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COGNITION AS COMMUNICATION: EXPLORING NIKLAS LUHMANN'S THEORY OF KNOWLEDGE

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Abstract. This article delves into the epistemology inherent in Niklas Luhmann's theory of social systems, specifically focusing on the concept of cognition. The research question centers on how cognition functions within Luhmann's theoretical framework, understood as a self-referential process in operationally closed systems. Luhmann argues that cognition emerges through layered observations, including observations of prior observations and recursive self-reflection. By situating Luhmann within the constructivist paradigm, the article contrasts his radical constructivism with other approaches and addresses critiques of his stance, particularly regarding the ontological implications of his epistemology. Drawing on frameworks such as poststructuralist correlationism, the article provides an introduction to Luhmann's epistemological contributions while analyzing their broader philosophical relevance. Through conceptual elucidation and comparative analysis, it highlights how Luhmann's sociological framework challenges foundational assumptions in epistemology and invites renewed reflection on the nature of knowledge and cognition.

Keywords: Luhmann • epistemology • cognition • environment • observation

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1. Introduction

Niklas Luhmann (1927–1998) was a German sociologist and systems theorist whose work has profoundly influenced sociology, organizational theory, legal sociology, media studies, and other disciplines. With a vast oeuvre comprising approximately 80 books and 300 articles, Luhmann stands as one of the most prolific and influential thinkers of the 20th century. Among his seminal works are *Soziale Systeme* from 1984 (*Social Systems*, published in English in 1995a), where he presents a comprehensive version of his systems theory, marking the transition from an action-theoretical to a communication-theoretical approach. His later magnum opus, *Die Gesellschaft der Gesellschaft* from 1997 (*Theory of Society*, published in English in 2012), synthesizes his theoretical contributions and offers an overarching perspective on society as a self-referential system. For Luhmann, society is a social system, while for an economist it may appear as an economic circuit, or for a politician as a political field.

Central to Luhmann's theory is the concept of communication. He famously argued that the social does not consist of individuals but of communication processes, which are the basic units of social systems. To analyze society through individuals, he contended, would be akin to explaining houses solely by referencing the bricks they are made of — a perspective too narrow to capture societal complexity. While this view aligns with Durkheim's idea of society as transcending individuals, Luhmann's approach diverges significantly by shifting focus from normative analyses to a descriptive exploration of how systems operate independently of human agency. Grounded in the German idealist tradition, Luhmann draws on Kant's emphasis on the limits of human cognition, a theme to which this article will later return in detail, while also engaging critically with Hegel's contributions to understanding systemic complexity. Hegel's exploration of contradictions and historical development laid the groundwork for systemic differentiation, but Luhmann rejects Hegel's dialectical synthesis and ontological commitments. Instead, he emphasizes the operational closure and paradox-driven dynamics of systems, framing society as an epistemological construct defined by its self-referential processes rather than a unified ontological totality. Additionally, he draws heavily on Edmund Husserl's phenomenological framework, elevating the concept of meaning (*Sinn*) as the basic concept in sociology (Luhmann 1990). For Luhmann, meaning, like in Husserl's theory, can be observed as the distinction between actuality and potentiality, providing the connective structure through which systems process and manage complexity. However, in contrast to Husserl's focus on consciousness, Luhmann shifts the analytical focus to social systems and their operations, positioning individuals as part of the system's environment. This places Luhmann's theory at a high level of abstraction, which he acknowledged with his remark: "There is a long way up to the windows in the philosophical auditoriums."

Luhmann belonged to the generation shaped by World War II and maintained a fruitful 30-year dialogue with Habermas, who also grew up amid the war's devastation.[1] While Habermas developed a normative theory of the good society, Luhmann adopted a descriptive approach, allowing modern society to emerge through precise conceptual analysis. Luhmann's functional systems — such as science, politics, and economy — are characterized by their closed and autonomous nature, though they depend on each other's outputs. One can detect an implicit anti-totalitarianism within this self-referential structure, where no single system can dominate the others.

Luhmann's systems theory is distinctively sociological, setting it apart from systemic approaches in philosophy, which often emphasize holistic or metaphysical ideas. While systemic approaches in philosophy tend to focus on universal structures or overarching ontological claims, Luhmann's work is resolutely epistemological, concentrating on the conditions under which knowledge is produced, and systems maintain coherence through their operations. His theory remains operational and empirical, avoiding speculative metaphysics and instead foregrounding the role of obser-

vation, communication, and differentiation as the mechanisms through which social systems self-organize and interact with their environments. He draws on the biological concept of autopoiesis (Maturana & Varela 1980), redefining it for sociology to describe systems as operationally closed entities that reproduce themselves through communication. These systems engage with their environments selectively, through distinctions, enabling them to navigate complexity. Functional systems such as science, politics, and the economy exemplify this dynamic, operating autonomously yet relying on each other's outputs. Luhmann's systems are both self-referential and differentiated, which he sees as central to the modern societal structure.

A key epistemological dimension of Luhmann's theory is its constructivist orientation. Luhmann identified at times as an operational constructivist and at others as a radical constructivist (Luhmann 1988; 1995b), emphasizing that knowledge does not reflect an objective reality but is constructed within systems through observation. This epistemological stance aligns with his broader rejection of universality in favor of systemic contingency. In his theory, cognition (*Erkenntnis*) is understood as the result of observation — a process of distinguishing and designating. This recursive process creates meaning through distinctions, but it also blinds the observer to the unmarked side of the distinction. Observation, for Luhmann, thus inherently entails both creation and limitation.

Building on George Spencer-Brown's calculus of form and Fritz Heider's perception theory (Heider 1959), Luhmann conceptualizes observation as both structured and dynamic. Additionally, he integrates Maturana and Varela's autopoietic framework in a deontologized version, to demonstrate how, mediated by language, social systems maintain their self-referentiality. From this vantage point, Luhmann asserts his epistemological cornerstone: "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, p.7). This idea resonates with Kant's critical epistemology, particularly his argument that human cognition does not access things as they are (*Ding an sich*), but instead structures knowledge through the categories of the mind. Similarly, Luhmann argues that systems do not operate by directly accessing their environment but through distinctions and observations that are internally generated. Thus, knowledge does not emerge despite the system's closure but precisely because of it, as closure ensures the system's capacity to process and organize complexity in a way that aligns with its internal operations.

