). On the general level of systems theory, this

applies regardless of the type of operation and recording (e.g. biological fixation, or writing). There is thus a disconnection from the outside world, and cognition must be seen as closed cognition. It is different from the outside world because the outside world does not contain boundaries and is as it is and happens as it happens. An observer may find that there are other observers, but only by distinguishing. Everything observable is the observer's own performance. Nothing in the environment is like cognition, not even the environment is in the environment. The observation only indicates which system the environment is the environment for. Without cognition, there would be no systems (ibid: 169). Concepts such as reality and world depend on the distinction and are an observer's achievement. But observation is obtained from a blind spot, which refers to the fact that one cannot distinguish in the observation the difference it is based on (which Luhmann also explains as the latent structure of the observation). This distinction cannot be distinguished on its own side and observation requires the distinction (ibid).

2.2 Operation and distinction

Cognition is a kind of operation, and it produces truth and mistakes - in the same way (Luhmann 1998: 170). As an operation, cognition is thus indifferent in relation to the distinction true $\bar{}$ false. All distinctions are made by an observer, defined as a distinguishing designation, but cannot distinguish itself, cannot at the same time distinguish whether true $\bar{}$ false itself is true $\bar{}$ false. The answer to this problem is binary coding in differentiated systems (ibid: 171). For Luhmann cognition is one kind of society's self-observation, even in science, there is also a secondary code (reputation). So, we must distinguish true $\bar{}$ false, from other forms of self- and external observation, like the other symbolically generalized communication media e.g. *right* or *power*). In constructivism, cognition is traced back to distinguishing between distinctions and not to a reason (as in idealism) (ibid: 172). The functionally differentiated society does not mean that anything goes, but that it makes possible a plurality of self-descriptions and world-descriptions (Luhmann 1995b: 8). For Luhmann, there is only one society and for him, society is a sociological concept of cognition (in Luhmann 2012) it is the main point that when a sociologist observes society he sees a society, while e.g. an economist sees an economic network). This means that the epistemologist himself becomes a rat in the labyrinth that must reflect

on from which place he observes other rats. Then the reflection leads not only to equality in conditions but to the unity of the system and any externalization must be justified as systems differentiation within society. Not before the sociology of cognition, a radical constructivism that includes itself is enabled (Luhmann 1998: 172). This means that one sees that one observes scientifically (true $\bar{\text{false}}$), that the science system is differentiated among other functional systems and that other cognition theorists distinguish differently, from other distinctions.

2.3 God

For Luhmann (1998) it is first with his theory that we level up with the epistemology that was developed within medieval theology. Now the concept of God as the indistinguishable has to be translated with the concept of the world if one distinguishes between system $\bar{\text{environment}}$ - and reality if one distinguishes between object and cognition (ibid: 173).

2.4 Perception and environment

Luhmann (1998: 174) distinguishes between the persistent in the changeable which is important when it comes to anchor points for cognition. For Luhmann, it is important to notice that language gives constant expression about the changeable (e.g. movements). Language does not have to simulate anything changeable through change. Luhmann notes that there must be temporary discontinuities in the outside world and relates to Heider (1959), and his theory of distancing perception. In this view, there is a difference between relatively loose and fixed coupling, in particular in the distinctions between air $\bar{\text{noise}}$ and light $\bar{\text{visible}}$ objects.

The important thing is the difference. If air made noise and if light became visible perception would be impossible. Physical substances must be found in loose and fixed coupling in order to form systems that can benefit from this difference and that with its help can observe one side of the difference: the form. This means that a medium consists in a loosely coupling and that a form consists in a fixed coupling.

Media $\bar{\text{form}}$ is the condition for perception and perception only works if the difference is not perceived itself. Difference is the latent structure of perception.

Only a theory that uses second-order observation can recognize that this is so (Luhmann 1998: 175). Forms, e.g. words can again, in a loosely coupling, be a medium for cognizing systems. For Luhmann there must be a physical (or otherwise)

constructed difference between loosely and fixed coupling or no cognizable system could develop. Otherwise, cognition would be referred to as coincidences at its boundaries without space-time distance to the outside world. Cognition is not possible in a random world (ibid: 176). However, this does not mean an adaptation of cognizing systems to reality, of which, for example, the climate catastrophe is a clear example.

