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**Lotman and the Modeling Procedure: The Formulation on the
“Intellectual Invariant” of a Culture / *Lotman e o procedimento
modelizador: a formulação sobre “invariante intelectual” da cultura***

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ABSTRACT

Considering the importance of the modelling concept from Cybernetics to Yuri Lotman’s thinking, this article aims to discuss how the inherent reasoning for the modeling procedure is found in one of its main formulations, related to “intellectual invariant,” which elucidates the action on the intelligent mechanism of the culture, capable of ensuring its perennality while inciting the creation of new texts. In order to continue this discussion, the fundamentals of the modelling process and its relationship with the scientific doing will be firstly resumed to indicate the “model” and the type of intelligibility they are capable of producing. When exploring the centrality that the modeler procedure has in Lotman’s formulation, the author is equally expected to elucidate how it is possible to build a very singular semiotic understanding of language and culture.

KEYWORDS: Modeling procedure; Models; Intellectual invariant; Language

RESUMO

Tendo em vista a importância que o conceito de modelização, advindo da Cibernética, possui para o pensamento de Iuri Lotman, este artigo visa discutir a maneira pela qual o raciocínio inerente ao procedimento modelizador se encontra presente numa das suas principais formulações, relativa à “invariante intelectual”, que elucidada a ação exercida pelo mecanismo inteligente da cultura, capaz de assegurar a sua perenidade e, ao mesmo tempo, incitar a criação de novos textos. Para proceder a essa discussão, primeiramente serão retomados os fundamentos do processo de modelização e sua relação com o fazer científico, com o intuito de indicar o que vem a ser o “modelo” e o tipo de inteligibilidade que ele é capaz de produzir. Ao explorar a centralidade que o procedimento modelizador possui nas formulações de Lotman, espera-se igualmente elucidar de que modo, para o autor, é possível construir uma compreensão semiótica muito singular acerca da linguagem e da cultura.

PALAVRAS-CHAVE: *Procedimento modelizador; Modelos; Invariante intelectual; Linguagem*

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Introduction

The formulations on the semiotic functioning of cultures proposed by semiotician Yuri Mikhailovich Lotman cannot be thought outside the intellectual environment that involved the theoreticians of the Tartu-Moscow School of Semiotics of which he was part and whose researchers belonged to different areas of knowledge such as Linguistics, Literary Theory, Semiotics, Cybernetics, Information and Communication Theory, to name but a few.

It is fundamental to refer to this scenario in order to situate the centrality that the modeling concept from Cybernetics has to the Lotmanian thought. This can be mainly noticed in two aspects. The former is the fact that a semiotician uses the modeling concept to define language and indicate the different function it has on culture. The latter regards the issue that, throughout his writings, it is possible to learn how he utilizes inherent thought for the modeling procedure to develop many of his conceptions.

This characteristic, so remarkable in Lotman's work, offers an important indication of his adopted "theoretical attitude," which is found in any attempt to define language as an object of knowledge while allowing to glimpse the procedures that serve as a basis to discrimination and analysis, as shown by Greimas and Courtés (2008, p.290).¹

This perspective allows us to discuss how the thinking related to the modeler procedure, also understood as Lotman's "theoretical attitude," is found in one of his main formulations related to the "intellectual invariant" (LOTMAN, 1998a, p.19),² through which it is possible to learn the modeling action exercised by language as well as how culture can be understood as a great intelligent organism with a memory directed to the production of new texts.

However, in order to continue this discussion, we will first situate the main characteristics of modeling according to Cybernetics, which will necessarily make us approach their relation with the scientific doing and, predominantly, with the type of knowledge that can be built through the modeling procedure. When elucidating Lotman's line of thinking to develop his formulations, we expect to point out in details

¹ In Portuguese: "atitude teórica."

² In Spanish: "invariante intelectual."

how his “theoretical attitude” offers an important indication to the analytical and epistemological mechanisms that allow us to build a very specific semiotic intelligibility on the functioning of languages and cultures.

1 Modeling Procedure

The concept of culture formulated by Lotman is found throughout his work. As the studies on the author advances, new contributions are added to compose a greater construct, allowing us to understand the relations that characterize the understanding of culture as language, text and memory. However, among all these formulations, one of them seems founding.

