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Communicative habitus and social distancing. Effects on the modes of sign production during the COVID-19 pandemic

Hábito comunicacional y distanciamiento social. Efectos en los modos de producción de signos durante la pandemia de COVID-19

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In the year 2020, in the context of the SARS-CoV-2 pandemic, Mexico's government implemented health policies of "social distancing". In this essay, we make a theoretical reflection on this policies' effects on signs' production. The paper begins with our definition of communicational habitus and the semiotic relationship with social distancing to analyze systems' evolutionary control from a systemic-semiotic approach.
KEYWORDS: Communicational habitus, systemic, COVID-19, sign production, semiotics.

En el año 2020 dentro del contexto de la pandemia del virus SARS-CoV-2, en México se implementaron las políticas sanitarias de "distanciamiento social". En este ensayo hacemos una reflexión teórica sobre los efectos en el modo de producción de signos que esta medida generó. El trabajo inicia con nuestra definición de hábito comunicacional y la relación teórica que guarda con el distanciamiento social para analizar desde ahí el control evolutivo de los sistemas desde un enfoque sistémico-semiótico.
PALABRAS CLAVE: Hábito comunicacional, sistémica, COVID-19, producción de signos, semiótica.

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Introduction

In 2020, following the SARS-CoV-2 pandemic, "social distancing" policies were established around the world (Jawaid, 2020; Kraemer et al., 2020; Zhang et al., 2020). The ground and data collection experience allowed sciences to observe that social coexistence in communities such as family, political, or sports gatherings generate a prolonged spread of the disease (Jawaid, 2020; Zhang et al., 2020). The most recent studies showed that social interaction and mobility forms are the main factors for the proliferation of highly contagious diseases (Kraemer et al., 2020; Zhang et al., 2020). With the above position, it is possible to assume that the technification of the environment and the interdependence of local and global territories harbor the "best" conditions for a large spread of this type of disease. Faced with this, the United Nations (2020) responded with a policy of socialization at a distance to give continuity to all countries' social, economic, political, and communicational activities. This measure, of course, had a strong influence not only on mitigating the spread of the virus but also on many other dynamics of social life.

Therefore, this paper offers a reflection on social distancing outcomes on sign production systems. And we outline the academic discussion towards the following question: Is there any isomorphism between the patterns of propagation of the disease and semiosis? Throughout this text, we understand the concept of *isomorphism* as a map that possesses one-to-one correspondences between elements of the systems put in relation. Still, they keep their operational features (Valle, 2017). As can be seen, in this reflection we will focus on activities related to the communicational habitus, therefore the essay is composed of five sections. In the first one, we develop a definition of communicational habitus and the theoretical relationship with social distancing. Subsequently, we will expose the epistemological framework of systems used as a conceptual basis to address the issue raised. Then we develop the theoretical debate on the evolutionary control of multiple systems from the systemic semiotic approach. Finally, we close with a reflection on the new communicational habitus

and their systemic integration.

The habit of communication and social distancing

We understand by communicational habit those[3] repeated inferences that lead to the interaction between systems employing a pre-organized code.[4] According to the *International Encyclopedia of Systems and Cybernetics*, "... repeated inferences are leading to the establishment of a habit" (François, 2004, p. 270), while communication understood in systemic terms is "the interaction between systems or parts of systems using a pre-organized code" (Valle et al., 2015). A system organized under a code, which also changes over time, is a dynamic and open complex system. Therefore, the challenge of the social sciences is to find what are the rules inherent to cultural codes, e.g., what is the coding of "System One", shown below?:

> System One, not coded: {e; c; u; d; o; u; n; p; t; a; o; o; e; r; t; e; d; n; i; c; n; u; s; c; n; e; i; s; e; s; p; c; o; i; n; t; m; a; a; r; n}
> System One, encoded: {cuando un patron de comunicacion es persistente}.

It is possible to characterize System One without a code, as letters without order, but also as a writing code of the Spanish language of the year 2021. Hence, the code is subject to social interaction and the use of the systems over time. If we interpreted the same System One character with another encoding, we get the following: 19th century English, {deprecated nun, ratoon inconstancies, pumiceous}; or 20th century French, {nu compound, decapoterent, ci saucissonneraient}.

The social context motivates the interpretation of the communicational habitus and encourages its transformations. Even so, semiotic theory presupposes that changes on sign production systems

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3 "... the conscious and controlled adoption of a belief as a consequence of other knowledge... (Peirce, 2012, p. 72).

