LANGUAGE, COMMUNICATION, AND CONTROL IN SYSTEMS THEORY AND CYBERNETICS

LINGUAGEM, COMUNICAÇÃO E CONTROLE NA TEORIA DOS SISTEMAS E NA CIBERNÉTICA

LENGUAJE, COMUNICACIÓN Y CONTROL EN LA TEORÍA DE SISTEMAS Y LA CIBERNÉTICA

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ABSTRACT: This article examines ideas related to communication control through an exploratory qualitative bibliographic analysis, focusing on the conceptions of Norbert Wiener and Niklas Luhmann. The investigation considers the hypothesis of language centered on communication, as adopted by both theories, aiming to assess whether the shared principles are sufficient to support the possibility of controlling communication entropy and, consequently, language. Furthermore, the study explores these theories' perspectives on the importance of language for humans and machines, as well as the potential existence of linguistic sharing between them.

KEYWORDS: Cybernetics. Systems theory. Language. Control. Communication.

RESUMO: *Este artigo examina as ideias de controle da comunicação a partir de uma análise exploratória qualitativa bibliográfica, com foco nas concepções de Norbert Wiener e Niklas Luhmann. A investigação considera a hipótese de linguagem centrada na comunicação adotada por ambas as teorias, buscando avaliar se os princípios compartilhados são suficientes para sustentar a possibilidade de controle da entropia comunicacional e, consequentemente, da linguagem. Além disso, o estudo explora as perspectivas dessas teorias sobre a importância da linguagem para seres humanos e máquinas, bem como a existência de um possível compartilhamento linguístico entre ambos.*

PALAVRAS-CHAVES: *Cibernética. Teoria dos sistemas. Linguagem. Controle. comunicação.*

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RESUMEN: *Este artículo examina las ideas de control de la comunicación a partir de un análisis exploratorio con un enfoque cualitativo y bibliográfico, centrado en las teorías de Norbert Wiener y Niklas Luhmann. Se aborda cómo ambas perspectivas adoptan la hipótesis de la comunicación como núcleo del lenguaje, evaluando si las coincidencias conceptuales entre ambas son suficientes para afirmar que comparten la idea de controlar la entropía en la comunicación. A través de la exposición de hipótesis comunes y diferencias clave, se concluye que, aunque existen puntos de conexión entre la cibernética y la Teoría de Sistemas, no es posible afirmar que estas teorías sean similares en lo que respecta a comunicación y control.*

PALABRAS CLAVES: *Cibernética. Teoría de sistemas. Lenguaje. Control. Comunicación.*

Introduction

This study investigates ideas from Systems Theory as developed by Niklas Luhmann and ideas from Cybernetics, developed by Norbert Wiener, based on the examination of a central similarity – the importance of communication in both theories – to explore a specific concept: the idea of *communication* and *control*. By developing the ideas of both theories on these points, it becomes possible to observe how Wiener's and Luhmann's concepts unfold the notions of control of language and to identify points of agreement and divergence.

The idea of control and communication is addressed here to circumscribe the development of a fundamental question: *how to guarantee the integrity of communication?* For Wiener (1968, p. 17), the purpose of Cybernetics was to develop a language and techniques that provide the capability to address the *problem of control of communication in general*, which he regarded as the primary issue to be analyzed and solved in society. Ensuring communicational integrity is, therefore, the objective behind the idea of controlling communication to guarantee communicational efficiency, which plays a fundamental role both for humans and machines.

Given that both theories address language and communication with significant relevance, the investigation sought to identify whether there are similarities and points of connection between Norbert Wiener's ideas and those of Niklas Luhmann regarding the control of communication. However, it is important to clarify, as Paetau (2013, p. 75) does, that Luhmann never explicitly declared any inspiration from Wiener's theories. Therefore, this investigation is conducted without explicit declarations of inspiration but works on foundational grounds that justify the curiosity to specifically examine these two theories together on the

theme of communication and control, since both share some relevant hypotheses around the topic.

Regarding these shared hypotheses, first, it is worth citing Valentinov (2017, p. 389): Wiener and Luhmann emphasize the importance of system-environment relations, observing the immersion of systems in their social or natural environments. The idea of language is highly relevant for these relations, both in Wiener and in Luhmann, with an emphasis on language in use within society.

Similarly, Cybernetics does not focus on the foundations and origins of language; its focus is on observing language in use. It is believed that this methodological premise is similar to Maturana's objectives when he created his inspiring theory of Systems Theory, showing a primarily functional and perhaps descriptive concern, rather than an ontological investigative one (Paetau, 2013). Paetau recalls that for Maturana, the question of life could not be answered by searching for the properties of elements constituting living organisms but by tracing fundamental organizational principles through which living systems acquire their identities and distinguish themselves from non-living systems (Paetau, 2013, p. 76). This fundamental conception is believed to resonate both in Cybernetics and in Systems Theory.