For the author, only through an exercise of intellection or scientific speculation, language could be separately conceived since it is directly related to a broader functioning of culture. This occurs because “[t]he fundamental ‘task’ of culture, as we will try to show, is in structurally organizing the world around man” (LOTMAN; USPENSKI, 1978, p.213),³ which is done by many varied systems of existing languages.

Yet, according to Lotman, man is surrounded by a “flow of information, life transmits its signals to him” (1977, p.3),⁴ which can only be learned when transformed into “signs that have the power to communicate in human society” (1977, p.4).⁵ Without them information would be lost, and man would waste vital opportunities to produce knowledge and guarantee his own survival. At the same time, information can only be produced when we consider complex modalities of interaction established by any organism with the surrounding and through which the “deciphering” of something external, but still unknown, occurs.

Therefore, even before we are related to them through signification processes and meaning production, languages would be responsible for assuring the co-existence of different forms of sign organization that grant materiality to information built by intricate exchange processes. Without that, it would not even be possible to talk about

³ LOTMAN, I.; USPENSKIY, B.A. On the Semiotic Mechanism of Culture. *New Literary History*, Baltimore, v. 9, n. 2, pp.211-232, 1978.

⁴ LOTMAN, I. *The Structure of the Artistic Text*. Translated by Ronald Vroom. Michigan: University of Michigan Press, 1977.

⁵ For the full reference: see footnote 4.

culture or social life, mainly if we consider the mediating function exercised by languages in the relationships between people and that result in specific forms of relation and interaction. Moreover, Lotman indicates the impossibility of thinking about life dynamics in a society dissociated from movements of “semiotic components of culture” (LOTMAN; USPENSKI, 1978, p.223),⁶ once this mobility constitutes a common feature of both.

As a consequence of this understanding and for culture in fact to exercise its function, its “central coding device” necessarily has two central characteristics. They are:

First, it should have a high degree of modeling potential, that is, either the ability to describe as wide a range of objects as possible, which would include as many as yet unknown objects as possible, this being the optimal requirement for cognitive models, or it should have the capability to declare those objects which it cannot be used to describe as nonexistent.

Second, its systematic nature should be acknowledged by the community using it as an instrument for assigning system to what is amorphous. Therefore, the tendency of sign systems to become automatized represents an ever present inner foe of culture against which it continually struggles (LOTMAN; USPENSKI, 1978, pp.222-223).⁷

It is noticed that the author sets modeling as a central mechanism of culture, resulting in a capacity that collectivity possesses to build intelligibility and discriminate the organization of varied types of language manifestation and, consequently, culture.

As we pointed before, modeling is a concept from Cybernetics and is directly related to the elaboration process of abstract models, built on the observation of specific phenomena. According to Dupuy, for science, the idea of model has a completely distinct meaning from the one given by common sense. If, for the latter, a model is something that should be imitated, then for the former, any “scientific model is initially an imitation” (DUPUY, 2000, p.29)⁸ which allows constructing intelligibility regarding what is aimed to know.

⁶ For the full reference: see footnote 3.

⁷ For the full reference: see footnote 3.

⁸ DUPUY, J-P. *On the Origins of Cognitive Science: the Mechanization of the Mind*. Translated by M. B. DeBevoise Princeton: Princeton University Press, 2000.

In that connection, it is important to determine how the idea of imitation can be understood once the model does not consider a “loyal copy” or a mere reproduction of the observed phenomenon based on the state in which it shows itself at a certain moment. We must keep in mind that Cybernetics has looked towards the study of living organisms and artificial machines as control systems that transform input and output messages. Simondon (2017)⁹ points out that there is not any machine that possesses self-regulation completely independent from the external environment with which it exchanges information because the results of the action are also resulting from the exchange that it establishes with the external environment.

Yet, according to Dupuy (2000, p.29),¹⁰ modeling is a procedure which is directly linked to scientific experimentation focusing on the discrimination of “how” or the functioning “manner” of what is observed in detriment to understanding the “*being* of things.” The model aims to point out the most elementary relations that assure the action and performance of the observed phenomena, as they are seen in their movement, also considering what cannot be always programmed due to exchanges established with the surrounding.

As the author states, “the modeling procedure is quintessentially the scientific procedure itself because it abstracts the form of phenomena and, therefore, is able to mark out isomorphisms between different domains” (DUPUY, 2000, p.56).¹¹ Thus, it is possible to seize a whole set of peculiarities that would hardly be detected outside the model and whose knowledge is fundamental to intervene in a specific object in order to control it as well as to reinvent it.