4 "A rule that associates some elements of system (a) with elements of system (b) or system (c)... Only this complex type of rule can properly be called a code" (Eco, 2000, p. 65).

do not depend on the context in which they unfold. For example, the writing support of any textbook becomes digital, and it is a novelty, but it is new until they eventually befit habitus. But the signs production a few times is a novelty. Usually, any speaker of a language can decode its language with great ease, as its competence as a speaker allows them to do so. Since the code is a cultural rule, this kind of rule is not limited to time or space, rather than by long-term and deep cultural relations. Eco (2000) established two postulates about communication and signification systems: I) A system of meaning "is an autonomous semiotic construction that possesses abstract modes of existence, independent of any possible act of communication that actualizes them" (p. 25); and II) it is possible "a semiotics of meaning that is independent of a semiotics of communication, but it is impossible to establish a semiotics of communication independent of a semiotics of signification" (p. 25).

According to Eco (2000), systems of meaning are independent of the communication system's characteristics. Thus, the qualities of interaction, propagation, or transfer theoretically should not affect the system's code. However, there are writing models –for example, the glyphic script of central Mexico in the sixteenth century– that have specific grammatical and semantic properties that derive from the positional-spatial organization of its writing units, that is, from how the signs interact in the communication system (Valle, 2009). But it is not the only writing of its kind. Modern scripts –for example, emoticons or computer icons– can be read independently of the reader's natural language (Valle, 2009). A writing system with grammar encoded in the visual interaction determines the mode of production of signs. This characteristic concerns the semiotic emphasis that the signification system's analysis must understand the communication systems codes. Signification will always require a medium or support to reach the final reader.

Nobody can fully understand a communication system without understanding the signification that it encodes. It is a fundamental principle of script decoding models and encryption models (Valle, 2015). Even in an adverse condition, the signification process will find a route to keep the communication processes current (Valle, 2021).

Very close to these forecasts, we observed the following during the months of isolation: a) people have not stopped communicating, b) people have assimilated new tools and means for the interpretation of social spaces and cultural interaction, and c) the "new normal" has caused a change in the forms and formats of communication systems in different areas of society.

A change of significant impact in Mexico was in public education. From our perspective, its analysis and exposition require a dedicated document in its entirety, so we will only mention some relevant data as an example. In 2020, a multiprogramming model was implemented, which consisted of converting open television channels and digital web channels (such as the Congress Channel) to broadcasting the audiovisual content of school sessions (Secretaría de Gobernación [SEGOB], 2020a, 2020b). Another example from the school environment is the demand for admission to high school online education. The program has a limit of 130 000 spots. Each new entrance has a limit of up to 21 000 students per semester; the maximum number of admission applications per year is 60 000 applicants. However, in 2020, there was an over-demand. The program received 60 000 applications in each of its school calls and generated four of them in the year instead of two. In total, close to half a million applications were submitted. Its first school call in 2021 had 121 000 applications (Presidencia de la República, 2020; Secretaría de Educación Pública [SEP], 2021). These numbers show a change in the expectation of young people towards this type of communicational habit. Undoubtedly, those who participate in the new practices will experience a transformation in acquiring meaning and knowledge.

Therefore, the topic of discussion that interests us is whether the systems of signification were transformed. If it occurred, it is essential to know if it was structural or only encompasses the signs' self-organization. From the theoretical debate, it is our interest to understand the changes in the sign production system, since there was an exchange in the interaction roles between the public or the *Nuclear Content* of the sign (Eco, 1997) with the private or the *Cognitive Type* of the sign (Eco, 1997).

Authors such as Buonano (1999), Imbert (2003), and Lacalle (2001) identified this phenomenon since the end of the last century. They called it the *post-broadcasting era*, *the content crisis*, or *subjectivity incorporation* as the main element in content creation (Valle, 2017). The so-called content crisis referred to the economic difficulties of large television stations and media consortiums to face the success of YouTubers, influencers, and one-day stars of the Internet. Everything indicates that the social distancing measures of the 2020 pandemic accelerated the incorporation of these new digital communication patterns. Still, the digital gap in less developed nations is not a resolved issue. Under the pressure of the new normal, Mexico motivated citizens to incorporate new forms of socialization at a distance, but it did not manage to reach the entire population.

The new communication habitus in Mexico consist of: a) the transfer of more than 60% of face-to-face social interactions to distance interaction models such as education, governmental procedures, fiscal activities, commerce, telework, family and religious relations, among others (SEGOB, 2020a, 2020b); and b) face-to-face consumption habitus were transformed into remote interactions and accelerated the incorporation of the poorest economies into the global digital economy dynamics.