Cognition would not be possible if reality were totally entropic, but at the same time, the reality is unknown, as it is on the other side of the cognition's distinction (Luhmann 1998: 177). Cognition cannot give the world the form of distinction, it is a mundane (on this side of the distinction) achievement of its own (ibid). Cognition knows nothing outside itself, "outside" is denoted by self- and external reference. Even if there were distinctions useable by the cognition, it could not use them as it would abolish operational closure.

Therefore, differential (paradoxical) concepts are necessary: World = system-environment. Reality = cognition-object. Meaning = actuality-potentiality. The designated cannot be defined based on a counter-concept, but only based on the distinction on which it is based. They can only be gained by cognition. They can only be connected to one side of the distinction, and they only allow re-entry on one side (e.g. reality will always depend on cognition - there can be no crossing to the object). Re-entry means the re-entry of the distinction into the distinction (like the observation of observation). The world is only an orientation concept in the system. Cognition-object is immanent to cognition. Moreover, reality must be overlapping in relation to both sides, and actuality-potentiality only makes sense in practice, i.e., refers to a horizon of other possibilities (real or not) (ibid: 178).

2.5 Self-reference and external reference

The difference between subject-object, thinking-being, knowledge-object, Luhmann (1995b: 8) observes as distinctions between self-reference and external Reference. The unity of the difference will always be the system that practices it. The system would never be able to build complexity and knowledge if it repeatedly mistook itself for its environment. Already the language almost certainly excludes this possibility: "No one would be tempted to confuse the word apple for an apple, and

yet at higher levels of abstraction at times the danger has existed for such a confusion as we know it from the conflict between realism and nominalism” (Luhmann 1995b: 7). Therefore, the system must be able to distinguish between self-reference and external reference to operate cognitively. Luhmann (ibid) links to the phenomenology by Husserl to describe the distinction. Husserl’s basic understanding was that consciousness at the same time relates to itself and to phenomena. None of these two references can be excluded because then the consciousness will lose its quality as consciousness. “The act form of intentionality thus becomes the very moment which makes possible a linking together of self-reference (noesis) and external reference (noema)” (ibid). According to Luhmann this takes place in a temporal, processual form so that consciousness can oscillate between abandonment to the world and reflection and can place and change its center of gravity. Luhmann further, like with Maturana’s concepts, also explains social systems by the same logic: “Communication can only be understood and it can only control itself regarding understanding or misunderstanding, if one can distinguish between message and information - i.e. self-reference and external reference – and combine them ad hoc. The message is the necessary self-reference of communication, while the components of information may freely signify either the communication itself or external conditions” (ibid). Still for Luhmann cognition is an internal construction e.g. an organization’s conception of its environment only runs through its own semantics, like the brain has its externally indifferent code for perception.

2.6 Further perspectives of cognition

Cognition may recognize its conditions on its own possibility, it can suppose it as it activates its possibility: Do what it does and thus prove possible (Luhmann 1998: 179). The problem is the conditions for an increase, especially for external compatibility. Failed theories spoke of assimilation, representation, or adaptation. Luhmann replaces these perspectives with the question: How a system under the conditions of operational closure builds internal complexity and, in this sense, increase cognitive performance (ibid)? Luhmann (1998: 180) points at language as a medium in both psychic and social systems which acts as the structural coupling

between them.³ Language increases the internal complexity, but language does not provide the construction of cognition as a real operation (ibid). Luhmann (1998) concludes that linguistic analysis cannot bring us closer to an understanding of the increased internal psychic and social complexity regarding cognition. Instead, he concludes that we must use psychological and sociological analysis to cast light on developments in cognition. These would not be possible if we like other theories observe connections in and between systems instead of distinctions (ibid 181). Cognition is only possible because systems at the level of their distinction and designation are closed operationally. This makes them indifferent to the thereby excluded environment. That cognition can only be achieved through disruption does not mean that it does not signify something real or is something real. It only means that there are no equivalents in the outside world, otherwise, the system would dissolve in the outside world (ibid: 182).