The article is organized into three sections to elucidate Luhmann's approach to cognition and its epistemological implications. Luhmann's theory is characterized by its intricate network of interdependent concepts and a circular structure. This interrelation necessitates a certain degree of redundancy and circularity in the article, as the concepts must be revisited and contextualized to convey their depth and interconnectedness. The first section (2) introduces Luhmann's general theory of social

systems, establishing a foundation for his epistemological framework. The second section (3) focuses on Luhmann's understanding of cognition, exploring how social systems construct knowledge through self-referential processes and distinguishing his approach from traditional epistemology. The third section (4) situates Luhmann's epistemology within broader philosophical debates, comparing his ideas with key thinkers and concepts such as correlationism and flat ontology. The conclusion (5) synthesizes the analysis, highlighting Luhmann's contributions to epistemology and their relevance to contemporary discussions.

2. Luhmann's communication sociological systems theory

2.1. General Systems Theory

Luhmann (1995a) advances general systems theory by transitioning from a focus on open systems to an understanding of closed systems. Within the ambit of general systems theory, Luhmann (1995a) distinguishes among biological, psychic, and social systems. However, he cautions against drawing direct analogies across these diverse system categories. Rather than relying on such analogies, he advocates for informed generalizations. Drawing inspiration from Maturana and Varela (1980), he perceives biological systems as inherently autopoietic (self-producing) and remaining structurally coupled with their environment, yet operationally enclosed around the functions that produce them. On a foundational biological scale, cells exhibit a complex interplay of components that perpetually interact, forming an integrated network. This dynamic network, through its organization, ceaselessly regenerates the very processes that gave rise to it. Such systems are always already adapted to their environment (for instance, in terms of gravity or nutritional needs) and exert non-linear control over their interactions with their environment, ensuring their continued reproduction as long the environment affords their needs. Either there is autopoiesis or there is not.

Luhmann's appropriation of these concepts transcends their initial ontological confinement to physicochemical contexts (Luhmann 1995a; 1995b, p.5). He reinterprets them to elucidate how social systems, mediated through language, evolve into autopoietic entities, asserting their difference from other system types. This sets the stage for Luhmann's exploration of epistemology, probing into the possibility of cognition within these social systems and engaging with the perennial conundrum of cognition at its core.

2.2. Layers of Observation – The Foundation of Cognition

Central to Luhmann's epistemological perspective is the notion of observation (Luhmann 1988; 2012; 1995b). Observing necessitates making selections, demarcating a system from everything else. This process of distinguishing, crucial in isolating an observational object, eludes simultaneous observation. It implies observing a particular aspect while simultaneously being blind to the distinction enabling such an observation. Luhmann (1988, p.22) defines *observation* as a "distinguishing designation."

Luhmann refines his observational concept through George Spencer-Brown's form calculus, differentiating between indication and distinction (Luhmann 2012). When a distinction is made, it creates an inner *marked space* and an outer *unmarked space*. The two sides, juxtaposed by their distinction, (marked ⌉unmarked) engender a form. As Spencer-Brown (1969, p.77–79) illustrates, drawing a circle delineates an inside (what's indicated) from an outside (the remaining excluded part of the world). Given the impracticality of depicting nested circles in texts, Spencer-Brown (1969, p.4) proposes a distinction mark: "⌉".

Observation, in this framework, emerges as a process of distinguishing and indicating one side of a form over the other. A distinction divides an internal (left) and external (right) side, with the internal side being indicated while the external side remains unmarked. The distinction itself acts as the observer, inherently creating an asymmetry: one side is designated, while the other is neglected. A crucial cognitive challenge lies in the observer's inability to recognize the foundational distinction during the act of observation.

However, subsequent observations allow us to observe the distinctions underlying earlier observations. By crossing the boundary of the original distinction and indicating a value on the external side, a new observation reveals a reflection value, which, together with the internal side, forms a concept of the initial distinction. Building on Spencer-Brown's (1969, p.69) "reentry" concept, Luhmann demonstrates how initial observations become reflexive through second-order observations. This reflexivity exposes the contingency of distinctions, offering insights into their constructed nature.

Yet, every new observation perpetually blinds itself to its own foundational distinction. Observing observations remains fundamentally a first-order act, unaware of its underlying premises. This creates an endless regression of observations, precluding universal knowledge. However, acknowledging these distinctions in our analyses enables us to scrutinize our observational stances and deliberate on the selections we or others enact. As this article explores further, this inherent blindness of observations challenges epistemological claims of solid knowledge foundations. Knowledge remains rooted in observation and the layers of reflexivity it generates.

2.3. Autopoiesis and Observation

For a systems theorist, a pivotal question arises: which distinction should one employ? Luhmann proposes that one should opt for the distinction that the system itself employs because the concept of autopoiesis emphasizes the distinctions that the observed object inherently makes. To illustrate: an organization produces and reproduces itself through communication of decisions. Hence, it can be said that it observes both itself and its environment via these decisions. Consequently, we, as external observers, can observe an organization through its decision-making processes. An autopoietic system differentiates itself from its environment through the foundational processes that reproduce it. This theoretical *deontologization* signifies that the elements composing the system are constituted by reproduction processes. These elements simultaneously delineate the system from its environment and allow an observer to observe it using the distinction between system ⌉environment.

2.4. Sociology of Communication

Luhmann (1995a, p.271) delineates social systems as those that are maintained through the medium of communication. In essence, by existing within the realm of communication, social systems inherently distinguish themselves from entities that do not communicate — referred to as their environment (Luhmann 2000b, p.10). Grasping how social systems embody autopoiesis necessitates an exploration into Luhmann's conception of communication. He proposes communication occurs when someone understands that something (and not something else) is uttered in one mode (and not in another) by someone else. This process necessitates a synthesis of three selections: information, utterance, and understanding, inclusive of potential misunderstanding (Luhmann 1990, p.3). Information is a difference that makes a difference, for example, the difference between whether the examiner gives one grade or another. *Utterance* denotes the disparity between the chosen mode of communication and alternative modes, e.g. the tone and attitude with which the grade is given. *Understanding* signifies how a receiver, distinct from the communicator, differentiates between information and utterance, i.e. perceives or interprets the utterance (Luhmann 1995a, p.140). This recursive nature of understanding underscores that communication is beyond the unilateral control of a single system, as understanding invariably hinges on the recipient's selection.