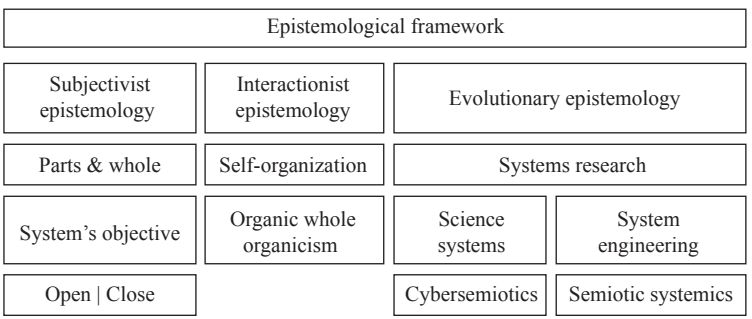
The non-obvious aspect of the new communicational habitus is its consequences on the systems of meaning. As we mentioned at the beginning of this section, the central postulate of Eco's *Treatise on General Semiotics* (2020) is that "a system of signification is an autonomous semiotic construction that possesses abstract modalities of existence, independent of any possible act of communication that actualizes them" (p. 25). However, since a couple of years ago, there is a considerable question derived from previous research (Valle, 2009, 2015). Will it be possible to explain in theoretical terms how communicational habitus actualize signification systems? Before entering into this reflection, we invite the reader to take the following consideration: our approach is systemic, close to cyber-semiotics. Therefore, the following section defines the epistemological framework of this work and our theoretical observation.

An epistemological framework: the systemic-semiotic perspective

Systems research is composed of systems science and systems engineering. Both make up the universe of systems thinking (Valle, 2019). Systems research agenda reaches the fields of *subjectivist*, *interactionist*, and *evolutionist* epistemology, as we call our epistemological framework (Valle, 2021), schematized in Figure 1.

Subjectivist epistemology provides the conceptual axioms to discover and organize a system's coherence in its parts. This objective maintains the coherence between the elements, whether open or closed to matter-energy and information. This epistemology arises in the activity of the observers and the observed (Vallée, 1987). On the other hand, interactionism epistemology involves an action or influence between elements and systems. It can occur causally or conditionally and consequently generates changes in the system's existence and permanence (François, 2004).

Figure 1
A General Outline of the Epistemological Framework of Systems



Source: The authors.

Interactionist epistemology explains self-organized systems with links and complementarity processes between previously

separated parts (Ashby, 1961). The transition from non-organization to the organization of a system is exemplified above in System One. The initial conditions of a system and its autogenesis process correspond to the causes and the conformation of links and interactions between the new connecting elements that constitute the code. However, the process by which these conditions originate is so variable from one system to another that their general properties remain relatively unknown (Ashby, 1961). For many years, systems researchers documented emergent properties within specific systems that arise in extraordinary situations and moments. It is the case for all living systems and some non-living systems.

Interestingly, in this autogenesis process in non-living systems, properties appear that can be considered organic at particular organization scales. Bahm (1984) proposed a concept that is not limited to biology and focuses on the universal property of organic unity; the idea of *organicism* means an organic whole. It incorporates specific ideas from *emergentism*. Contemplates modeling from *holons* and postulates that integrative tendencies occur in any open system. They "propitiate the emergence and maintenance of totalities" in more complex scales (Bahm, 1984, p. 9). This author argues that sometimes the tendencies to unite parts on a scale of greater complexity make individuals' collective stronger. Sometimes, the trends of a whole to join its features are more robust. When these two types of tendencies cooperate, the integration has simplified. On the other hand, when they compete with each other, integration delays. Organic integrity is a systemic concept. It defines behavior as a type of system. It has a certain isomorphism with anthropology's structuralism and attributes organicism to the identity handled. Moreover, it is variable in each existing system. However, it is universal in terms of organic integrity and is a structural invariant of scale (Bahm, 1984).

The "Third World" of Popper's theoretical model proposed that the study of scientific problems is the most relevant: problem situations, scientific conjectures, scientific hypotheses or theories, critical arguments, scientific discussions, and evidence in disputes. The Third World corresponds to objective knowledge (Popper, 1968). Meanwhile, "Second World" corresponds to the subjectivist, as shown in Table 1.

TABLE 1
SYSTEMIC SEMIOTIC INTEGRATION MATRIX

Epistemology	Concepts	System qualities	Semiotic objects
Subjectivist	Observer Observation The Observed	Coherence Connectivity Parts and whole	Crisis of contents Post-broadcasting
Interactionist	Actionist Self-organization Organicism Scale-invariant	Exchange Influence Action between parties	Changes in the system of signification due to the influence of the communication system
Evolutionary	Problem situation Conjecture Argumentation	Existence Permanence Transformation	The tendency of organicism towards a dynamic system with non-centralized code control

Source: The authors.