Above all, an important point of connection between the two theories is observed in the importance Wiener (1968) attributes to the notion of feedback, which, in Cybernetics, precisely favors the control of entropy in communication. In Luhmann (1996), this concept represents a foundational notion of Systems Theory. The approaches differ, but the significance given to the concept is the same, which also attracted the present investigation.

Both the idea of language in its use and the importance of feedback are present when reflecting on language use in language models and a possible sharing of language between humans and machines. Is this idea supported by the examined theories?

To answer these questions, both theories are examined together, focusing the analysis on the ideas of communication and control to analyze, according to Cybernetics and Systems Theory, whether there are possibilities to control communication and how this possible control reflects on the idea of language used by humans and machines.

The ideas of communication and control in cybernetics: Adaptation to language sharing with intelligent systems

What does Wiener (1968, p. 84) mean when he combines the ideas of communication and control? This is a central question in his theory when addressing language, which he stated was man's greatest interest and characteristic achieve-

ment. The author builds a paradigmatic theory that classifies technology as a form of social construction and improvement. Based on this foundation, he studies language and highlights the importance of information to govern the entire society, which, according to him, could only be understood through the study of messages and the communication facilities available (Wiener, 1968, p. 16).

Wiener (1968) emphasizes the importance of language for maintaining social cohesion. This cohesion was constantly threatened by entropy, the tendency toward disintegration and loss of control. For the author, nature did not intentionally aim to frustrate human efforts toward order. This issue is not to be taken manichaeistically but rather in an Augustinian sense, understanding that entropy is merely the absence of order (Wiener, 1968, p. 189).

Thus, the demon to be fought is confusion, not malice. With the increase of entropy, closed systems such as living beings, society, or communication systems lose their distinctions and individuality. However, since entropy is only the absence of order, it suffices to order – and a fundamental element for this ordering is *language*.

Wiener (1968) explains that the amount of information in a system serves as a measure of its degree of organization, and the entropy of a system serves as a measure of its degree of disorganization. For the author, *messages* are the way to organize and configure information, and therefore a message represents the negative of entropy, as it organizes and distances disorder. Different forms of messages form language, a network of communications on three levels: the phonetic level, the semantic level, and the behavioral level. The third level is a kind of translation of an individual's experiences, conscious or unconscious, into externally observable actions. This was the *behavioral* level of language (Wiener, 1968, p. 79) and consisted of raw, direct, and observable actions that joined the coded and symbolic system of actions to form spoken or written language.

For Wiener (1968), there were enclaves that maintained a *tendency toward organization*, *communication* being one of them. According to the author, although the tendency toward entropy also tries to affect communication, there are stages in which entropy does not increase and organization and information are created and preserved. Wiener focuses on these stages, warning that progress was engaged in a battle against entropy, chaos, and the force of absurdity, and that it was necessary to fight and make progress happen, using technology as an ally to overcome entropy.

According to Wiener's theory (1968), any expressions of language – such as poems, books, words, jokes – could be considered messages aimed at organizing information. He observes that the more probable a message is, the less information it conveys and the lower the tendency toward entropy, making information transmission easier. If the message is more complex, there is a higher degree of entropy. The

greater the degree, the greater the difficulty; however, in such cases, it was possible to apply technology to language.

Technology was a powerful ally in combating entropy and assisted in the formation of *information*, a term designating the content of what we exchange with the external world by adjusting to it, which causes our adjustment to be perceived by the world, in a process of receiving and using information to adapt to environmental contingencies (Wiener, 1968, p. 18).

Thus, information itself represents a quest for order: a closed system (such as a human being) performs a communicative exchange with the external world, and information forms the basis of this communicative process that allows man to adapt to the world. Viewed from this perspective, language is a joint game between speaker and listener against the forces of confusion. The tendency toward entropy is observed in the communication process because there is a possible sequence of orders, each with its own probability, carrying its informational content. There are successive stages of transmitting the intended information, and the information received, when compared to the originally transmitted information, will not be the same, since with entropy, there is always dissipation of information.

What has dissipated cannot be recovered, Wiener (1968) laments, recalling the second law of thermodynamics: when entropy increases, there is no reversal. The problem in language is that *meaning is lost*, and therefore, the author seeks to stop or at least delay the tendency toward entropy, avoiding this loss of meaning.

For Wiener (1968, p. 73, our translation), *language* would be "[...] a word used to describe the codes through which communication is processed." Without useful and effective communication, the author argues, language holds no importance for society. This language is shared with machines, which also have their codes, insofar as language is considered a *symbolic behavior observable* and thus easily reproducible by machines.