2.5. Social Systems as Selectors of Meaning

However, a challenge emerges in Luhmann's model: the role of individual consciousness in the communication process. Although he emphasizes the imperative to es-

chew any references to consciousness when perceiving communication as autopoietic (Luhmann 2002a, p.157), the presence of multiple consciousnesses involved in selecting information, utterance, and understanding seems inescapable. To fully embrace Luhmann's (1995a) notion that solely communication communicates, one might argue that it is the social system itself that selects understanding. For example, in an organization, whether someone knocks before entering a room or walks in is not merely a matter of individual interpretation but is shaped by the norms established within that organization. These norms, formed and maintained through the organization's communication processes, determine how such actions are understood — whether as normal, respectful adherence to protocol, or, alternatively, as an informal approach. This illustrates that understanding is not solely an individual matter, and meaning is not an inherent property of the act itself but is instead selected by the broader social framework in which it occurs.

From a systems theoretical perspective, it is crucial to distinguish between the observations of individual psychic systems and the intrinsic operations of social systems. Psychic systems, such as an individual's perception of an organization, observe the social domain as their environment, filtering it through their selective cognition. Conversely, from the perspective of a social system, individual psychic systems constitute its environment. This delineation necessitates a social concept that excludes direct references to consciousness, focusing instead on communication as the foundational operation of social systems.

Communication emerges as the mechanism that resolves the double contingency inherent in social interactions, where each participant's actions are contingent upon the expectations of the other. This dynamic foster the creation of social systems "from below" by linking individual understandings into shared meanings. However, these systems are simultaneously conditioned "from above" by the broader social framework, which establishes the standards for how meanings are selected and understood. For instance, the understanding of this text is influenced by its context as a philosophical journal article, shaping the horizon for how its content is interpreted compared to, say, an organizational email or a news article.

Based on this exposition, it is now possible to recapitulate the three selections of communication through the concept of meaning, as presented in the introduction. Using an exam grade as an example, the grade communicates the actual, e.g., *A*, which gains its meaning by not being one of the implicitly co-communicated, non-selected other possibilities (the potential). The utterance derives its meaning through the actualized mode in which it is given, e.g., a firm tone and demeanor from the examiner – and by not being, for instance, uncertain (the potentiality against which the actualized mode obtains its meaning). Understanding is also an actualization within a horizon of non-selected potentialities. The student might, for instance, accept the result with satisfaction and not respond with frustration or protest.

2.6. Bridging Micro and Macro Levels in Social Systems

A communication event materializes only upon understanding, where the distinction between information and utterance is socially instantiated through subsequent communication. Messages become part of a social system only when linked to further communication, forming a lineage of accepted or negated meanings specific to that system. These sequences differentiate one social system from another, each evolving based on its communication history and context (differentiation).

This dynamic reflects the interplay between micro- and macro-level processes in Luhmann's theory. On the macro level, functional systems such as the economy, science, or law establish generalized expectations, creating frameworks within which organizations operate. These expectations condition the decision-making processes within organizations, which respond through decision communication aimed at resolving specific uncertainties. For instance, economic fluctuations influence organizational strategies, as decisions about investments or hiring align with broader economic conditions.

On the micro level, individual communication processes within organizations or interactions not only respond to macro-level expectations but also reproduce or modify them. For example, purchasing decisions in the economy contribute to economic trends, just as discussions and decisions within scientific communities shape the trajectory of scientific paradigms. Similarly, a reader engaging with this philosophical article may experience a shift in perspective, prompting them to modify their future contributions to scholarly discourse — perhaps choosing to publish in different journals or engaging with alternative theoretical frameworks.

Thus, communication bridges the gap between micro and macro levels, with individual acts of communication cumulatively influencing and reshaping societal structures. Functional systems create the broader context of expectations, while organizations and interactions respond to and transform these through communicative acts. This recursive process underpins the evolution of social systems, demonstrating how societal structures are both the product of and the framework for individual communication processes. The interplay of micro-level communication and macro-level expectations thereby constitutes the foundation of social reality and the continuous reproduction of societal structures.

2.7. Differentiation

The advent of modern oral language facilitated the ability to communicate about communication itself, transitioning social systems into self-reflective entities and simultaneously separating them out from their environment (Luhmann 1995a, p.153). This act of differentiation from a non-communicative environment functionally

carved out the distinction between system and environment, thus defining society as that which reproduces through communication, separate from non-communicative entities. Historically, to manage escalating internal complexity, society has undergone various internal differentiations, leading to the emergence of distinct systems such as functional systems, organizations, and interactions in modern society (Luhmann 2012; also see Tække 2022a). Luhmann characterizes modern society as functionally differentiated, implying its segmentation into multiple functional systems such as the economic, political, legal, and scientific systems. Notably, contemporary society lacks a central nexus but is divided into these functional units, each utilizing unique communication media, codes, and programs for observation. For instance: *The economy* employs money as its symbolically generalized communication medium. *Politics* hinges on the medium of power. *The legal system* revolves around the medium of rights. *Science* is anchored in the pursuit of truth. *Religion* operates on the premise of faith. Luhmann's societal portrayal is anchored in the system-environment dichotomy, eschewing the conventional part-whole distinction. For him, the latter is excessively ontological. He leans towards an epistemologically oriented system differentiation theory. This functional differentiation essentially mirrors the system⎪environment difference within the social system itself (Luhmann 1995b, p.7). Hence, society becomes a unique internal environment for each functional system. Every system addresses a distinct facet of societal complexity, exclusively aligned with its system⎪environment distinction, reimagining society through this singular lens. Consequently, functional systems can operate more efficiently, presuming other societal reproduction prerequisites are catered to by other systems (Luhmann 1995a, p.192).

Each functional system, as previously highlighted, operates and observes its environment through a symbolically generalized communication medium and specific binary codes accompanied by observation programs. The medium streamlines, invigorates, and centers communication, while the code establishes parameters for gauging successes and setbacks and observing relevant distinctions in the environment. For instance: the economy operates and observes the world through the medium of money and the binary code *payment⎪non-payment*. Politics relies on the medium of power, coded as *power⎪no power*, to observe and process decisions. The legal system employs the medium of rights, structured around the code *legal⎪illegal*, distinguishing lawful acts from unlawful ones. Science hinges on the pursuit of truth, expressed through the code *true⎪false*, to observe and validate knowledge. Religion uses the medium of faith, distinguished by the code *immanent⎪transcendent*, to observe and interpret meaning beyond the tangible world. These binary codes not only architect the system's operations but also constitute the specific perspectives through which systems observe their environments. The codes establish a communicative preference - juxtaposing a positive value (e.g., payment, power, legality) with a corresponding

negative value (e.g., non-payment, no power, illegality). The positive value crystallizes the core motivation for communication within each system, while the negative value provides contrast and differentiation. As Luhmann articulates, "Codes indicate the medium responsible for their functional areas and thus limited but loose coupling of possibilities" (Luhmann 2012, vol. 1, p.217). These codes not only guide communication but also frame the system's specific mode of observation, ensuring that its operations remain system-specific and selective. Meanwhile, programs operate at the system's organizational echelon, specifying how the code is applied in concrete situations and refining the system's observations. Unlike the binary codes, which remain invariant, programs can adapt, be remembered, or even forgotten, reflecting the system's capacity for learning and evolution.