2.7 Evolution

Now we have a picture of real social systems that can observe each other and, in this sense, are able to cognize, building up complexity as autopoietic systems. This happens in structural coupling to an external environment that is stable in such a way that the social system's internal cognition can increase its internal complexity through various media starting with and based on language in the form of internal differentiation. But what about evolution, how is social evolution possible, and how does evolution relate to cognition? Luhmann (2012 vol 1, chap. 3) presents a circular theory of evolution with the concepts of variation, selection, and retention. The basic statement of the theory is that evolution transforms a low probability of becoming into a high probability of maintenance (ibid: 252). Evolution is, so to speak, a theory of waiting for usable coincidences (ibid: 253). Variation is placed on the level of the elements. Selection is about the structure and works in two ways. Either the existing is protected from variation, or change occurs, and the result is variation. Retention (restabilization, temporary stabilization) refers to the actual formation of the system. Luhmann differentiates between variation and selection, as well as between

³ Luhmann (1990; 2012) also points at how other media, such as writing and printing again increases the possibilities for building up more and more internal complexity on both sides of the distinction between psychic system | social system, but he never put this theoretical development in relation to the problem about cognition and increase of external compatibility.

selection and retention, and denies a connection. It is not possible to know whether variation leads to selection or whether it succeeds in restabilizing the system after the selection of an innovation. That is, evolution cannot be planned (ibid: 258). Evolution is structural change and is not possible without the difference between system and environment. If the environment did not vary differently from the system, evolution would quickly end up in an optimal fit. It follows, according to Luhmann (ibid: 262), that evolution does not affect the adaptation of the system to the environment but presupposes adaptability. When systems no longer exist, they no longer evolve either.⁴ When evolution changes a system, at the same time the environment changes for all other systems for whom the changed system forms part of the environment: “The world becomes dynamic from within” (Luhmann 2012 vol 1: 262). Evolution in social systems is connected to the inner world of society (ibid: 274). Cognitively, an autopoietic system like the social, would not be able to survive because of its representations of the outside world, but rather because of its self-reproductive abilities. Epistemologically speaking, it means that knowledge itself selects that it can know based on what it already knows. Variation relates exclusively to certain operations (i.e., the communicative events) in which something innovative is occasionally uttered and understood. The selection is always based on some structures, i.e., on the expectations of some reproductive use. In relation to science, this means that the new elements are marked as true or false. Finally, retention in the continuity of autopoiesis consists of scientific communication, e.g., differentiating out a new field like media studies.⁵

3.0 Discussion

In the discussion, we will reach out to other scholars and try to observe Luhmann’s theory of cognition and his epistemological and ontological position. We will also discuss what kind of constructivist Luhmann is, try to perform the discussion as critically as possible, and use it to try to make this difficult theory appear clearer and more comprehensible.

⁴ If, for instance, social systems destroy the climate of the earth and that kill human life ultimately, social systems’ autopoiesis and evolution come to an end.

⁵ For a more extended discussion of Luhmann’s take on evolution see Harste (2021) and Jönhill (1997).

3.1 Construction

Epistemologically seen, according to Bertilsson (1998), both Luhmann and Foucault can be considered *epistemic constructivists*, while Luhmann attributes to the system sovereign epistemic status, Foucault privileges discourse as an epistemic field. According to Paulsen (2005), it also makes good sense to place others, such as Laclau and Bourdieu, under this label: They all develop theories that uncover how human understandings of a common reality are constructed. The technical concepts of system, field, discourse, and if Latour is included, actor network, cover the same basic construction issues where: "A certain discourse, field or system closes historically around itself and creates a certain reality in this process of closure. If science e.g. is called a system, an academic field or a discourse, is not crucial in the first place. (...). The scientific community creates its own reality in the form of truth-hungry universities, academics, theories, methods, teaching and research and an external reality, the whole world is schematized as true or false from the scientific drafts" (Paulsen 2005). As a logical consequence of such thinking Andersen (1999) has developed a strategy for analysis that is fully epistemological and works with an empty ontology where the object is not presupposed. This conception of epistemology observes how the world comes into being when social systems observe their environment in certain perspectives that make the world in the broadest sense appear in certain ways. This analytical strategy will observe how other observers observe and construct their objects. So, even when Luhmann's constructivism is radical (compared with e.g. Kant) and operational (as only communication communicates) it is also epistemic because it is systems that cognize.