Considering, therefore, only the symbolic aspect of language, Pfohl (2001, p. 105) states that Wiener envisioned the possibility of any experience being represented by a symbol for a mathematical situation. Thus, Pfohl (2001) believes that Cybernetics presents a model of "circular causality," meaning a constant energy exchange driven by information in all directions, but not in all directions at once, given the need to maintain form and distinction. Hence, there would be an organized feedback process facilitating the construction of secure boundaries, including language, which would unfold to serve the need for control and the fight against entropy.

Operating at the symbolic level of language, what is called the apophantic horizon, Cybernetics advocates the possibility of machines and humans sharing language and focuses efforts on using methods that work with this observable aspect to combat entropy.

On these bases, Wiener (1968) developed a *theory of messages* defining *communication and control* as belonging to the same class and maintaining an umbilically necessary relationship: when communication occurs, a message is transmitted, and this transmission is responded to with a connected message. Sending and receiving indicate whether the information contained in the message was understood. But for understanding to exist, control is necessary, and the examination of the receiver's messages will indicate whether comprehension of what was transmitted has occurred (Wiener, 1968, p. 16).

Any interruption outside the programmed sequence causes problems in the transmission of the message and information. Therefore, communication and control maintain an intricate and indispensable relationship, and it is from this premise that the objective of Cybernetics develops: *control of communication*.

This control is necessary to achieve the *transmission of information*, enabling human life to adjust efficiently to the environment. Technology enters the equation to enhance this situation, allowing greater control and increased ordering, with more and more information transmission.

The proposal to apply technology as an ally to control language drives the author's ideas into the present. Furthermore, Wiener is among the pioneers in research on Artificial Intelligence (AI), advocating the similarity between humans and machines through several points, including the reception of information by machines and humans: both capture information from the external world and adapt or not according to that information.

In the transmission of information, the data input aims to produce an output, potentially involving a large number of combinations in the stored records, forming memory. The input and output movements result in adaptation to the environment through information, and this adaptation can be controlled by registering the fulfillment or non-fulfillment of tasks.

However, it is evident that all this depended on the successful reception of correct information, since effective behavior requires information about the achievement of the objective. Therefore, the concept of feedback gains importance[1], which can manifest in simple forms, such as a light turning on or off when a button is pressed, to more complex forms, where feedback regulates a set of behaviors in a complex feedback loop resulting in *learning*. The phase following the reception of information consists of actions actually performed in the external world. Intended actions do not matter; only effective actions deal with entropy and guide the organism back to order.

[1] Ultimately, a machine that is subject to the external world and aims to act effectively requires that information about the results of its actions be provided to it, as this will allow it to adjust its behavior. Thus, the control of the machine will be based on its actual performance rather than its expected performance. This is what gives the concept of feedback – defined as "the ability to adjust future conduct based on past performance" (Wiener, 1968, p. 33) – such importance.

Wiener sought the "[...] informational effectiveness of ordered communicative feedback, aiming at the construction of a temporary closed system, a local enclave against chaos" (Pfohl, 2001, p. 117, our translation). For him, machines contain a *need for communication* since the various parts of the machine must "talk" to each other in an appropriate language, and this communication between parts depends on awareness of what has already been said. These ideas form the principle of *regulated feedback*, *highlighting* the notion of *interactive feedback*, where the controller's influence exists and communication depends on the results of an action.

Pfohl (2001) explains that Wiener moved away from rigid models that predicted a one-way response toward more flexible mechanisms in their communicative capacities. If the goal was communication, the enemies were "[...] entropy, chaotic disorganization, and noise" (Pfohl, 2001, p. 117, our translation). Indeed, Wiener replaces a superficial one-way command model with one in which sending and receiving information continuously alter the organism's behavior and its adaptation to the environment.

The better the adaptation to the environment, the better the learning and the greater the organism's capacity for autonomy. Through this lens, humans and machines are systems capable of learning and autonomy, regulating their own behavior based on received information, with the possibility of adjustment through feedback. A human or a machine can autonomously adjust their behavior and actions to achieve a certain goal, Wiener (1968) stated.

Wiener (1968) considered that both machines and living organisms stand out by "[...] resisting, locally and temporarily, the general tendency toward increased entropy. By virtue of their decision-making capacity, they can produce around themselves a zone of organization in a world whose general tendency is to deteriorate" (Wiener, 1968, p. 34, our translation). To resist degradation, humans and machines use feedback and autonomously regulate their behaviors, maintaining their operational integrity. Delving deeper into this issue, the author asks: what separates one person from another, what provides identity and autonomy to an individual? For him, it is not physical matter, since the biological individuality of an organism lies "[...] in a certain continuity of process, and in the organism's memorization of the effects of its past developments. This seems to also apply to its mental development" (Wiener, 1968, p. 100, our translation).