This is possible because the building of models necessarily implies in the formulation of a “corresponding equivalence class” (DUPUY, 2000, p.30)¹² that overlaps the observed phenomenon, establishing a relationship of similarity instead of equality or identity with it. It is from this relation of equivalence that the intellectual capacity of the modeling procedure to discriminate the dynamism of a specific phenomenon occurs, since the model coexists in a diagram that essentially attempts to represent relations. Here it is necessary to briefly consider the conception proposed by

⁹ SIMONDON, G. *On the Mode of Existence of Technical Objects*. Translated by Cecile Maspina y John Rogove. Minnesota: University of Minnesota Press, 2017.

¹⁰ For the full reference: see footnote 8.

¹¹ For the full reference: see footnote 8.

¹² For the full reference: see footnote 8.

Charles Sanders Peirce about the diagram in order to situate the capacity of the diagrammatic structure to function as a model and incite the production of a very specific type of knowledge.

According to the author, hypoicons¹³ are divided into three types, limited by the manner each one of them relates with the firstness category (PEIRCE, 1931).¹⁴ They are: image, diagram and metaphor. Diagrams are specially built by a correspondence established between the relations found inside the signal and the relations that characterize the composing parts of the dynamic object, creating then a similarity bond between the sign and the object.

Even if the diagram is classified as a hypoicon, it surpasses the secondness category, (which implies relationship and confrontation),¹⁵ because in the classification of hypoicons proposed by Peirce, the diagram is a second hypoicon. Therefore, it is not possible to disregard the action that the objects from dynamics exercise in the constitution of a diagram in order to construct a structural proximity between them. In this sense, the existing relations between the constituting “parts” of the object will determine the *representamen*, and this correlation is materialized by an analogy established between the connections that form one and the other, considering their internal hierarchies and not only an identity correspondence between them.

If we consider that the dynamic object plays a determining role in the configuration of the diagram which characterizes the model, it can be said that any language phenomenon that possesses minimum organization is able to incite the formulation of models. This is possible because, as Santaella points out, the iconic sign

¹³ Hypoicon is another name given by the author to the iconic sign and represents the object through similarity, even if it is small. Overall, the triadic conception of the sign proposed by Peirce presupposes a logical relationship among three correlates: the *representamen*, the object that determines itself and the interpretant that consists of a more developed sign, generated by the *representamen*. The object of the sign is divided into two: the dynamic object that is the object “itself” and the immediate object which is the way how the former is represented in the sign. Due to the relationship it establishes with its dynamic object, the sign is divided into icon, index and symbol.

¹⁴ PEIRCE, C. *Collected Papers of Charles Sanders Peirce*. Cambridge, MA: Harvard University Press, 1931.

¹⁵ According to the phenomenology developed by Peirce, the ways of being of an experience can be grasped through three universal categories. Firstness refers to the immediate understanding of an object as it presents itself to the mind and involves a quality of feeling unrelated to anything else. Secondness implies in resistance and confrontation; it is the consciousness reacting to the “facts” found in the world. Thirdness is the category of intelligibility and thought, it is through it that we represent and attribute meanings to things. According to this theoretical framework, the classification of something into first, second and third is not a simple random ordering devoided of a substrate, but implies in the understanding of the logical functioning of something due to the way it presents itself.

or hypoicon (to which the diagram is related) is “intrinsically triadic” (SANTAELLA, 1995, p.145)¹⁶ even if not a “non-genuine triad” (SANTAELLA, 1995, p.145),¹⁷ as it represents something through relations of similarity. This means that it is possible to discriminate some trace of the object that determines it even if it is tenuous.

The process of logical determination, which is established between sign and object and its specificity in the diagram configuration characterizing the model, makes it possible to understand why the modeling procedure allows us to know an existing model even though its configuration is fragile or incipient, tending to be recurrent when managing irruption processes of new expressive modalities. According to this perspective, and taking up Lotman’s understanding, because language organizes itself and builds its own “world,” it is open to incite the elaboration of models through which the existence of a particular culture form can be discriminated and that is not always clear.

This same line of reasoning allows us to understand why, for Lotman, every language is also a modeling system that presupposes a specific ordering form between sets of invariants and variants. The former report themselves to the most elementary internal bonds that characterize the specificity of a language organization, delegating semiotic individuality to it. The latter are the result of established exchanges with the surroundings. In the relationship between variants and invariants, each language builds its own hierarchy. It is through these combinations that, in different manners, the modeling systems of a culture are able to materialize the “information wave” to which Lotman refers.