2.8. The Scientific Functional System

In Niklas Luhmann's theoretical framework, the scientific system is defined by its unique medium of truth and operates under the binary code true⌉false (Luhmann 1994). This system distinguishes itself by its autopoietic nature, producing and reproducing its operations (observations) through communication. The distinction between truth and falsehood forms the backbone of the system's self-referential processes, determining its internal logic and operational boundaries. Science's truths are not absolute but are generated as outcomes of the system's recursive operations, guided by both its code and its programs. The distinction between code and program is pivotal. The code true⌉false remains invariant, while the programs — such as theories, experimental protocols, referencing systems, and peer-review processes — specify the conditions under which something is marked as true or false. Luhmann (1992, p.184) emphasizes this differentiation, arguing that it allows the system to produce "truthful sentences" by coupling the medium of truth with programmatic conditions. For instance, the peer-review process exemplifies how programmatic operations regulate the system's communication, ensuring scientific outputs adhere to established norms.

In the scientific system, reentry manifests as the application of its core distinction — true/false — within the system itself, creating a recursive process where the system observes and regulates its own operations. This reflexive application generates a self-referential paradox: the system cannot conclusively determine the validity of its truths from within. For instance, scientific claims evaluated for their truth rely on programs such as peer review or experimental replication. These programs themselves operate under the binary code of true⌉false, illustrating how the system's operations are maintained despite the unresolved paradox. A similar mechanism is evident in the legal system, where the validity of laws is reaffirmed through judicial decisions and precedents, despite the inability of the legal system to ground its authority inde-

pendently of its own operations (Derrida, 1992; Teubner, 1993). As Teubner (1993) emphasizes, this capacity for self-sustaining operation demonstrates how autopoietic systems manage paradoxes without resolving them but instead operationalize them to continue functioning. This recursive process underscores Luhmann's concept of second-order observation, where the system observes its own observations to reassess and refine its knowledge. In the scientific system, second-order observation is institutionalized through written communication, a development Luhmann (1998) attributes to the advent of printing technology. The ability to record and systematically reflect on historical and theoretical frameworks ensures the system's continuous evolution, despite its paradoxical foundations. However, this very dynamic reveals that science does not produce normative or universal knowledge; instead, its truths remain contingent on its operational framework and the programs governing its processes. Thus, while science resolves its paradoxes operationally, the knowledge it produces is always contextually and historically situated.

Moeller (2012), following Luhmann, elaborates on this point, arguing that science's truths are communicative constructs akin to those produced by other social systems. Science does not produce absolute truths but instead constructs knowledge within its operational framework. As Luhmann (1992, p.184) states: "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." This highlights that science's truths are contingent on its communication processes, shaped by the programs that govern its operations, such as peer review, citation practices, and experimental reproducibility. These constructs emphasize that scientific knowledge, while systematic and robust within its context, remains fundamentally bound by the distinctions and operations of the scientific system itself.

The science system produces knowledge, not societal opinions or news, which fall under the domain of the mass media. As Luhmann (2000b, p.1) states, "Whatever we know about our society, or indeed about the world in which we live, we know through the mass media." This highlights the differentiation between functional systems: while science generates knowledge within its operational logic, it relies on other systems, like mass media, for societal dissemination (Luhmann 2000b). The scientific system exemplifies how functional systems operate autonomously while remaining structurally coupled with other systems, such as education, the economy, and politics. It also illustrates how individual communicative acts — publishing an article and conducting a peer review — reproduce and refine the broader scientific structure. The system's capacity to reflect on its own operations, despite the inherent paradoxes, ensures its continued evolution as a cornerstone of societal knowledge production.

2.9. Summary

For Luhmann, cognition is a self-referential process inherent to both psychic and social systems. While psychic systems operate through individual consciousness, social systems can be understood as cognitive entities that generate meaning (*Sinn*) through communication. This process enables social systems to navigate their environment by establishing distinctions and reducing complexity. The distinction between marked and unmarked spaces, derived from Spencer-Brown's calculus, illustrates how cognition operates through distinctions that enable systems to process complexity. This self-referential mechanism allows systems to observe their own observations, integrating and adapting to their environments while remaining operationally closed. Cognition in Luhmann's framework is intrinsically tied to meaning, which functions as the connective structure enabling systems to manage complexity. The scientific system, one functional system among others, generates knowledge by distinguishing between true and false. The application of the true⌉false code through reentry demonstrates how systems handle paradoxes by operationalizing them rather than resolving them, thus maintaining their autopoietic processes. Therefore, cognition is contingent and system-bound, serving as the medium through which systems construct their realities. In this perspective not even the scientific system can claim universal or normative truths.

3. Epistemology and cognition in Luhmann's Theory

3.1. Cognition as Construction

From Luhmann's perspective, Kant's epistemology provides a valuable but ultimately insufficient foundation for understanding cognition within the framework of system theory. By critically engaging with Kant's "foundational structure," Luhmann outlines a clearer conception of cognition as a self-referential and systemic process, emphasizing the operational closure and autonomy of social systems (Luhmann 1988; 1995b). This critique allows Luhmann to offer a more dynamic and contextually grounded alternative to Kant's transcendental idealism. Kant's dualism between noumena (things-in-themselves) and phenomena (things as they appear to us) introduces a persistent epistemological problem: it makes knowledge of noumena inaccessible. For Luhmann, this division is unnecessary. Cognition does not aim to access an external reality but emerges from within the closed operations of a system (Luhmann, 1988, p.9; 1995a, p.7). By reframing cognition as an internal function contingent on the distinctions a system employs to differentiate itself from its environment, Luhmann eliminates the need for a foundational external reference. Furthermore, Kant's rigid transcendental categories, designed to structure human cognition universally, lack

the adaptability needed to account for the contingent, recursive processes inherent in cognition. Luhmann, by contrast, views cognition as an iterative and self-referential process. Systems like science and law construct and adapt knowledge by continuously reproducing their operations, maintaining autopoiesis and refining their frameworks in response to their internal and external complexities (Luhmann, 1992, p.184).