The systemic framework allows us to limit our semiotic objects described in the first section according to the system's qualities and the epistemology from which the observations arise. The following sections will review these semiotic objects' properties by their qualities and the epistemology of origin, as shown in Table 1.

THE PERSPECTIVE OF THE SYSTEMIC SEMIOTIC APPROACH

There is a condition of signification that Eco (2000) called "naive iconism", in which signs are treated as similar, analogous, naturally linked to their object, or motivated by their object (p. 287). Virtual experience, and digital communication in particular, suggests an

analogous reality, similar to and inspired by a parallel, prior and ideal presential reality.

By choosing a theoretical treatment of the object under the perspective of naive iconism, we take the risk of converting the meaning into a mere perception and replication of the objective world. The semiotic point of view leads to erroneous interpretations because we are not identifying the code or the mode of production of the signs. Still, it is associated with what seems evident to the observer and not with the original semiosis subject.

Naive iconism can lead us to think that the digital object is "a mirror of reality", however, semiotic theory indicates that signs are coextensive to a cultural link at all times and in any case. Co-extension to a cultural link implies that any communicational habit, whether newly acquired or long-standing, is not a mirror of reality but rather corresponds to new semiotic systems with their mode of meaning production.

Scholars analyze the meetings through digital media, such as YouTube, Zoom, Google Meet, StreamYard and Cisco Webex, as a mirror of a face-to-face space. Digital habitus, in many ways, are highly iconic, nevertheless it does not exist solely motivated by a face-to-face object. Indeed, even their interpretation through the screen of a cell phone, tablet, or computer semiotic system has its respective production processes of *Cognitive Types* and *Nuclear Contents* (Eco, 1997).

Therefore, our interest has been to observe how the sign modes interact across the correlation between functives.[5] According to Eco's biplanar model (2000), the meaning-productions deal with the sign's public characters interaction. Likeminded to the signs production process, the whole experience transmits culturally and depends on the personal experience or the subjects' disposition to construct Nuclear Contents[6] (Eco, 2000). The dictionary will be one of the properties of semiotic interest because its production process

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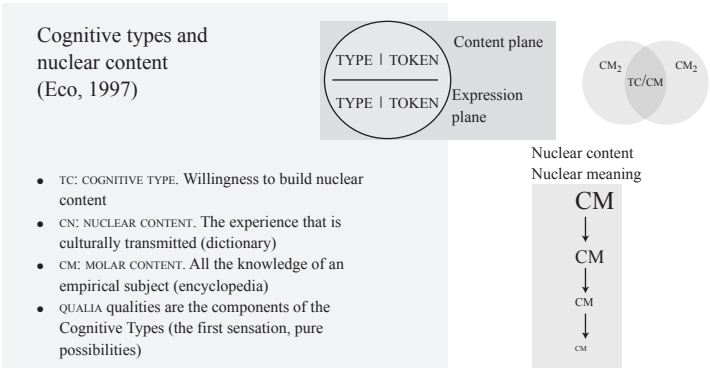
5 The functives are the minimal elements of the plane of content and the plane of expression, which can be either *Types* or *Tokens* (substance, forms or specimens). When joined together, a semiotic function or sign emerges (Eco, 1997).

6 It is the sign's Cognitive Type (Eco, 1997).

depends on individuals' cultural experiences. Simultaneously, encyclopedia knowledge corresponds to all the inside understanding of an empirical subject, as shown in Figure 2 (Eco, 1997).

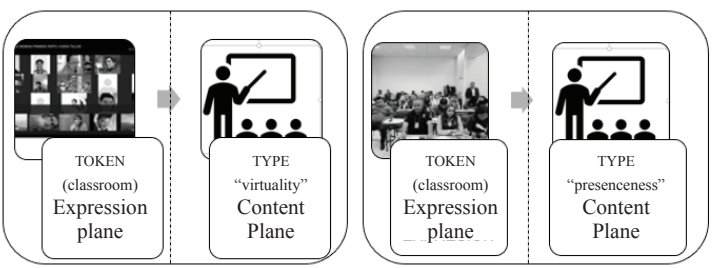
FIGURE 2
COGNITIVE TYPES AND NUCLEAR CONTENTS



Source: The authors based on Eco (1997).

FIGURE 3
BIPLANAR MODEL FOR "CLASSROOM" TOKENS AND TYPES "VIRTUALITY" AND "FACE-TO-FACE"

TC: COGNITIVE TYPE. Disposition to build Nuclear Content.
CN: NUCLEAR CONTENT. The experience that is culturally transmitted.



Source: The authors.