Thus, Wiener (1968) concludes that individuality is linked to the *continuity of a specific process* that an organism continues to develop, with this process opposing chaos, disintegration, and death. This process, which depends on adjustments, feedback, and the correct transmission of information, is present both in machines and in human beings. Based on this observation, Wiener develops the idea of individuality and human consciousness as models susceptible to artificial replication.

Since individuality is connected to this continuous process of resistance to entropy, what characterizes an individual *is a process of memorizing the effects of previous developments and the continuity of that process*. Therefore, individuality is connected to a process of avoiding disintegration, and for this reason, Wiener states that *we are patterns that perpetuate themselves* (Wiener, 1968, p. 98).

We are patterns that perpetuate ourselves because we are living proof of the success in receiving correct information and the continuity of the process resulting from this reception of information. For Wiener, "[…] the individuality of the organism is more like a flame than a stone, more a form than a lump of substance. This form can be transmitted, modified, or duplicated..." (Wiener, 1968, p. 101, our translation).

A pattern can be transmitted, just like a message, through feedback processes. Considering individuality as a properly executed process emphasizes a *formal issue* far more than any question regarding substance. A formal process can be transmitted, provided it is understood, explained, and translated suitably for transmission.

To understand which form would be suitable for transmission, attention must be paid to the fact that man is an island in a dying world, immersed in a process of resistance to degradation called *homeostasis*. Everything in the human body is regulated by mechanisms that seek to resist adverse changes, and these mechanisms, participants in homeostasis, are *negative feedback mechanisms* that depend on feedback. Such processes, patterns, and homeostasis could be artificially replicated by machines.

And for homeostasis to be achieved, the existence of information is essential; however, the important factor is not the amount of information sent but the *amount of information on which the machine or human can base effective action*, since correct information supports homeostasis.

Thus, the control of information transmission becomes fundamental. In other words, for Cybernetics, the idea of control of communication arises as a necessity to combat entropy and not as a whim for dominance. After all, for clear and effective communication to exist, control was imperative, and it was from this control that the organism's life or death, its continuity or degradation, resulted.

Communication and language for Luhmann: a convergent concentration of attention with the rejection of the idea of intersubjectivity

For Luhmann (1996), when an organism's vital capacity in an environment is secured, organisms begin to organize self-observation through the nervous system, observing the state of the organism itself and ensuring the repetition of successful patterns. Conceptually, the author establishes that consciousness is an operationally

closed autopoietic system that cannot intervene in its environment, since consciousness does not control the outside and cannot make the world act according to its perceptions.

At the same time, according to Luhmann (1996), consciousness cannot cease to be in this world and cannot avoid being irritated by noises and visions, nor can it prevent perceptions. There is a lack of control that characterizes the consciousness's dealings with the world, and from this absence of control arises the operability of thought and communication, through the search for a kind of accommodation between what is inside the consciousness system and its environment.

Thus, while for Wiener (1968) communication was a process of meaning transmission between sender and receiver, for Luhmann (1996) the situation is far more complex. He argues that there is no *transmission* from sender to receiver because no individual conscious knowledge can be isolated, existing by itself as if suspended from its conditions of origin and propagation. According to Luhmann, what Cybernetics considers the essence of communication – the transmission of information – is merely a secondary effect of communication.

Luhmann (1996) states that communication does not coordinate individual behavior, as coordination is not the function of communication; it is merely a condition that allows communication to occur within a real environment inhabited by individuals. For the author, communication should not be expected to improve the integration of individuals within the social complex, and this is not the framework through which communication should be understood, since no consciousness can attach its own operations to another consciousness – no consciousness can be an extension of another (Luhmann, 1996, p. 22).

Here lies a noteworthy difference between the theories: for Wiener (1968), there was a transmission of information between sender and receiver, with the message serving as a measure of organization to counteract entropy and disorganization. Once meaning was transmitted – and thus Wiener speaks of semantically significant information – communication was deemed successful. This thesis finds no resonance in Luhmann's thought, as he denies the possibility of transmitting meaning between one consciousness and another; rather, what exists is only a *convergent concentration of attention* (Luhmann, 1996, p. 18).

Moreover, while Wiener (1968) fought against entropy in the transmission between receiver and sender, Luhmann does not locate the problem of communication in message transmission. Instead, he situates it in what he calls the "autopoietic closure of vital and psychic systems" (Luhmann, 1996, p. 22, our translation). For him, this closure gives communication both its meaning and its independence as an autonomous operational system, since each system works with its interpretations and meanings – the same applying to communication itself.

Luhmann does not subscribe to the idea of meaning as something jointly constructed between sender and receiver. This is highly significant because, as Bachur explains, for Luhmann, "[...] communication is an operation performed without a subject" (Bachur, 2009, p. 41, our translation).