Luhmann also challenges Kant's assumption of universal validity for transcendental categories, emphasizing instead the cultural, historical, and systemic variability of cognition. Each functional system, such as science or law, constructs knowledge based on its own codes and programs, which determine what is observed, how it is processed, and how distinctions are drawn. This grounding in systemic operations ensures that cognition is contextually relevant rather than universally applicable, aligning knowledge production with the unique logic of each system.

Central to Luhmann's critique is the necessity for epistemological self-reference. Any theory of cognition must observe itself as an observer to critically assess the distinctions it employs. This is encapsulated in Luhmann's concept of reentry, where the distinction between system and environment is applied reflexively within the system itself (Luhmann, 1988, p.13). In the scientific system, this takes the form of applying the true⌉false distinction to its own operations, allowing the system to observe and refine its outputs, such as peer-reviewed articles and theoretical frameworks. The reentry process generates a paradox: the system cannot conclusively validate the truth of its truths from within. However, rather than destabilizing the system, this paradox is functional. Through operational closure, the system continues its autopoietic processes without resolving the paradox but instead operationalizing it (Teubner, 1993). As Luhmann notes, "cognition is possible not in spite of but because of its operational closure" (Luhmann, 1988, p.9).

This dynamic also applies to other functional systems, such as law, where judicial precedents reaffirm the validity of legal norms, despite the system's inability to ground its authority outside its operations. These parallels demonstrate the broader applicability of Luhmann's critique of foundational epistemology and his reconceptualization of cognition as an internally generated process. Luhmann's radical constructivism thus shifts from the traditional epistemological stance of "though cognition is impossible" to the revolutionary assertion that cognition is possible "because it is impossible." This radicalization emphasizes that cognition is a product of the system's self-referential operations, detached from any external foundational structure. In doing so, Luhmann challenges the reliance on subject-object unity in traditional theories, replacing it with a systemic perspective where cognition is contingent on the distinctions drawn within the system itself. This theoretical shift secures the operational independence and autopoiesis of social systems, ensuring their distinctiveness and capacity to generate knowledge without dissolving into their environment (Luhmann, 1998). This radicalization emphasizes that cognition is a product of the

system's self-referential operations, detached from any external foundational structure. While Luhmann aligns with Kant in viewing cognition through a form of media theory, albeit in a non-foundational sense, his theory also resonates with Hegel's insight that differentiation occurs within and because of the system's environment. The evolutionary history of differentiation, for Luhmann, presupposes an ongoing engagement with an environment that systems simultaneously construct and observe. This theoretical shift secures the operational independence and autopoiesis of social systems, ensuring their distinctiveness and capacity to generate knowledge without dissolving into their environment (ibid).

3.2. Cognition and observation

Now, let us revisit observation. Luhmann posits that the internal differentiation of social systems leads to their self-isolation, enabling each system to operate selectively within its own boundaries (Luhmann 1988, p.13). According to Luhmann, a system's ability to develop complexity and construct knowledge depends on avoiding confusion between itself and its environment: "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, p.7). Cognition, in this framework, is rooted in observation, which inherently involves distinguishing and designating based on those distinctions (Luhmann 1988, p.14).

This disconnection from the external world means cognition is closed, intrinsically different from an external world without boundaries. Observations reveal the observer's own constructions, not the environment itself. Thus, without cognition, systems cease to exist (ibid., p.17). The observer's concepts of reality and world arise from this distinction, marked by a 'blind spot' that conceals the difference underpinning the observation — a difference that remains undistinguishable from within (ibid).

3.3. Operation and distinction

Cognition functions as an operation that generates both truth and errors, as described by Luhmann (1988, p.21). In this operational context, cognition is neutral concerning the true ⟧ false distinction. All distinctions are the product of an observer, who can differentiate and designate but cannot simultaneously assess the true ⟧ false distinction itself as true or false. Luhmann answers this dilemma with the concept of binary coding in differentiated systems (ibid., p.22). For Luhmann, cognition represents a form of societal self-observation, which in the functional systems of science uses the code of true ⟧ false. It is crucial to differentiate the true ⟧ false distinction from other forms of self- and external observation, such as those encountered in other symbolically

generalized communication media like rights or power. In constructivism, cognition is rooted in the distinguishing of distinctions rather than in reason, as posited by idealism (ibid., p.24). The functionally differentiated society, according to Luhmann, does not imply a relativistic 'anything goes' scenario; rather, it facilitates a plurality of self-descriptions and world-descriptions (Luhmann 1995b, p.8). Luhmann asserts that there is only one society, and for him, society is a sociological concept of cognition. In Luhmann (2012), he emphasizes that different observers perceive society differently (e.g., a sociologist sees a society, while an economist sees an economic network). This implies that the epistemologist becomes a part of the very maze he studies, needing to reflect on his position within it. The radical constructivism in the sociology of cognition, which encompasses self-inclusion, is made possible by this approach (Luhmann 1988, p.24). It recognizes that scientific observation (true ⌉ false) is a function of the science system, differentiated among other functional systems, and that different cognition theorists distinguish differently based on their distinct distinctions.

3.4. Perception and environment

In understanding Luhmann's epistemology, it's essential to recognize the distinction he makes between the persistent and the changeable as anchor points for cognition. Language, for Luhmann, articulates the changeable (like movements) without needing to simulate change itself. He emphasizes the importance of temporary discontinuities in the external world, drawing on Heider's theory of distanced perception (Heider 1959). This involves a differentiation between loosely and tightly coupled elements, exemplified by the distinctions between air ⌉ noise and light ⌉ visible objects. The key lies in the difference: if air produced noise or light became visible, perception would be impossible. Physical substances must exist in both loose and tight couplings to create systems that can leverage this difference and observe one side of it: the form. A medium consists of a loose coupling, while a form consists of a tight coupling. The medium ⌉ form dynamic is crucial for perception, which only functions if the difference itself is not perceived. Difference is the latent structure of perception (Luhmann 2000a).[2]

Luhmann asserts that only a theory utilizing second-order observation can recognize this (Luhmann 1988, p.35). Forms, like words, can again serve as a medium in a loosely coupled system for cognition. Physical (or other) constructed differences between loose and tight couplings are necessary for the development of a cognizable system. Without this, cognition would be relegated to mere coincidences at its boundaries without spatial ⌉ temporal distance from the external world. Cognition is unfeasible in a random world (ibid). However, this doesn't imply that cognizing systems adapt to reality (Luhmann 1988, p. 47). Think of the climate crisis, for example,

might a refrigerator appear as an adaptation to the environment, preserving food by cooling it. Yet, its operation depends on electricity, often generated by CO2-emitting coal power plants, contributing to the climate crisis and thereby undermining our livelihood.