Cognitive Types are private and correspond to the "schemas that allow subjects to mediate between the concept and the manifold of intuition" (Eco, 1997, p. 152), i.e., on a video call, the listener has the disposition to interpret screen images (in boxes with or without the interlocutor's picture) and refer to the experience of the space of a "classroom", as shown in Figure 3. In this context, the Nuclear Content "virtual classroom" or "face-to-face classroom" is understood as a collective experience. It will have different characteristics in the face-to-face form and the digital form. Then, the face-to-face and digital experience will have distinctive tokens and types, as shown in Figure 3.

The Nuclear Content refers to "... the term *content* in the Hjelmslevian sense, as a correlate of an expression" (Eco, 1997, pp. 160-161). The interrelation of tokens and types can only occur through experience, mainly through interaction and the sign's evolution.

Peirce's phenomenology of experience objectively embraces this discussion of the exchange and development of them. It states that something can be constructed or stand in place of something else through experience (Peirce, 2012) and not necessarily motivated by the object. A sign is determined by a potential state of a variety of reality (object), which generates a brain experience. That brain experience is an *interpreting sign* that cannot exist by itself because it will not function; it necessarily requires a mind to interpret it. Indeed, four entities are needed to assemble a sign and produce semiosis: the state of reality to which is referenced, the experience categories by which the individual defines his degree of interaction with reality, the interpreting signs, and the cultural representations, as seen in Table 2.

The evolution of signs in digital communication is related to the categories of experience. According to Peirce (2012), there are three modes or categories of experience in which objects can exist in experience: *firstness*, *secondness*, and *thirdness*. The firstness responds to a positive quality. For example, the first time a professor teaches online and speaks to a screen. It is a mere *possibility*. The second quality corresponds to current events. In this case, let's think of the same teacher, but this time he is on a digital video conference with a family member or work colleague. At this moment, he may have difficulties in using the interfaces, but he perceives that he is in the "here and now"

TABLE 2
FOUR ENTITIES TO ASSEMBLE A SIGN

Experiences coextensive to a cultural bond	State of reality (objects)	Categories of experience	Interpreting signs	Cultural representation (Signs representamen)
Private (Cognitive types)	State of affairs of the micro-universe	Individual experiences	Interactions between signs	Signs encoded in the electrochemical visual memory
Public (Nuclear Contents)	State of affairs of the macro-universe	Interactions between objects in the concrete world	Semiotic systems and symbols	A mind that encodes and decodes boundaries

Source: The authors based on Valle (2021).

with his interlocutor, even though, in concrete terms, this is not the case. Thirdness corresponds to the laws governing cultural circumstances. In this case, after a semester, for teachers who have established channels of communication, schedules, and advice through teleworking, it seems entirely logical for them what at the beginning was a novelty. In that sense, their experience has coupled to a third-party category that generates coherence with all their environment to truly ensure that they have a class with 60 people from home. However, the transition from concrete reality to a digitized reality requires cohesion between these interactions. Cohesion is a level of inferential complexity that gives unity, acquired in community and cultural networks. We count at least three levels of complexification (0, 1 & 2). According to the scale of interaction and the scope in the access of Cognitive Types, sign paths make up in Table 3.

Table 3 represents the possible scales of complexity in which meaning can stabilize, and a new sign emerges within culture, society, community, family, and personal context (Valle, 2017). The preponderance of meaning formation from *Cognitive Types* depends on

the scale at which consensus on meaning occurs. Nuclear Content, on the other hand, refers to institutionally consensual knowledge. It is also called *dictionary knowledge*. In the digital communicational habit, the mode of production of signs operates from encyclopedia knowledge or Molar Content. That is, it entirely depends on the experience and knowledge of the empirical subject.

Now, before the new normality, these processes of evolution of meaning were prolonged and obtuse. We did not fully appreciate the process. However, in the year 2020, the accelerated incorporation of new digital communicational habitus allowed us to observe the evolution of different types of meanings towards complexity and towards the degradation or loss of complexity. Before the 2020 pandemic, the use of digital networks was largely optional, and only certain cultures used them massively, especially in countries without a digital gap. Nevertheless, after 2020, it was no longer an option. The digital communication habit became the only means of information. It even became a mandatory mode for populations not trained in its use. The transformation of face-to-face communication habitus to digital left traces and records in Big Data. These databases allow traceability of meanings in different topics.

For example, it is possible to trace the efforts of thousands of scientists since the first discussions about the SARS-CoV2 virus in the forums of journals such as *Science*, *Nature* or *The Lancet*. In these cases, various minds directed all their efforts towards one goal: the scientific construction of a cure against the COVID-19 disease. Thus, the evolution of meaning acquires different edges and strategies, according to the type of objective that each semiotic system intends to achieve. In this sense, the development of contents operates in a collective and non-synchronized act. On the contrary, the construction of scientific knowledge and disciplinary research works with methods adjusted to specific phenomena and operate mainly in a linear fashion. However, open systems are complex, dynamic, and cybernetic. It means that such systems are cyclical, have feedback, and new information modifies each new cycle's initial conditions. Therefore, adaptation mechanisms to the varying states of reality can be puzzling to the reductionist view.