3.2 The science studies perspective

From a mainstream science studies perspective, all the epistemic constructivists are criticized for having the same problems as Kant's theory, that said that we cannot know anything about the world in itself; we are closed inside, or locked up in our own senses and knowledge categories (Collin 2021). Many philosophers in the generation after Kant and later, on the other hand, drew the opposite conclusion that if there is no access to cognition of the world per se, then all claims about it are simply meaningless: there is only the world of phenomena; the world as we experience it constitutes the only and real reality. Collin (2021: 143) postulates that

Luhmann takes a third way that escapes Kant's problem because a system's environment according to the theory is observable by other systems. A social system and its environment are observable by another system that can observe the interaction between the two – like Maturana and Varela could observe and register the relation between a dove and its environment and the dove's perception of it. According to Collin, Luhmann errs; when he postulates that there are systems from which the reality that is the environment of his own sphere of cognition can be observed, he is speaking about something that is outside the limits of his cognition - for these systems must lie outside the borders. Such an external point of view cannot exist: a cognitive system, that can observe the environment for Luhmann's cognitive system and find a solid base must itself belong to the world-in-itself. Therefore Luhmann, still according to Collin (2021: 143), cannot say anything substantial about how this world is designed. Collin writes this also counts for Maturana, Varela, and everybody else that subscribes to the *distortion theory*! As a little curiosum Collin writes that this does not set a question mark with Luhmann's sociological theory (?).

Reading Collin (2021) it is clear that he follows the mainstream viewpoint that humans adapt more and more to the environment because every experiment shows how the world is designed. Even though he of course is familiar with Popper and Kuhn – and Hume and very well knows that we do not know why the laws of nature are how they are, he is still convinced that what Luhmann would call first-order observation - a human that observes the world, like a subject observing an object - is a human adaption to the environment. He does not see that for Luhmann, social systems even through second-order observations, are only able to observe through their own semantics, media, codes, programs etc. Luhmann is more critical than Collin when it comes to giving statements about the design of the world. It is Collin who believes that we are in a process of adapting to the world, not Luhmann. The conclusion is that Collin does not see that Luhmann does not claim to say anything about the design of the world external to social systems. It is sociology, and Luhmann's epistemology only claims to say something about social observations – and even observations of the external environment - for Luhmann are only internal social observations.

The climate crisis, for instance, is a social internal crisis where scientific first-order observations (external reference) are made and interpreted on basis of what is already known (or believed) in the system (second-order observation; self-reference). In the functionally differentiated society the science system is just one out of many and the economy, for instance, observes the scientific observations from another code (ask if it pays (and with a totally other cognition of the time dimension)). The point is that it all is communication, not, for instance, CO₂ or melting ice.

But what is adaptation? Autopoietic systems are always already adapted to their environment. For social systems that means brains and consciousness. But is a refrigerator not an example of adaption? To give a Luhmann explanation we will point to his theory about technology. Luhmann's philosophy of technology⁶ is based on the distinction between operational closure on the one hand and causal (technical) closure on the other. The concept of technology, the causal (technical) closure, is thus a concept that embraces all conditions where we have identified devices (functioning simplification) that as causes give certain effects, while the outside of the concept is given by all other possible causes and effects (Luhmann 2012 vol 1: 317). This becomes clear when Luhmann formulates the form technology as a distinction between controllable and uncontrollable cause conditions (ibid). The concept of reflection for technology (the outside of the concept) therefore consists in this optic of all effects that fall outside those we have, so to speak, captured and can control. Luhmann (ibid) also describes technology as the observation of a calculus, in the sense that one assumes that there is repeatable causality. Thus, it is assumed that on the inside of the form "technology" one has repeatable causality, while on the outside of the form "technology" one has unreduced causality. For example, one has experience with building a certain type of bridge and therefore reckons that a bridge of this particular construction will be able to carry the same loads if it is built elsewhere - just as one expects it to every day be able to carry the same traffic load. As a result of this concept of technology, Luhmann most often touches on technology in connection with the concept of risk, for example in connection with the establishment of biochemical and nuclear facilities where one consciously runs a risk in order to obtain benefits (energy and economy). To give a short conclusion our

⁶ See Tække (2013).

“adaptation” (the causal (technical) closure), according to Luhmann, is like Socrates’ Island of knowledge that every time it grows gets longer and longer shores to the unknown. As a simple observation, all our smart “adaptions” like cars and coal-fired power plants or lithium batteries seem to destroy our basis of life.