Such diversity is also related to the nature of the information itself that may equally request very specific sign arrangements so that the greater the heterogeneity of the existing modeling becomes, the greater the culture capacity to produce and change information gets. Regarding that, Lotman indicates that “[...] it becomes necessary not only to increase the number of diverse messages in the already available languages [...], but to constantly increase the number of languages into which it is possible to translate the flow of surrounding information, making it accessible” (LOTMAN, 1977, p.4).¹⁸ In

¹⁶ In Portuguese: “intrinsecamente triádico.”

¹⁷ In Portuguese: “triáde não genuína.”

¹⁸ For the full reference: see footnote 4.

this sense, any language sphere capable of building a minimum organization through the correlation between invariants and variants can raise the formulation of a model.

However, the action exercised by modeling is not limited to the first elaboration of a model that aims to understand the functioning of a determined object. Because it is a sign, the semiosis that every model generates in culture cannot be disregarded. As Dupuy (2000)¹⁹ states, once elaborated, the model pulls away from the phenomenal reality, which has raised it, acquires autonomous life, and becomes an independent object of study, capable of raising inferences that can either produce new models or make viable the configuration of a certain phenomenon that eventually did not even exist.

Peirce (1931)²⁰ also points out that one of the main characteristics of a diagram is that through its examination, other issues related to its object can be found and that they are not always clearly perceptible. This is possible due to the similarities through which the building process of a model happens, which generates an essentially associative process based on the production of new analogies and inferences about other yet unknown aspects of a particular phenomenon. This line of reasoning, defined by Peirce as abduction, (1931)²¹ raises suppositions about other equivalences that may be established between spheres that, at first, do not seem to be related, assigning new meanings to other objects. In this case, it cannot be forgotten that the possible similarity does not result from the similarity built on what stands out among different phenomena, but occurs due to the relationships established among their parts, as explained by the model/diagram.

Thus, the same model can indicate that, if different language phenomena are similar in an aspect, they can also be similar to others, which can result in discrimination of yet unknown traces of a system. Consequently, this procedure may significantly contribute to discriminating language functioning even if destituted of clear ordering. The diagram can also indicate the existing dissimilarity between distinct phenomena that still leads to the elaboration of inferences which allow us to build the intelligibility of a specific language form.

¹⁹ For the full reference: see footnote 8.

²⁰ For the full reference: see footnote 14.

²¹ For the full reference: see footnote 14.

It is exactly through this process that the predictive character of the modeling process, capable of eliciting the collection of assumptions due to the possibility to irrupt certain language phenomena, can be understood. There is another facet related to the diagram that allows us to better understand it. On the one hand, still according to Peirce (1931),²² an icon does not make the elaboration of accurate statements about something possible; on the other hand, it raises conjectures or hypotheses that are capable of carrying out future experiments. Therefore, the diagram built by the modeling procedure opens pathways to raise assumptions on the possible forms of language construction and, consequently, cultural organization, keeping in mind eventual correlations that may be established among distinct contexts presenting a minimum similarity among them.

Thus, it can be understood that Lotman's theoretical attitude is similar to cyberneticists considering the attempt to build models that can explain the most elementary relationships that characterize the functioning of different language forms. This perspective allows understanding why, according to the theoretical construct formulated by Lotman, language could never be seen only because of its capacity to represent something distinct of itself and, therefore, to generate meanings in a culture. Through modeling, it is necessary to consider that the existence of a language form itself and its organization form can produce inferences about a culture or broader sociocultural transformations. Thus, the explanation of a language and its semiosis by a model is already about a specific cultural phenomenon.

This theoretical attitude, indicating an epistemological perspective of a language study and consequently of a culture, is equally found in Lotman's work. In our opinion, the formulation he proposed about the functioning of an "intellectual invariant" (LOTMAN, 1998a, p.19)²³ clearly elucidates the modeling mechanism action on the structuring form of its reasoning.²⁴ At the same time, understanding the functioning of this intelligent mechanism of a culture allows us to broaden Lotman's understanding of modeling even more. Next, we will discuss these relationships.

²² For the full reference: see footnote 14.

²³ In Spanish: "invariante intelectual."