Communication has no subject because *it is systems – not individuals* – that communicate. Therefore, there is no need for a concept of consciousness as subjectivity that would later support the construction of intersubjectivity or shared meaning. Bachur (2009) clarifies that "[...] communication does not mean understanding, consensus, mutual exchange of a common meaning transmitted as a thing; rather, it refers to an open dynamic of meanings and performances activated by countless material signifiers" (Bachur, 2009, p. 34, our translation). Thus, Bachur's interpretation – adhered to here – explains that for Luhmann, communication entirely dispenses with the notion of the subject as an autonomous, individual consciousness, since both the social system and individual consciousness constitute autopoietic systems that operate according to their own logic and are self-referential.

Accordingly, the thesis of complete separation between systems of consciousness and systems of communication rests on the assumption of their *simultaneous temporalization* and on the fact that the recursive networks of each system are different and non-intersecting, as each system has its memory and organizes its anticipations according to its operations, as Bachur (2009) explains.

In this framework, consciousness is a self-referential system, and Luhmann (1996) explains that it processes situations through a specific sequence while simultaneously carrying out numerous somatic processes that constitute it, although these processes themselves are not consciousness. According to Luhmann, consciousness operates based on its singular operations and interprets the processes of the world.

Luhmann (1996) argues that we cannot perceive as others perceive, just as we cannot perceive distance between humans and things, or between subjects and objects. In most cases, this distinction is presupposed – there is no need to know what another human being feels or perceives for communication to occur. Communication operates independently of the notion of consciousness tied to perception. In fact, given that communication and consciousness are two distinct and self-referential systems, it is not the human being, but *only communication itself, that can communicate* (Luhmann, 1996, p. 28).

The distinction between "I" and "other" and between "subject" and "object" is only introduced to make it possible to locate points of contact for communication – or more precisely, for communication to locate the points of contact necessary for its own occurrence. Luhmann says that we do not speak with the object about the subject, nor with the subject about the object. What we need to know about another subject or about the object depends on communication and its respective themes and conditions (Luhmann, 1996, p. 18).

Bachur (2009) states that one of the most interesting aspects of Systems Theory is the *materiality of communication*, a notion deeply connected to what Luhmann explains about language. In this regard, it is necessary to clarify what this materiality of communication consists of.

> [...] the shift from the analysis of meaning to the social practice that constitutes it, distancing it from traditional hermeneutic forms embedded in the philosophy of the subject, which assumed meaning as something given in consciousness – as intentionality, to use phenomenological terms – thus situating it within the social conditions that allow it to be constituted (Bachur, 2009, p. 19, our translation).

Bachur argues that "[...] the materiality of communication seeks to replace the apprehension of meaning by the subject who interprets the world (drawing solely on their consciousness) with the analysis of the social conditioning factors in the formation of meaning and of the material carriers of meaning" (Bachur, 2009, p. 20, our translation). Accordingly, the materiality of communication would be manifested through the material elements that contribute to the emergence of meaning – true material substrates that enable and condition the emergence of meaning without being confused with the meaning itself. Examples would include the body, the text, and communicative technologies.

It becomes clear that the materiality of communication reveals a dimension of exteriority of language, showing that communication does not depend on consciousness and making it possible to understand the social sphere as a self-referential objectivity, independent of the self-reference of consciousness. Hence, meaning arises from material means, and access to meaning does not occur through the activity of the hermeneutic subject – as a mental or spiritual activity – but rather as a practical-poietic social activity (Bachur, 2009, p. 26).

Thus, *meaning depends on communication* but not on intersubjectivity or consciousness, as Luhmann (1996) emphasizes that the alter ego is constructed through communicative participation and that *communication is the condition for intersubjectivity – not the other way around. In other words, intersubjectivity is not a prerequisite for communication* (Luhmann, 1996, p. 19).

According to Luhmann (1996), the repeated use of language in society generates meanings that cannot be rejected, and the establishment of such meanings has social implications that are visible in the communicative processes of each system. Since there is no metalanguage that leads to the "truth," each system operates with its own meanings. Being self-referential, they will assign different meanings to the same element across different systems – contracts, for example, carry different meanings in the economic system and the legal system (Luhmann, 2004, p. 15). It is important to recall that, for the author, it is systems that communicate – not

individuals. Therefore, communication both between and within these systems, according to Luhmann (1996), establishes meanings.

Indeed, as confirmed by Weyermüller and Rocha (2019), communication is what differentiates humanity; it is essential to society and to language, given that language emerges from small human groups that must interact continuously within a dangerous environment (Weyermüller; Rocha, 2019, p. 237). Thus, for Luhmann (1996), it is impossible to reduce the contents of knowledge to the resources of individual consciousness; knowledge is linked to communication between societal systems.