TABLE 3
DEGREES OF COMPLEXIFICATION OF THE SIGN, OR COEVOLUTION TOWARDS NUCLEAR CONTENT

Complexity level	0	1	2
Origin of type/ token	The sign considered in itself	The sign considered in its object	The sign considered from its interpreter
Category of the experience			
Firstness	QUALISIGN: a spot of color in an abstract painting, the color of a dress.	ICON: the portrait of Mona Lisa, a diagram, a formula.	RHEMA: any visual sign as a term of a possible statement. The inventory of emoticons of a virtual keyboard.
Secondness	SINSIGN: live TV filming, a road sign.	INDEX: an indicator arrow, a shoe print in the mud.	DICENT: two visual signs joined in such a way that can deduce a relationship. Sentences with emoticons.
Thirdness	LEGISIGN: an iconographic convention, the cross's model, a type of temple with a circular plan.	SYMBOL**:** a prohibited direction sign, an iconographic convention.	ARGUMENT: a visual syntagm that relates signs of a different type; the set of traffic signs.

Source: The authors based on Eco (2011).

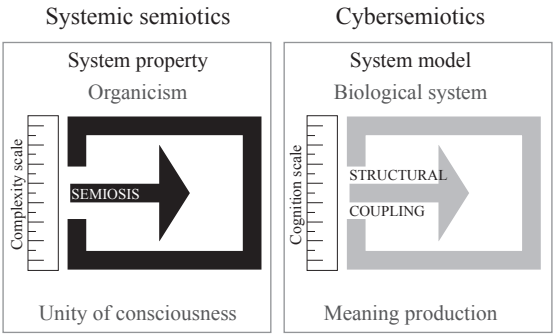
Building scientific thought founded on the phenomenology of experience generates the perception that the unity of meaning refers to a process of structural coupling between the categories of experience firstness, secondness, and thirdness. The experience category of secondness required a firstness. For a thirdness, the two previous ones are needed even in their simplest elements. It corresponds to the traditional view of semiosis as an evolutionary process of the sign (Guddemi, 2000). In cybersemiotics, this process has known as the *triple autopoiesis* (Brier, 2008, 2013). We must remember that the terms *structural coupling* and *autopoiesis* have intended to explain the direction of organisms in their life cycle (Maturana, 2002). Therefore, in this logic, only from the living system emanate signs and consciousness. On the other hand, under the semiotic-systemic isomorphism, the direction taken by *organic integration* produces semiosis. In this logic, from the complexification of systems emanates semiosis and consciousness.

System-semiotics understand isomorphisms with conscious systems as a network of codependent and coevolving systems. In reviewing the process of sign production, as compared to cyber-semiotics, it has postulated that the production of meaning occurs only in biological systems and is given by structural, evolutionary, and multidirectional coupling. Thus, cybersemiotic studies depend on the degree of complexity that has "the self-organization of cognition and the structural coupling of observers" (Brier, 2008, p. 101; Vidales, 2017, p. 25). In contrast, systemic semiotics postulates that the unity of consciousness is semiosis, independently of the organism and the system to which it refers (Valle, 2021). Systemic semiotics observes the universal properties of consciousness and postulates them as levels of organicism. The integration of ideas is in Figure 5.

Both positions debate the effects of the evolution of signs and their isomorphisms with complexity levels. However, the next question asked of the discussion from the semiotic-systemic perspective: is there such isomorphism with other systems? Can we speak of coevolution between biological systems and conscious systems?

The survival strategy of many communities has been total confinement; perhaps, this is the key to overcoming this situation.

FIGURE 5
DIFFERENCES BETWEEN CYBER-SEMIOTIC AND
SYSTEMIC SEMIOTIC POSTULATES



Source: The authors.

However, such a strategy would wipe out entire civilization systems, namely: the economy, labor relations, institutional relations, etc., generating social crises globally. What should we prioritize, the social or the biological? We will now enter into this discussion.

WHO IS IN CONTROL, LIFE OR SOCIETY?