²⁴ It is important to point out that this is not the only formulation done by Lotman in which the presence of the modeling procedure is noticed. The same happens with the concept of semisphere, created by him, which is based on the definition of a biosphere elaborated by the Russian scientist Vladimir Ivanovich Vernadsky. However, keeping in mind the aim of this text, we are going to approach only the question related to "intellectual invariant" of the culture.

2 The Culture Mind and Modeling Procedure

Throughout his work, Lotman's concern to discuss the processes that result in the irruption of new textual arrangements, capable of producing non-predictable meanings in a culture, is noticeable. However, studying something new also requires the equal understanding of how different modeling systems keep their own semiotic individuality, despite the constant exchanges that they establish with the surrounding. The action of these opposing movements, which ensure the culture's perennity, is possible due to the action of an intelligent device that is subjacent to language dynamics itself and defined by Lotman as a creating consciousness or "culture mind."

To explain this process, Lotman utilizes the same theoretical attitude incited by Cybernetics, as he states that "[f]or the purposes that we have proposed, it is quite sufficient to limit ourselves to a certain general cybernetic modeling of the situation that interests us" (1996d, p.65).²⁵ Such a situation is based on the functioning of both constructive hemispheres of the human brain.

One of the main aspects of individual consciousness considers the presence of two completely opposing tendencies that subsist in constant tensioning. Understanding each of them implies, above all, to consider them responsible for the production of distinct signs from which different forms of reasoning and action result.

As indicated by Machado, alluding to an important study performed by Roman Jakobson (1995)²⁶ on two types of aphasia, it cannot be ignored that "a language is a manifestation of the biological capacity located in the brain" (MACHADO, 2007, p.180)²⁷ so that any lesion in one of the hemispheres surely results in some deficiency in the language use.

In sum, the left side would be responsible for the production of discrete signs while the right one is related to the generation of non-discrete sign. Discrete signs are related to digits, i.e., units that present themselves separately as it occurs in the written

²⁵ In Spanish: "Para los fines que nos hemos planteado, es del todo suficiente limitarse a cierta modelización cibernética general de la situación que nos interesa."

²⁶ JAKOBSON, R. Two Aspects of Language and Two Types of Aphasic Disturbances. In: JAKOBSON, R. *On language*. Cambridge, MA: Harvard University Press, 1995.

²⁷ In Portuguese: "a linguagem é manifestação de uma capacidade biológica cuja localização está no cérebro."

alphabet. Due to the linear, sequential and predicative structure that characterizes the concatenation process of letters and words in the syntagma, sequentiality is created, establishing a previous order to be followed by the thought flow. Because of that, the left side tends to work in order to disconnect itself from the phenomenal experience in favor of “[...] the tendency to refined inventiveness in the domain of new denominations and classificatory categories” (LOTMAN, 1996b, p.45),²⁸ built and based on a specific syntax.

On the other hand, non-discrete signs are continuous and cannot be separated into units or digits. They keep their proximity with the phenomenal world, establishing a relation of similarity or analogy with it, fostering less abstract but more situational reasoning modalities. Consequently, the right hemisphere opposes to the temporal linearity of reasoning connected to discrete signs, inciting the development of a more analogical thinking to overlap distinct objects synchronically.

The disparity between each one of these tendencies will be fundamental for the model elaborated by Lotman. According to him, the individual mind functioning is essentially characterized by two distinct movements. In the former, the simultaneous symmetric activity of each sphere generates a reciprocal inhibition, producing a “certain regularity of consciousness” (LOTMAN, 1996b, p.48)²⁹ or a stabilization state. Concomitantly, it is through this asymmetry that a tendency can boost its opposing action once this sphere, which was momentarily atrophied, faces new information to be translated by its own internal codes. Lotman illustrates this movement when stating that:

However, this activity of the left hemisphere, apparently, is not useless; having released itself from the immobilizing control of objectuality, it elaborates a language of distinctions. Afterwards, those distinctions, already as a fact of the linguistic code, are transmitted to the right hemisphere, and then the ‘normal’ consciousness begins *to see* the nuances of the chromatic range that were previously indistinguishable for it (LOTMAN, 1996b, p.45; emphasis in original).³⁰

²⁸ In Spanish: “[...] la tendencia a una refinada inventiva en el dominio de las nuevas denominaciones y categorías clasificacionales.”

²⁹ In Spanish: “cierta regularidad de la consciencia.”