Cognition wouldn't be possible in a completely entropic reality, yet reality itself remains unknowable because it lies beyond cognition's operational distinctions (Luhmann 1988, p.41). Cognition cannot impose its form of distinction onto the world; rather, it is a mundane achievement of its own operations (ibid). Cognition knows nothing outside itself; "outside" is indicated through the interplay of self-reference and external reference. Even if usable distinctions existed, cognition could not employ them without dissolving its operational closure. Therefore, certain paradoxical concepts become essential: *World* marks the unity of the difference between system and environment, *reality* designates the unity of the difference between cognition and object, and *meaning* signifies the unity of the difference between actuality and potentiality (Luhmann 1988, p.42). These concepts cannot be defined through counter-concepts but only by the specific distinctions upon which they rely. This unity through distinction highlights the simultaneity of difference and dependency. The designated (e.g., "world" or "reality") cannot exist outside the distinctions that construct them. Re-entry, as the reintroduction of a distinction into itself, ensures that cognition remains immanent to its operations, such as observing observation. The world serves merely as an orientation concept within the system, while cognition constructs its object through its own distinctions. Likewise, actuality and potentiality can only be made meaningful in practice, referring to a horizon of other possibilities — whether real or imagined.

3.5. Self-reference and external reference

The distinction between self-reference and external reference is central in Luhmann's work. He observes the differences between subject ⌉object, thinking ⌉being, and knowledge ⌉object, viewing these as distinctions between self-reference and external reference (Luhmann 1995b, p.8). The system, he argues, is always the unity of these differences. A system needs to distinguish between self-reference and external reference to develop complexity and knowledge. If a system confuses itself with its environment, it hinders its cognitive development. Language, according to Luhmann, almost certainly prevents this confusion: "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, p.7).

Luhmann connects this distinction to Husserl's phenomenology, which posits that consciousness relates to both itself and to phenomena. Excluding either self-reference

or external reference would cause consciousness to lose its essence. "The act form of intentionality thus becomes the very moment which makes possible a linking together of self-reference (noesis) and external reference (noema)" (Luhmann 1995b, p.7). This linking occurs in a temporal, processual form, allowing consciousness to oscillate between engagement with the world and reflection, and to shift its focus. Applying this concept to social systems, Luhmann draws a parallel with Maturana's concepts. He states, "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" (Luhmann 1995b, p.7). For Luhmann, cognition is always an internal construction. An organization's understanding of its environment, for instance, is processed through its own semantics, similar to how the brain uses an externally indifferent code for perception. This perspective emphasizes the internal, self-referential nature of cognitive processes, whether in individual consciousness or in social systems.

3.6. Cognition, language, and the environment

In further exploring cognition, Luhmann emphasizes that cognition may recognize its conditions and activate its possibilities by doing what it does, thus proving its potential (Luhmann 1988, p.47). He questions the traditional theories of assimilation, representation, and adaptation, proposing instead to ask how a system, under the conditions of operational closure, can build internal complexity and thereby increase cognitive performance.

Luhmann points to language as a key medium in both psychic and social systems, acting as the structural coupling between them (Luhmann 1988, p.48).[3] Although language increases internal complexity, it does not construct cognition as an operation that provides direct access to the environment. Luhmann concludes that linguistic analysis alone cannot deepen our understanding of increased internal psychic and social complexity in cognition. Instead, he suggests that psychological and sociological analysis are necessary to illuminate developments in cognition. These analyses are vital because, unlike other theories that focus on connections within and between systems, Luhmann's approach emphasizes distinctions (ibid., p,50).

Cognition, according to Luhmann, is only possible because systems are operationally closed at the level of their distinction and designation. This operational closure renders them indifferent to their excluded environment. The fact that cognition can only be achieved through disruption doesn't imply that it doesn't represent or constitute something real, for example, that theories about a connection between

CO2 emissions and temperature increases may be true. It merely means that there are no direct equivalents in the external world. If there were, the system would dissolve into the external world (Luhmann 1988, p.52). This perspective underscores Luhmann's view of cognition as an internally constructed process, distinct from and not directly mirroring the external world. This is where Luhmann positions himself within an out-differentiated system, observing and asserting its nature (see the introduction). He accomplishes this through the self-implication of his own theory, without claiming universality or superiority over others. However, the theory recognizes that it does not see what it cannot see. But what about evolutionary theory, which should be able to describe how systems adapt to their environment?

3.7. Evolution

Now we have a picture of real social systems that can observe each other and, in this sense, can cognize, building up complexity as autopoietic systems. This happens through structural coupling to an external environment that is stable in such a way that the social system's internal cognition can increase its 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 and the environment?

Luhmann (2012, vol.1 chapter 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., p. 252). Evolution is, so to speak, a theory of waiting for usable coincidences (ibid., p.253). Variation is placed at 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 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., p.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., p.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, the environment simultaneously changes for all other systems for which the changed system forms a part of their environment:

"The world becomes dynamic from within" (Luhmann 2012, vol. 1 p.262). Evolution in social systems is connected to the inner world of society (ibid., p.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 what it can know based on what it already knows.

Variation relates exclusively to certain operations (i.e., 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 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]

4. Perspectives on and parallels to Luhmann's theory

4.1. Luhmann and the Environment

Luhmann's brand of constructivism is radical (in comparison to, for instance, Kant's foundationalism), operational (since only communication communicates), and fundamentally epistemic, since it is the systems themselves that cognize. In this latter regard, it can be compared with Foucault. In the realm of construction, from an epistemological standpoint, Bertilsson (1998) categorizes both Luhmann and Foucault as epistemic constructivists. While Luhmann ascribes a supreme epistemic status to the system, Foucault prioritizes discourse as the key epistemic domain. From a mainstream science studies perspective, epistemic constructivists are criticized because we, in their theories, cannot know anything about the world in itself (Collin 2021). If there is no access to the world per se, then all claims about it are simply meaningless. According to Collin (ibid), 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. Collin's problem is that Luhmann is speaking about something 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 belong to the world-in-itself. Therefore, Luhmann, according to Collin (2021, p.143), cannot say anything substantial about how this world is designed. Collin writes that this also counts for Maturana, Varela, and everybody else who subscribes to the *distortion theory*. As a little curiosum, Collin writes that this does not set a question mark with Luhmann's sociological theory. Maybe Collin follows Luhmann as far as social systems can observe each other but opts out when it comes to social systems' observations of their non-communicative environment.