Four indispensable properties compose the limits of semiosis: Space, Time, Life, and Culture. Suppose a systemic alteration occurs in any of these coordinates. In that case, the systemic theory (François, 2004; Valle, 2021; Valle et al., 2016) foresees that the evolution of signs will undergo accelerated changes. Because it is a dynamic system, it may reach its point of no return quickly, i.e., that the transformations of meaning will be irreversible (Valle & Chavarría, 2020). From the systems perspective, a Minimal System of Meaning (SM) is the subject of semiosis, which in its broadest form is a way of seeing the world, a way of segmenting the universe and associating expressive units with units of Content. An MS can be an empirical subject in a living system,

a digital algorithm, a human being, or a lifeless entity hosted by another entity.

The spatial limit of semiosis determines the gradation of the phenomenology of experience and the type of structural coherence that an SM can reach. Conversely, the time limit depends on self-organization and the level of organic integrity that the SM can match, either for the reduction or amplification of its complexity. This phase is notorious for the number of feedback cycles that the SM can perform to stabilize a sign's meaning. The number of total cycles of its existence determines the life cycle of the symbols. This isomorphism is based on the universal laws of thermodynamics. If a system does not generate complexity in each feedback loop, it creates disorder, i.e., entropy. If the system is heading towards its maximum degree of entropy, the system tends towards its demise. It moves towards complexification and therefore towards negative entropy or information, it generates order. This type of stability that derives in complexity possesses specific behaviors which can be measured as a probabilistic evolution. Nevertheless, sooner or later, its nature is towards maximum entropy, hence the decay and death of all conscious beings (Prigogine, 1978; Prigogine & Nicolis, 1967, 1971; Shannon, 1948, 1949).

From a systemic semiotic perspective, the time limit is not a straight line but a loop of limited iterations –by the matter that constitutes the system– and that in each round evolves or tends to its disappearance. The biological limit is tied to the temporal limit. Up to this point, the theory foresees that even artificial systems depend on natural self-organization. The systemic concepts of *matter*, *energy*, and *information* are necessary principles to understand any system since they are the elements that interact, change, continue and disappear in the system's complexification. For example, the amount of symbolic information that any plant can operate is inferior to the number of signs that any mammal can handle; on the other hand, the number of biosignals that a plant can operate is infinitely superior to the number of biosignals a mammal produces. In the first case, the difference derives from the brains' complexification (Zhao et al., 2019). In the second case, the difference is in the gene-cellular complexification (Baluška et al., 2010).

In a competitive situation between minimal systems of meaning, as occurred in the COVID-19 pandemic, the collective action of scientific communication allowed the advancement and acceleration of essential discoveries to survive the disease and the SARS-CoV-2 virus. The digital massification of information has a clear objective: to generate a vaccine, treatment, or mitigation strategy, before the level of organicism of the virus reaches a devastating mutation for humans. From a systemic approach, the isomorphism between consciousness in life and consciousness in the SM of the virus (a non-living entity) will be, as the theory foresees, only on the collective scale: as culture and as a pandemic. On that scale of organization, we observed similar behavior in both systems. That similarity of patterns characterized as scale invariance.[7]

The objective of both systems –culture and pandemic– is to adapt to the new conditions; their success and optimality operate only at the collective level by exchanging matter, energy, and non-centralized information. The pandemic event placed the human collectivity in a race of evolutionary order. The question that arises from both cases is whether the collective behavior derived from significant adaptive achievements for the two systems, the human system and the virus system have some macroscopic order in evolution. That is, the question is whether both collectivities co-evolve in some way. Can systems so different in size, biochemistry, and scale of semiotic complexity, have something in common from an integral and ecological approach? Which also from a reductionist vision have no relation.

The isomorphism is a schematic map with correspondences between operative characteristics of elements of different systems. More precisely, an isomorphism is:

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7 Scale invariance refers to the similarity that systems can have at different scales of complexity, i.e., homomorphisms between systems (François, 2004). For example, mathematical fractals are homomorphic, but natural fractals, such as the structure of a broccoli, are homomorphic, limited and with certain properties of self-similarity but not equality.

> ... the result of the operation of various states of the elements that correspond to the analogous operation on another set. This fact implies that there are isomorphic relations that are much more interesting than the structural ones of the system or the historical relations of short-term and, for the case we are interested in, technological type (Valle, 2017, p. 107).

Scientists observed patterns of significance in the databases that had an unprecedented public openness. On the official website of the World Health Organization (2021) "COVID-19, Global literature on coronavirus diseases", as of March, 2021, there were 120 386 articles from international databases; 83 067 articles from international organizations; 19 078 preprints, and 8 369 clinical trial records. Scientific knowledge follows such a mode of production of meaning, where all knowledge must be validated and evaluated before being put to public scrutiny.