It is useful to briefly revisit earlier theories of knowledge to understand what Luhmann means when discussing it. Many of these earlier theories conceptualized knowledge as a copy – an idea familiar to those who know Plato's theory of Forms (1997), which asserts that what we perceive is a mere shadow of true essence. This is clearly illustrated in Plato's concept of *mimesis*.

In a brief digression on this topic, in Book IX of *The Republic* (1997), Plato presents Socrates and his interlocutors discussing the nature of justice and developing the concept of a just city, constructed through logos, drawing an analogy between the city and the soul. The just city corresponds to a just soul, and in seeking correctness, Plato narrates the dialogue between Socrates and Glaucon. Socrates asks: "Can you tell me, in general, what mimesis is? I don't quite grasp what it aims to achieve" (Plato, 1997, p. 425). The dialogue serves to show that without the idea, no craftsman can execute it. But what would we call a craftsman skilled enough to reproduce the heavens, the stars, the cosmos? Holding up a mirror would suffice, says Socrates – it is as if the world were being created. "But these are only appearances," protests Glaucon, to which Socrates replies that the painter is one such craftsman.

Touching on a fundamental question in philosophy – the being-versus-appearance debate – Socrates explains that there are three beds: one natural form, created by God (the idea of a bed); another created by the carpenter – the "bed-maker" – which is merely executed by him and is thus the "sensible bed"; and finally, the painted bed created by the painter, who paints the appearance of the carpenter's bed. The painter, then, would be "[…] the imitator of what the other two are artisans of" (Plato, 1997, p. 429, our translation).

This idea conveys the understanding that what is sensible and phenomenal is volatile and corruptible. The painter paints the sensible object "bed," that is, the appearance of the bed. There is no artisan of the idea – the artisan is God. While it is possible to accept that the carpenter's bed maintains a deep resemblance to the divine idea of a bed, the same cannot be said of the bed painted by the painter, which is merely an imitation of an imitation. The painter imitates appearances; thus, there is an *ontological degradation*, in terms of *degrees of being*. Greek philosophy speaks of three levels: reality is the idea, the bed would be the sensible representation, and

the painter reproduces images that are distanced from reality. Mimesis, therefore, is a false *techne* – not true art – because art carries an ontological deficiency. Socrates laments that "[…] imitation is far removed from the truth, and if it models all objects, it is only because it respects a small part of each one, which, in turn, is nothing more than a shadow" (Plato, 1997, p. 430, our translation).

This brief recollection of ancient Greek philosophy allows us to understand Luhmann's idea when he states that the ancient conception of knowledge as a degraded copy of a pure essence still *plays an important role*, since the effort to maintain c*ommunicational integrity* requires a relationship of similarity to distance arbitrariness. Thus, it is evident that this is not a solipsistic choice of meaning, but rather a search for similarity with the pure essence – a search that occurs through communication.

However, one should not assume that in this discussion about knowledge, Luhmann (1996) yields to Cartesianism. In fact, he criticizes "[…] a certain idealization of the observer in the form of a complex of measurements and calculations" (Luhmann, 1996, p. 16, our translation). He rejects any reference to the role of the neutral observer, to the pursuit of an "objective" and unblemished point of view, or to the conception of the world as *res extensa*, calculable and determinable as a thing in itself.

Indeed, Luhmann (1996) asks: why must what is taken as knowledge always refer back to man? His question could be paraphrased as: *Why is meaning presumed to result from arbitrary choices made by individual consciousness?* The author believes that modern society has reached a series of relativizations of world and knowledge concepts, which might suggest a tendency toward subjectivization. After all, if knowledge comes from man and man is the subject who communicates, then these relative conceptions might be treated as subject to individual choice. But can each person truly decide arbitrarily on their worldview?

Not for Luhmann (1996), for whom individual human participation as a subject occurs within social communication relations. This implies that worldviews are always socialized, and therefore, relativism cannot be equated with arbitrariness (Luhmann, 1996, p. 16). For the author, knowledge is an assimilation of the environment, and thus it does not matter who constructed it. Once the element of arbitrariness is removed, only the common element expressed in similarity matters. For this reason, there is still a role for the theory of knowledge as copy, as it links the issue of knowledge to a type of real content. Conversely, the rejection of this theory forces one to "observe the observer," and to ask not "what," but "how" (Luhmann, 1996, p. 44, our translation).

Therefore, Luhmann (1996) challenges the notion that knowledge is always the knowledge of a subject and rejects the idea that man is the subject of his knowledge or that a subject is always an individual consciousness. He dismisses any

notion of solipsistic and arbitrary meaning selection, relying instead on the idea of communication between systems, not between solitary individuals disconnected from historical-social conceptions. Nonetheless, acknowledging that the idea of meaning being chosen by the subject is a strong one with dominant status in many lines of thought, the author asserts that emphasis should always be placed on communication as an operation that occurs factually and is therefore empirically observable (Luhmann, 1996, p. 15).