Reading Collin (2021), 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 is, of course, familiar with Popper, Kuhn, and Hume, and very well knows that we do not know why the *laws* of nature are as they are, he is still convinced that what Luhmann would call first-order observation — a human observing the world, like a subject observing an object — opens for human adaptation 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, and programs. Luhmann is more critical than Collin when it comes to making statements about the design of the world. It is Collin who believes that we are in the 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, only how it is constructed semantically in social systems.

Consider the example of the climate crisis, perceived internally by social systems. Scientific first-order observations are made and interpreted based on existing knowledge within the system (second-order observation; self-reference) saying the climate is getting hotter and action must be taken. In a functionally differentiated society, various systems, like the economy, politics, and law may interpret the observations differently, driven by distinct codes and cognitions, such as profitability, re-election, and property rights. Luhmann emphasizes that all these interpretations are forms of communication, distinct from tangible phenomena like CO2 or melting ice. Regarding adaptation, Luhmann posits that autopoietic systems are always already adapted to their environment. Luhmann's philosophy of technology, distinguishing between operational (autopoietic) and causal (technical) closure, underscores this concept.[6] Technology, in Luhmann's view, encapsulates conditions where devices, identified as functioning simplifications, cause specific effects. The concept of technology is demarcated by controllable and uncontrollable causal conditions (Luhmann 2012, vol. 1 p.317).[7] For Luhmann (2005), risk is often associated with technology, especially in contexts where benefits are sought despite potential risks, like in biochemical or nuclear facilities. In conclusion, Luhmann views *adaptation* (causal (technical) closure) as a growing body of knowledge that simultaneously exposes us to greater unknowns, akin to Socrates' expanding Island of knowledge. From this perspective, our technologies, such as cars, coal-fired power plants, or lithium batteries, appear more as a risk to our life's foundation than an adaption.

4.2. Luhmann Observed with Concept of Correlationism

Returning to constructivism Bryant (2016) defines Luhmann as a poststructuralistic correlationist. Correlationism, as traced back to Kant and the Copernican turn,

say that vi epistemically cognitively only have access to the phenomenal and not the noumenal (Meillassoux 2008; Bryant 2011; 2016).[8] Correlationism posits that we only ever have access to the *correlation* between thinking and being, where subjectivity and objectivity cannot be distinguished, and the object in itself, isolated from its relation to the subject, is never recognized (Meillassoux, 2008, p.5). This is not to say that a subject must relate to an object to recognize it, which realists also agree upon, but rather: A) We can never know what belongs to the objects and what we contribute (weak correlationism), and B) The mind structures reality, and object properties are products of the mind (strong correlationism) (Bryant 2016, p.72). There is a distinction between universal and pluralistic correlationism. In *universal correlationism*, the mind is seen as the same for all rational beings, so cognition uncovers the universal structure of the mind, as in Kant's articulation of the 12 categories and the forms of cognition (time and space). *Pluralistic correlationism*, however, implies that there is no universal cognition 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, p.73). In *poststructuralist correlationism*, it is not the correlation to a subject that is important. Language, fields, discourse, and, *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, p.74).

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

The concept of observation provides 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; their concepts are part of the world; their concept of causality, technology, etc., are part of the world they observe. Therefore, the field of cybernetics, by examining its own principles and operations, must account for its activities within its domain. As Foerster (1995) states, "cybernetics becomes cybernetics of cybernetics, or second-order cybernetics."[9] 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 1995a, p.487). This does not mean that anything goes (Luhmann 1995b, p.5). 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 cognitive loneliness or isolation is not a curse but the possibility for cognition and knowledge. If systems were not isolated and operationally closed, everything would flow together, and systems would not exist.

Although Luhmann rejects ontology, he emphasizes the importance of distinguishing between a system's environment and systems existing within the environment of this system (Luhmann 1995a, p.17). Luhmann differentiates between the environment constituted by the system and systems that exist independently within the environment (Bryant 2016, p.86–87). The primary distinction is between system and environment, where systems self-constitute by differentiating themselves from an environment, while simultaneously creating their own (observed) environment. This implies that each system has its unique (internally constructed) environment, and there are as many environments as there are systems.

However, there might also be other systems within the observing system's environment that do not belong to the environment constituted by the observing system. According to Bryant's interpretation, Luhmann employs the concept of environment in two distinct senses. Firstly, there is the environment that the system constitutes and selects for its maintenance. This is the environment formed through the system's distinctions. Secondly, there is the environment independent of the system's distinctions, the autonomous environment. Luhmann notes that constituting a specific environment always involves the risk that distinguishing between system and environment becomes problematic, as the environment is more complex than the system itself. He states, "Systems lack the 'requisite variety' (Ashby's term) to respond to every state of the environment. [...] There is no point-to-point correspondence between the system and environment" (Luhmann 1995a, p.25). This refers to the independent environment — an external world not registered by the system. Due to limited capacity and the overwhelming complexity of the independent (non-constituted) environment, the system must form a known environment, which carries the risk of overlooking significant aspects.

Bryant (2016, p.88) concludes that Luhmann's position is cautiously realistic in three aspects: 1) He must acknowledge the existence of other systems not constituted by the observing system, which may be imperfectly understood due to our distinctions but exist. 2) The independent environment must exist and be separate from the constituted environment to introduce perspectivism in systems theory, open to risk, selection, and contingency. 3) While systems constitute their own elements, these elements cannot be created from nothing. They must utilize some form of substance or materiality, which can then be transformed into elements. This could include Heider's perception media and the idea that every utterance must consist of something perceptible and capable of being distinguished in media forms (Luhmann 1988, p.36). Luhmann (1988) also emphasizes that cognition is only possible in a world with

physical (or other) differences between loose and fixed coupling, without which no cognizable system could develop.

4.3. Luhmann and Latour

Luhmann's radical constructivism, which situates cognition within the self-referential operations of systems, contrasts sharply with Bruno Latour's flat ontology.[10] For Latour, reality is continuously constructed and reshaped through dynamic actor-networks, where human and non-human actors — such as technologies, climate phenomena, and policies — interact and influence each other (Latour, 1993; 2017). In this perspective, cognition occurs through the transformations enacted within these networks, as each mediator introduces a new interpretation of the observed reality. This stands in contrast to Luhmann's systemic approach, where cognition is restricted to autopoietic systems that operate through distinctions and are closed to their environment. Latour's rejection of hierarchical distinctions between humans and objects positions him as an advocate of pluralistic correlationism, extending the subjectivity of cognition beyond human-centered frameworks. Luhmann, however, adheres to a poststructuralist correlationism, where only communication communicates, and the world is constructed internally by the distinctions of social systems (Luhmann, 1995a).