³⁰ In Spanish: “Sin embargo, esta actividad del hemisferio izquierdo, por lo visto, no es inútil; habiéndose liberado del control inmovilizante de la objetualidad, elabora un lenguaje de distinciones. Después, esas distinciones, ya como un hecho del código lingüístico, se transmiten al hemisferio derecho, y entonces la

It is based on this reasoning that Lotman proposes a “modeling of the intellectual invariant as such” (1998a, p.19),³¹ which is characterized by an essentially asymmetric relationship built between absolute disparate spheres because exchange and tensioning are only possible by unbalance and inequality between them. However, symmetric relations establish correspondence and parallelism bonds preventing any possibility of exchange. This is the mechanism that results in information processing and production by consciousness, considering that the “mind faculties are always only the properties of the information processing system” (DUPUY, 2000, p.30).³² Thinking is then understood as an exchange act between different singularities in which one hemisphere is also tensioned by its opposing one to “decipher” something that is external to itself and, therefore, to produce information.

For a semiotician, the process which is “extraordinarily analogous” (LOTMAN, 1996b, p.46)³³ to brain processing occurs in culture. In it, we find the existence of moments of intense exchange between completely disparate systems and, at the same time, the stabilization periods, in which one sphere turns back to its own internal re-ordering since its internal bonds are directly affected after the exchange with another. Therefore, Lotman (1996d) indicates the co-existence of two absolutely opposing movements in culture, characterized by the tendency to heterogeneity and the propensity to homogeneity, also defined by him as a structural paradox. The former is reported in the potentialization moments, resulting from the conflict established between opposing orientation systems whereas the latter elucidates the language self-organization capacity, ensuring its semiotic individuality.

However, it is in the cultural text materiality that it is possible to discriminate this intellectual action. It not surprising that Lotman (1998a) settles it as the third class of intelligent object alongside the human individual consciousness and the collective intelligence of culture.

Every text (LOTMAN, 1998a) is essentially defined by semiotic heterogeneity, once it is the result of a relationship built between, at least, two languages. Its formation

consciencia ‘normal’ comienza a *ver* los matices de la gama cromática que antes eran indistinguibles para ella.”

³¹ In Spanish: “modelización de la invariante intelectual como tal.”

³² For the full reference: see footnote 8.

³³ In Spanish: “extraordinariamente análogo.”

is characterized by highly complex translation processes, named “untranslatability” by Lotman (1996d), as they do not occur facing an algorithm that previously sets a parameter for translation. Consequently, translational equivalences are established between different spheres from which the irruption of non-predictable textual arrangement results. It is thought this characteristic that the text is able to perform its main function in culture, i.e., inciting the production of new meanings.

Still, according to Lotman, this process is only possible by the action of a thinking device of culture. Due to the absence of a pre-determined orientation, “a specific *repertoire* of ‘correct’ (possible) translations” is built (LOTMAN, 1998a, p.20),³⁴ in which an acting “correction mechanism” occurs and through which a sign arrangement is selected in detriment of others. Such a mechanism cannot be seen by the perspective of a selection done between the options “correct” or “incorrect,” but by the intellectual capacity of culture that through the conflict between different spheres makes “choices” capable of producing semiotically heterogeneous texts.

Because every text is the outcome of an intellectual action of culture whose marks are found in the materiality of its sign arrangement itself, it is equally possible to discriminate traces of its constructive process through the memory written in it. In line with the reasoning line found throughout Lotman’s work, memory does not report to a human faculty but regards to a device of culture itself, found in the most varied sign systems. And similar to intelligence, the memory of culture has a double movement, splitting into informative and creative.

While the former reports to self-regulation, marked by the coding and re-coding process of a system when in contact with another, which keeps it as an ordered whole, the latter regards the intellectual capacity of culture to generate textual arrangements that are not produced by a previously given algorithm. Besides, neither produces unambiguous meanings because in these cases the text anticipates its own configuration of the code so that it preannounces the emergence of new forms of sign configuration. Moreover, according to the intellectual dimension of culture, only in the relation with another, a text is able to incite the production of meanings, once it can say nothing isolatedly. From that comes the capacity of a text to foment the irruption of non-

³⁴ In Spanish: “cierto *repertorio* de traducciones ‘corretas’ (posibles).”

predictable meanings that do not deplete themselves in the moment they were produced because they are always related to other textual arrangements.