Ensuring the integrity of information transmission through the control of communication via language: Is this an idea embraced by the theories of Wiener and Luhmann?

To finally answer this question – the central focus of this work – it is worth returning to Luhmann's (1996) idea of placing emphasis on communication as an empirically observable substrate and asking whether this resembles Wiener's (1968) emphasis on the observable symbolic aspect of language.

It is believed that it does not, because in Luhmann we find much more importance placed on observing the social effects of language than on its symbolic-logical aspect per se. For the author (1996), *meaning depends on communication*, but not on intersubjectivity or consciousness, or even multiple consciousnesses. Luhmann emphasizes that the alter ego is constructed through communicative participation, and that *communication is the condition for intersubjectivity – not the other way around; that is, intersubjectivity is not a prerequisite for communication*.

Indeed, with the notion of meaning selection by the subject's consciousness rejected, and knowing that according to systems theory society becomes *structurally coupled* to the consciousness processes of individuals, it is clear that the objective is not to control symbols or transmit information, but rather to understand the structural coupling between communication and consciousness. Each of these systems, being self-referential, will organize itself based on its own operations.

These ideas directly impact the concept of communication and control developed in this work. If the notion of control was so central to Cybernetics in terms of combating entropy and ensuring the transmission of information, how then is communication control addressed in systems theory? What about the issue of entropy, which certainly surrounds language? How can it be ensured, in some way, that information is transmitted between systems?

These questions can be addressed by analyzing Luhmann's (1996) answer to a single question: why are various consciousness systems, each with their dynamics, able to participate in, persist within, and present themselves with reliable duration in society? (Luhmann, 1996, p. 39).

The answer, for Luhmann (1996), is *language*.

In a most intriguing way, the author argues that language is not an attribute of consciousness or of the subject, but rather *the medium that enables the structural coupling between communication and consciousness*.

Luhmann (1996, p. 40) attributes to language the role of a medium of consciousness independence and a linking tool. He explains that only through the structural coupling provided by language is it possible to ensure the necessary combination of dependencies and independencies between self-referential systems. Language functions as a linkage mechanism, ensuring the connection between distinct systems: consciousness and society.

However, at the same time, Luhmann (1996) explains that regarding the concept of structural coupling, there are operations of restriction and specification, and language, by establishing a dependency on participation in communication systems, simultaneously enables the *independence* of consciousness from certain social constraints, since *language allows a certain freedom of thought for the individual in relation to the social system*. According to the author, language is not a system, but a "non-system" that enables the constitution of systems in the spheres of consciousness and communication by making structural coupling between these different types of systems possible (Luhmann, 1996, p. 43). The reality of language lies in the fact that its use can be observed, and this use is communication.

Language is a "non-system" because there are no specific linguistic operations that can define its boundaries as a system. Delimitation occurs only in each individual case and in different ways due to communication systems and the consciousness system. Language merely performs the coupling between systems and has its use observable in communication.

Final considerations

Based on this understanding, it becomes clear that the idea of communication control in systems theory does not align with what was proposed by Cybernetics.

The concepts and discussions concerning the understandings of Cybernetics and Systems Theory regarding language, communication, and control have shown that the dimensions of language emphasized by Wiener and Luhmann lead to communication and the use of language, highlighting far more the social aspect of language than any individual construct detached from the practical use of language in the world.

Starting from the emphasis on the centrality of communication, present in both theories, this work has also presented important dissonances, especially in the understanding of language. For Wiener, language consists of an observable symbolic

behavior, which makes it easily reproducible by machines, while Luhmann asserts that the reality of language is that its use can be observed, but he does not adopt a semiotic theory of language. Instead, he emphasizes that the use of language occurs within communication.

These ideas about language in the two theories bring to light a key question: Do machines and humans share language? Yes, would say Wiener and Cybernetics; no, would say Luhmann. In fact, by understanding language as a non-system and emphasizing its role in enabling the coupling between system and consciousness, Luhmann would argue that machines – even advanced language models – may *indeed use* language, but they are not permeated by the social relations that shape human usage. Humans are embedded in complex social systems that make them use language broadly, not based on technical rules and prior programming, as machines do.

It is also accurate to say that both theories attribute a significant role to language. Cybernetics and its pursuit of autonomous machines depend on a language evaluated at its symbolic level, based on observable and reproducible behavior – core aspects that support the collaborative effort in technological development. Luhmann assigns a central role to language in his theory, in which language is a "non-system," functioning to structurally couple two differentiated and self-referential systems: consciousness and the social system.

Furthermore, the subtlety in Luhmann's concept of communication challenges the notion of communication as a message transmission from sender to receiver, an idea defended by Wiener.