Both approaches challenge the human-centric assumptions of traditional correlationism, but while Luhmann deontologizes reality by focusing on communication's operational closure, Latour's actor-networks emphasize tangible interactions as constitutive of reality. In poststructuralist terms, Luhmann's systems theory aligns with the view that cognition arises from internally constructed distinctions, whereas Latour's flat ontology insists on following the trajectories of mediators to uncover how knowledge and reality are co-created by heterogeneous actors. This juxtaposition provides a broader lens for understanding cognition. While Luhmann focuses on the autopoietic self-reproduction of meaning systems, Latour's emphasis on the relational interplay within networks opens new possibilities for examining how knowledge is dynamically shaped in complex environments. Together, they enrich the concept of correlationism by highlighting different facets of the interplay between cognition, systems, and networks in constructing reality.

5. Conclusion

The article has engaged with the intricate question of epistemology as interpreted by Niklas Luhmann and the nature of cognition within his social systems theory. This investigation revisits the enduring philosophical inquiry into the scope of our knowl-

edge about the world, presenting an analysis of cognition as outlined in Luhmann's framework.

At the internal theoretical level, the conclusion is that the environment is incapable of contributing to any operation that generates or sustains the system's structure. Conversely, the environment does influence how an observer perceives the system's structural drift, to which the system consists of elements taken from the environment, albeit selected and structured from within the system without interference from the environment. Luhmann's self-referential systems are situated within the traditional epistemological dilemma, reminiscent of the Cartesian dualism: the empirical operations of these systems are unquestionably real to themselves (Luhmann 1995b, p.6). This holds true for biological and social systems alike due to their operational closure. Structural couplings among the three levels of systems formation have co-evolved, particularly post-language acquisition. These systems are unable to employ their operations to establish direct contact with their environment — including each other. Nonetheless, the environment can irritate the system, to enhancing its cognitive capabilities and readiness to observe deviations and process information: "No representation of the environment (such as it is) exists in the system. Only the system's own constructions exist" (ibid., p.7). Luhmann, akin to Kant, posits that reality is always mediated — Kant (2002) through spatial-temporal forms and categories, but within a foundational theory, and Luhmann through perceptual media, language, and meaning in a non-foundational theory. Hegel criticized Kant by arguing, "[...] if cognition is not an active tool but a passive medium, and the light of truth reaches us through this medium, then we perceive not the truth as it is, but as it appears through and in this medium" (Hegel 1999, p.63). Precisely, Luhmann would agree, except that for him the medium is grounded in the system's selective interaction with its environment, and consciousness is an autopoietic system, like social and biological systems. This dichotomy poses a challenge only for conventional epistemology — or for idealists like Hegel who believe they have resolved the issue of reference. For Luhmann, such decoupling is a requisite for cognition (cognition depends on this necessary disconnection between the system and its environment, allowing the system to operate autonomously).

On a more meta-theoretical level, the article posits that Luhmann is better described as a poststructuralist correlationist, offering a more nuanced characterization than merely labeling him an epistemic constructivist. Through this perspective, Luhmann presents a theory of cognition that eschews any firm grounding in knowledge, relying solely on observation and second-order observations. He elucidates the differentiation of social systems: "Cognition is possible, not despite, but because of the system's inability to make contact with the environment" (Luhmann 1995b, p.7). This implies that the internal generation of elements within the cognitive system enables the system to persist in its environment, conditioned by its fitness — and dependent

on not destroying its environment (Tække 2024). This is not mere adaptation but an evolutionary process of autopoietic reproduction under selection pressure, i.e., structural experiments within the system that are tested against the environment, determining the system's continuance or demise.

If the scientific system registers a thaw in the permafrost, political considerations and deliberations must prompt a political party to enact precautionary legislation. However, this is contingent on the internal dynamics within that party and the government's machinations in the realm of power. Given the functional differentiation of society, it is highly improbable that political power and economic interests will align with the idealistic aspirations to safeguard Earth's ecosystems from human-induced damage — regardless of scientific evidence or theories. Moreover, even if a new form of differentiation, such as algorithmic differentiation (see Tække 2022a; 2025), were to orchestrate a coordinated societal response, we still face the challenge of the unknown external environment and the production of new risks with every technical or causal effort. In a functionally differentiated society, each system and organization cognizes its constituted environment differently, underscoring the complexity of achieving consensus or coordinated action in the face of the environmental crisis.

In this example, the deep-seated epistemological assumptions of a theory prove to be crucial for how we view our environment and problems with a theory. For instance, within mainstream epistemology, where it is assumed we adapt more and more to the environment, solutions often involve more new technological innovations. However, from a Luhmann perspective, these would again lead to new risks concerning an environment that we cannot perceive or cognize directly.

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Notes

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

[2]The medium ⌉ form dynamic can be exemplified through language. Letters serve as a loose coupling (medium) but disappear into words (form) once tightly coupled. Similarly, words disappear into sentences, and sentences into meaning. In perception, the medium remains invisible, while the form becomes perceptible, as the latent structure of difference underlies what is observed (Luhmann, 2000a, p.106).

[3]Luhmann (1990; 2012) also points out how other media, such as writing and printing, again increase the possibilities for building up more and more internal complexity on both sides of the distinction between psychic and social systems, but these media do not seem to alter the basic problems of cognition and external compatibility.

[4]If, for instance, social systems destroy the climate of the earth and 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).

[6]See Tække (2013).

[7]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.

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

[9]Cybernetics is an interdisciplinary research field concerned with the study of self-regulating organisms, mechanisms, organizations, and systems. Originating with Norbert Wiener and others in the mid-20th century, it provides a theoretical framework for understanding processes of feedback, control, and communication in both biological and artificial systems. Luhmann's systems theory is deeply influenced by second-order cybernetics, which extends the field by emphasizing the role of the observer in shaping and understanding these processes (Foerster, 1995; Luhmann, 1995b).

[10]Flat ontology refers to a philosophical framework that rejects hierarchical distinctions between different types of entities, emphasizing that all entities (whether human, non-human, social, or material) exist on the same ontological level. This concept is central to Bruno Latour's actor-network theory, which posits that objects, technologies, natural phenomena, and humans equally participate as "actors" in networks that shape reality. In contrast to traditional metaphysical hierarchies, flat ontology underscores relationality and the distributed agency among diverse actors (Latour, 1993; Bryant, 2011).