3.3 Poststructuralistic correlationism

Another more fair or on-the-spot discussion about Luhmann’s epistemology, than Collin’s, tries to follow what we under Luhmann’s theoretical constraints regarding cognition can know about the environment. The question is what a social system can know about its environment. Following Bryant (2016) the conclusion is that Luhmann is a poststructuralistic correlationist with *a tempered realistic position!*

Correlationism can be traced back to Kant⁷ (Mellassoux, 2008; Bryant, 2011; 2016), and can theoretically be interpreted as an epistemic theory that has led to an ontological deficit giving rise to the conviction that we only have access to the phenomenal and not the nominal. Correlationism is the idea that we only ever have access to the correlation between thinking and being. Where one cannot distinguish subjectivity and objectivity. And where we never recognize the object in itself, isolated from the relation to the subject (Mellassoux, 2008, 5). Correlationism is not the thesis that a subject must relate to an object to recognize it (this means also the realists), but: A. We can never know what belongs to the objects and what we ourselves contribute (weak correlationism). B. It is the mind that structures reality and object properties are the products of the mind (strong correlationism) (Bryant 2016, 72). One can also distinguish between universal and pluralistic correlationism. In universal correlationism, the mind is the same for all rational, so cognition uncovers the universal structure of the mind. In the thinking of Kant, this takes place via the articulation of the 12 categories and the forms of cognition (time and space). Pluralistic correlationism means that there is no universal comprehension structure, not one reality, not just one way of constituting objects (i.e. contingency). It is within pluralistic correlationism that we find the poststructuralists (Bryant 2016, 73). In poststructuralist correlationism, it is not correlation to a *subject* that is important!

⁷ In *Critique of Pure Reason* (B xvi), Kant is arguing that objects must conform to our reason (Kant 2002).

Language, power, Dasein, meaning, signs, discourse, and, for instance, *systems* can take over the subject position. There is no X without it being acknowledged by Y and no theory of X without Y. The subject position Y can be taken by different concepts as long as we require that X cannot be imagined without Y (Bryant 2016, 74).

Within this framework Luhmann evidently is a poststructuralist correlationist because only communication communicates (Luhmann 1995). In relation to reality, Luhmann (2002b: 144) writes: "Cognitively all reality must be constructed by means of distinctions and, as a result, remains construction".

The concept of observation, provide us with reflections on the conditions for uncovering what we can know about the world. In Luhmann's poststructuralistic correlationist position objectivity is not believed to exist in the sense that an observer stands outside the world and observes it as it is. The observer is part of the world, his concepts are part of the world, his concept of causality, his technology, etc. are part of the world he observes, therefore he must be able to explain how his observations observes: "the cybernetics, by entering his own domain, has to account for his own activity; cybernetics becomes cybernetics of cybernetics, or second-order cybernetics" (Foerster 1995). Following Luhmann (1995b), observations are made without ontological fixpoints that qualify them for saying something normative about reality. The systems theory is just a theory among others describing the environment (Luhmann 1995: 487). This does not mean that anything goes. Luhmann has built a system of observations that observes observers, but which can also be used to observe its own observations. But still, the environment is outside the system, which is left on its own, to its own internal distinctions, semantics, and constructions of the environment. Luhmann's comfort is that the cognitive loneliness or isolation is not a curse but the possibility for cognition and knowledge *conditio sine qua non*. If systems were not isolated and operationally closed everything would flow together and systems would not exist.

Although Luhmann rejects ontology, he writes that it is crucial to distinguish between a system's environment and systems in the environment of this system (Luhmann 1995: 17). Luhmann draws the distinction between the environment that the system itself constitutes and systems that exist independently of them in the environment