In contrast, the SARS-CoV-2 virus strategies are different. Viruses are composed of genetic material (containing ribonucleic acid, RNA), as with coronaviruses. When the virus enters the host's body through the mouth or nose, it attaches to a cell. The RNA from the virus enters the cell. There it makes copies of itself, which eventually leaves the infected cell and infects other healthy cells. It may happen that, in different contexts, an error occurs during the virus copying process, which is called a mutation.

An SM, such as a virus, does not produce signs but operates as a system that delivers information. Shannon's mathematical theory of information (1948) estimates that a system can submit information from a certain amount of redundancy[8] or coding constraints of 50% and the other 50% depends on the encoder's variation: "A physical system, or a mathematical model of a system which produces such a sequence of symbols governed by a set of probabilities, is known as a *stochastic process*" (Shannon, 1948, p. 5).

At the beginning of this reflection, in the example of System One, we spoke of a codeless system; a codeless system is an isomorphism

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8 Redundancy reflects the constraints, or the organization of the system. if a system is excessively redundant (i.e., very constrained) it cannot make much functional sense, and if it is fully redundant, none at all.

to the *zero-order* approximation in a Shannon stochastic process. It is obtained by choosing all letters with the same (equiprobable) probability and independently. However, as one advances in stochastic processes, and increases the chance of only certain types of interaction and constraints, as in a natural language, then combinatorics of the system emerges, and the redundancy increases. Once the redundancy of a code dominates the combinatorics up to 50%, there will be more information and less entropy.

Both digital habit's meaning production and the replication system of a virus share entropy and information isomorphisms. However, the SM's operation and the type of order generated by a virus-like system focus on adjusting the SM's biological variety to the host's tropism and antibodies (Britton et al., 2020). These systems produce a lot of information randomly, from a certain minimum degree of redundancy.

On the other hand, the digital habit's meaning-producton operates from inferential processes of induction, deduction, and abduction. It uses a complex multilevel of redundancies interacting between a diversity of metalanguages and languages. It gives us an enormous possibility of absorbing variety on planetary and cultural scales. The aspect of interest for systems engineering is the type of evolutionary path of the new digital entities since it operates in three types of inferences: a *deduction* –when we couple the sign to a symbolic representation previously recognized in the culture–; an *induction* – when we couple the meaning of the sign to a local notion of a group of speakers, perhaps not wholly defined and recognized by the collective–; and a *retroduction* –when we create a new conception of understanding of reality, and an emergent property appears: a new sign, concept or behavior–.

According to the above, a collective of individuals can consolidate meanings by three paths: deduction, induction, and retroduction (or abduction). All three cases can initiate in the same Cognitive Type. If a collective agreement reaches and derived from this critical intersubjective, we speak of Nuclear Content. In the consensus area, the Cognitive Type loses the private element, homologizing the meaning to a public and collective interpretation. Consequently, the Nuclear Content derives from the force that a collectivity gives to consensus or

imposition. In the era before the content crisis, sign production followed the deduction route, always channeled in the symbolic unidirectionality of the Nuclear Contents provided by the last century's social institutions: the real power, the political power, the spiritual power. From post-broadcasting, changes emerge in the system of meaning. The evident difference is that the organization of contents in the digital mass media follows inferential retroductions. We find a symbolic multidirectionality that comes from thousands of cognitive types that, based on consensus and system dynamics, give meaning to something.

Conclusion

From a theoretical perspective, the new normal is only the "tip of the iceberg" of more profound events. It only accelerated digital communicative habitus. The subjectivist epistemology already seen since the past century. Meanwhile, the interactionism epistemology explains that social distancing phenomena require specific symbolic interaction at the signs production level. In the new forms of communication, the predominant role in the production of signs is of a cognitive type. The cognitive type acts in an overpowering way to recognize new states of reality and undergoes an evolutionary process that goes through firsts, seconds, and thirds until it reaches equilibrium or homeostasis.

We observed two cases of organicism in 2020, the first of biological order. These are complex entities that transduce healthy cells into a new organicism through interaction with the cell and a certain degree of redundancy in their replication codes. However, the infected host at its most complex scale, i.e. the culture, operates as a new organism with an emergent organicist property within its cells. The spread of the SM virus takes advantage of the high redundancy in human symbolic interaction systems, such as mobility and cultural interaction patterns, to make its contagion more efficient. The second case is the new normality's communicational habit. The paramount quality is that its system of signification accelerated the production of meaning from retroductive processes, whose origin is the interaction on the scale of culture.

The success of the virus or human beings will depend on the patterns of mobility and interaction on the scale of complexity of culture, i.e.,

on the collective and non-centralized, and the new forms of redundancy at the collective level. Generally speaking, and only on this scale of complexity of culture, we intuited that evolutionary processes of biological systems are co-evolutionary with those of conscious systems.

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