Luhmann rejects intersubjectivity and attributes a dual role to language, noting that consciousness expresses itself linguistically and that language should be understood from its most fundamental concept: communication. According to the author, there are no solitary individuals "suspended in the air" communicating, but rather people who are part of societies and share historical-cultural concepts embedded in language.

For Luhmann, communication is a subjectless process, and language is not an attribute of consciousness, but of communication. Language can be observed at its operational level, but it is not the same as consciousness, nor exactly the same as communication, since the operations of consciousness differ from those of communication, forming two distinct and self-referential systems.

Thus, systems of consciousness and systems of communication exist separately, and it is language that fulfills the role of coupling them. Consciousness operates linguistically, but not solipsistically or in isolation. Language requires communication; it is produced by human beings in a world (Oitaven, 2016, 344).

In this sense, the discussion on knowledge carried out by Luhmann, especially his critique of the notion of knowledge as "the knowledge of a subject,"

directly leads to the importance of communication and the idea of language in use. Language, as a "non-system," is tasked with enabling structural coupling between systems. Language plays a dual role: organizing internal consciousness processes and regulating its relation to the environment, thereby eliminating the arbitrariness of meaning selection by an individual subject.

In conclusion, it is possible to state that, despite points of convergence between Cybernetics and Systems Theory, there is no conceptual similarity between these theories when it comes to language, communication, and control – despite their sharing of some core hypotheses essential to the development of these topics.

REFERENCES

BACHUR, J. P. **Distanciamento e crítica: limites e possibilidades da teoria de sistemas de Niklas Luhmann.** Tese apresentada para Faculdade de Filosofia, Letras e Ciências Humanas da Universidade de São Paulo, com orientação do Professor Fernando Haddad. 2009, São Paulo. Available at: https://www.teses.usp.br/teses/disponiveis/8/8131/tde-13102009-172653/pt-br.php. Accessed on: June 27, 2024.

CARNEIRO, W. A. **Os direitos fundamentais da constituição e os fundamentos da constituição de direitos: reformulaçoes paradigmáticas na sociedade complexa e global.** *Revista Direito Mackenzie*, 129-165, 2018.

GEHMAN, S., GURURANGAN, S., CHOI, M. S., & SMITH, N. A. (2020). **Real Toxicity Prompts: Evaluating Neural Toxic Degeneration in Language Models.** *Allen Institute for Artificial Intelligence*. Fonte: arXiv:2009.11462v2 [cs.CL] 25 Sep 2020

LUHMANN, N. **La ciencia de la sociedad.** México: Universidade Iberoamericana, 1996.

LUHMANN, N. **Law as a social system**. Oxford: Oxford Press, 2004.

MAURER, K. **Communication and Language in Niklas Luhmann's Systems-Theory.** *Pandaemonium Germanicum, 16*, 1-21. 2009, Available at: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1982-88372010000200002. Accessed on: October 28, 2024.

OITAVEN, D. **A hermenêutica da esgrima e dos direitos humanos**. Salvador: Jus podium, 2016.

PAETAU, M. **Niklas Luhmann and Cybernetics**. *Journal of Sociocybernetics, 11*, 75-103, 2013. Available at: https://webcache.googleusercontent.com/search?q=cache:-mkpwVZioccJ:https://papiro.unizar.es/ojs/index.php/rc51-jos/article/view/790/721+&cd=6&hl=en&ct=clnk&gl=br. Accessed on: June 27, 2024.

PFOHL, S. **O delírio cibernético de Norbert Wiener.** *Famecos*, 105-121, 2001.

PLATÃO. **A República.** São Paulo: Nova Cultural, 1997.

SCHURIG, A. S. **Se a metafísica nao existe, tudo é permitido? Um diálogo entre a verdade, o direito e a pós modernidade**. Rio de Janeiro: Lumen Juris, 2020.

UMPLEBY, S. **A History Of The Cybernetics Movement In The United States.** *ournal of the Washington Academy of Sciences, 91*(2), 54-66, 2005.

VALENTINOV, V. **Wiener and Luhmann on feedback: from complexity to sustainability.** *Kybernets, 46*, 386-399. Doi: 10.1108/K-11-2016-0317, 2017.

WEYERMÜLLER, L. S. **Comunicação Ecologica Por Niklas Luhmann**. *UNIVALI*, 232-262. doi:Doi: 10.14210/nej.v19n1.p232-262, 2019

WIENER, N.. **Cibernética e Sociedade. O uso humano de seres humanos.** (J. P. Paes, Trad.) São Paulo, SP, Brasil: Cultrix, 1968.

WIENER, N. **Cybernetics or control and communication in the animal and the machine.** Cambridge: The M.I.T Press.1985.