(Bryant 2016, 86-87). The main distinction is between system and environment. The systems constitute themselves, differentiating themselves from an environment, but are also *constituting* their own (observed) environment. This means that the environment receives its unit through the system and only in relation to the system. This also means that there are just as many environments as there are systems. However, there might also be other systems that exist in the environment of the observing system, which does not belong to the environment that the observing system constitutes. Following Bryant's observation, Luhmann thus uses the concept of the environment in two different meanings. On the one hand, there is the environment that the system constitutes, the one they select in, which is relevant to its maintenance. This is the environment that the system *constitutes* through its distinctions. On the other hand, there is the environment that is independent of the system's distinctions, the *independent* environment. Luhmann writes that the constitution of the constituted environment always involves the risk that the formation and maintenance of the difference between system and environment becomes a problem because the environment is more complex than the system itself. "Systems lack the "requisite variety" (Ashby's term) that would enable them to react to every state of the environment. [...] There is [...] no point-to-point correspondence between the system and environment" (Luhmann 1995, 25). When Luhmann refers to risk and an environment more complex than the system, he refers to the independent environment - an outside world not registered by the system. Because of limited time and the overwhelming complexity of the independent (non-constituted) environment, the system must constitute the known environment, which poses a risk, as it may ignore something important.

Bryant's (2016, 88), conclusion is that Luhmann has a *tempered realistic position* on three fronts: 1) To be consistent, he must admit that there are other systems that are not constituted by the observing system. We may have a deficient view of them because of our distinctions, but that does not mean that they do not exist. 2) The independent environment must exist and be independent of the constituted environment, to open up perspectivism in the systems theory, open to risk, selection, and contingency. 3) Although systems constitute their own elements, these cannot be constructed *ex nihilo* (out of nothing). They must draw on some form of substance or materiality that can then be shaped into elements. Here one could think of

Heider's perception media but also think that every form of utterance must consist of something both possible to percept but also possible to make form media distinctions in (Luhmann 1998: 176). Also, Luhmann (1998) stresses that cognition is not possible in a random world, but only in a world that has a physical (or otherwise) difference between loose and fixed coupling, without which no cognizable system could develop.

3.4 Luhmann and Latour

Where Luhmann deontologizes another of the epistemic constructivists Bruno Latour works with what can be seen as a flat ontology. For Latour (2008) it is the actor-networks that have epistemic primacy. For him, it is not only humans that act but also nonhumans why we can say that his ontology is flat, it includes all kinds of actors like also guns, seat belts, permafrost, and the printing press. For Luhmann only autopoietic systems cognize and he focuses on society and its differentiation. For Latour, there is no such thing as a society only actor-networks, for him sociologists (especially his favorite anime Pier Bourdieu) in the tradition after Durkheim, which also includes Luhmann, turn the perspective upside down. He believes that society cannot function as a major explanatory variable. Crime, inequality, political beliefs, etc. cannot be explained with society. On the other hand, society itself must be explained! What is it that creates social constellations? How is society continuously built up, how is it stabilized in temporary structures, and how does it change character? Latour (2008) distinguishes between two different sociologies. There is 'the sociology of the social' that follows Durkheim's basic idea of society as a particular domain, and there is Latour's own 'association sociology', that, cultivates the meticulous explanation and the study of how the social is constantly created as new connections or joints. But the Durkheim approach shows above all its inadequacy when confronted with phenomena like, for example, environmental problems, that do not have to do with a limited social domain, but on the contrary combine a myriad of complex technological, human, biological, etc. elements. Here the sociology of association must take over, so in this specific sense, Latour (2008) is anti-sociologist. Of course, human actions, communication, symbols, etc. are central parts of society, or rather of the social/collective, but in line with a number of non-human actors, including objects and technologies. Environmental problems, for instance, cannot be discussed independently of how

they are created through e.g., measurements, risk assessments and emissions, and here technological components and physical objects play an active role. Latour's merit is to argue consistently for how we can follow these actors and map their actions - and through this show how the social is created. It seems like the Latourian critic hits Luhmann who exactly views the environmental problems from a societal perspective: Luhmann (2012) points at many problems in the functionally differentiated society among others the upcoming ecological disaster which makes it clear that planning and coordination is not possible in the functional differentiated society (Luhmann 2012 vol 2: 108). There is no coupling system (ibid: 115), no coordination of irritation, and no central monitoring (ibid: 116). Observation of irritation is limited to only one functional system (ibid: 117). Irritation is increased due to functional differentiation, while functional systems avoid any form of coordination (ibid, 120). Luhmann (ibid: 125) writes that a controlling center cannot exist. On the other hand, nothing in Luhmann's theory seems to exclude the insights from a Latourian perspective it only increases the sensitivity of the theory to include different non-human actors like media to understand the communicative processes. But when it comes to cognition the flat ontologization of, for instance, permafrost, a Luhmann view would be a matter of scientific observations and communications that in other functional systems like economy and law would be differently observed. The communicative systems cannot open direct contact with their environment. From a Latourian perspective, we would have to follow the actor-networks from scientific observations to their consequences in other actor-networks in politics and law. But for Latour cognition happens in every transformation in the actor-networks, every time there is a message going through a new mediator, we have a translation where the message is reinterpreted. For Luhmann cognition belong only to autopoietic systems, but of course, a technical system may be pre-programmed, and a Turin machine would be able to decide its own next steps, but still in a pre-programmed way. When it comes to nature, for instance, permafrost, a way to explain it is that it works like a trivial machine not as a kind of cognition. That it thaws out now shows us something about which risks the functionary differentiated society runs.

Conclusion

In this paper, we have worked with the problem of what epistemology is following Niklas Luhmann, and what cognition is in his theory of social systems. It is the classic question about what we can know about the world. The paper has provided an analysis of what cognition is in the theory and introduced Luhmann's theory of cognition.

On one level – the internal theoretical – the conclusion is that the environment cannot contribute to even one single operation that produces and reproduces the system's structure. On the other hand, the environment influences how the observer can recognize the structural drift of the system. The mainstream epistemology problem with the reference (between system and environment), provides Luhmann's theory of self-organizing systems with the old cartesian situation: empirical operations of the empirical systems whose reality for themselves is beyond any doubt (Luhmann 1995b: 6). For Luhmann this situation counts for also biological and social systems because they also are operationally closed. As a part of all the three levels of systems formation's structural couplings, through their evolution, at least after the acquisition of language, have formed as co-evolution. These systems cannot use their operations to establish contact with their environment (including each other). But the environment can irritate the system, and the system can increase its irritability because it can increase its cognitive capacity and prepare itself for observing deviations and processing more information: "No representation of the environment (such as it is) exists in the system. Only the system's own constructions exist (ibid: 7). Luhmann like Kant has an epistemic medium theory: for Kant (2002) reality is always mediated through the forms of cognition (space and time) and the categories, for Luhmann the media are e.g. perception media, language, and meaning. Hegel's critique against Kant was that: "[...] if cognition is not a tool for our activity, but a kind of passive medium, and the light of truth reach us through this medium then we do not receive this truth as it is in itself, but as it is through and in this medium" (Hegel 1999: 63). Exactly, Luhmann would say, with the exception that the media substratum is part of the environment, and the consciousness is an autopoietic system like social and biological systems. But that is only a problem for mainstream epistemology (or idealism if they, like Hegel think they have a solution to the reference problem), for Luhmann, this decoupling is the possibility condition for

cognition. But still, Luhmann in some sense follows Hegel: of cause autopoietic system has emerged in the environment of the earth as always already adapted and has ever since had their evolution in this environment.

On the even more meta-theoretical level, the conclusion is that Luhmann is a poststructuralistic correlationist which seems to be a more detailed description than defines him as an epistemic constructivist. From this angle, Luhmann provides us with a solid theory of cognition with no solid ground of knowledge except observation and observation of observation, and a theory about the differentiation of social systems: "Cognition is possible, not in spite of, but by virtue of the system not being able to make contact with the environment" (Luhmann 1992: 16). This means that it is the production of elements within the cognitive system that makes it possible for the system to maintain itself in its environment as long as it is fit. This does not mean adaption but an evolutionary process that through autopoietic reproduction under selection pressure – experiments within the system tested up against the environment - either lets the system maintain itself or not. If the scientific system makes observations of a thaw in the permafrost political observations and reflections must let a political party take precautions and make a law proposal. But this is only possible if the internal reproductions in that party and in the government which is processing around the medium of power fall out in such a way. With the functional differentiation of society, it is highly improbable that political power and economic profit should have coincident interests with idealistic dreams of saving the earth's ecosystems from human destruction – even if scientific observations and theories say so. And even if a new form of differentiation, like an algorithmic differentiation (see Tække 2022) should form a coordinated societal observation and effort, we end up with the problem of the unknown external environment and a new production of risk by every technical or causal effort we make. There are systems and there is an external environment and in the functionary differentiated society each functional system and each organization cognize each their constituted environment differently.

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