Going back to the theoretical attitude, it is noticed that Lotman takes the individual human mind as object and, through the modeling procedure, elaborates a model that allows to locate the intellectual and semiotic functioning of culture through which the continuous movement of systems is observed towards the production of new cultural texts as well as the preservation of different semiotic individualities from which the action of two distinct types of memory results. At the same time, Lotman (1998a) also elucidates how the study of the intellectual mechanism of culture can incite the raising of assumptions capable of broadening the understanding of the cerebral activity functioning itself, mainly regarding symmetry.

The presence of the “intellectual invariant” in both spheres would allow the discrimination of other existing similarities in one or the other and, through observation of the movement of culture, infer the existence of mechanisms related to the functioning of individual intelligence even though they are still unknown. Thus, a diagram regarding the brain functioning is built and opposes the diagram of the functioning of culture. By observing both, it would be possible to recognize invariants that would be common to both as well as their dissimilarities. Lotman indicates that “the general scientific importance of human knowledge increases abruptly” (1998a, p.19)³⁵ due to the possibility of a dialog to be established between different fields of scientific knowledge through the modeling procedure.

It is exactly this theoretical attitude by Lotman, based essentially on the modeling procedure, that makes us point out the importance that the space has in its formulations. Before situating it, it is important to emphasize that every model consists of metalanguage that reports to a specific object-language. As we mentioned before, in this case, the modeling procedure presupposes the elaboration of diagrams whose internal relations aim to explain the constituent interactions of a phenomenon. Despite the difference between these two levels, Lotman points out the existence of an existing invariant between them: space. According to the author:

³⁵ Excerpt in Spanish: “la importancia científico-general de los conocimientos humanísticos aumenta bruscamente” (1998a, p.19).

However, a definite relationship exists between these two totally separate schemes. One of the universal peculiarities of human culture, possibly connected with the anthropological features of human consciousness, is the fact that the world view invariably acquires features of spatial characteristics. The very construction of a world order is invariably conceived on the basis of some spatial structure which organizes all its other levels. Thus, a homeomorphic relationship appears between the metalinguistic structures and the structure of the object (LOTMAN, 1975, p.101).³⁶

Here, the homeomorphism relation should be seen from two aspects. The former regards the movement of the observed object itself – in this case, the modeling systems of culture. According to Lotman, a system must have a duplication mechanism or a “repeated multiplication” (LOTMAN, 1996c, p.84)³⁷ of the spatial model itself to be able to fulfil its semiotic functions in culture. For the author, this process can be understood by topology, a Mathematics subject that studies distinct properties of sets that are preserved even when deformed. It allows outlining homeomorphic relations between different spaces that can be inverted in each other based on their own trajectories and properties. For such, concepts such as neighboring, interiority, exteriority and continuity become crucial.

As the author points out, since the earliest beginnings (LOTMAN, 1996c), *homo sapiens*'s activity was related to the creation of classification models of space by limiting “my space” and “the other's,” similar to what occurs in the formation of cities that, for a given collectivity, are considered the “culture –bearing” part while limiting the external space which does not belong to it. A similar process is verified in the relation of a temple with a city, which becomes its external space, or even, in the formation of any ritual, which limits what is internal and, consequently, what is extrinsic. It is through these organizational forms of space that Lotman indicates how the limitation of a “non-culture” happens, i.e., another form of organization that puts itself outside the space delimited as proper to a culture itself.

Through the modeling procedure of each of these spaces, it is possible to discriminate the constituent variants of each one as well as its invariants through which it is possible to recognize the recurrence of one same spatial duplication form by the

³⁶ LOTMAN, I. On the Metalanguage of a Typological Description of Culture. *Journal of the International Association for Semiotic Studies*, n. 2, pp.97-123, 1975.

³⁷ In Spanish: “multiplicación reiterada.”

common topological properties that would not be perceptible outside the model. In addition, Lotman indicates that topology is an indispensable resource for the study of typology that is related to the “conception of cultural development” (1975, p.97)³⁸ – typical of each culture – and that would equally allow the recognition of its semiotic individualities. However, by studying the spatial or topological models, it would be possible to detect similarities between cultures with different forms of development or separated in time, and that, at first, seem to keep nothing in common.

Thus, by recognizing some common topological properties between different spheres, entire cultures can be reconstituted: despite the belief, they have not disappeared and continue to subsist in latent form within other cultures. This allows us to understand why topology should also be understood as an important mechanism related to the informational memory of systems, capable of indicating the existence of persistence of a distinct form of culture, through the modeling procedure.

A second aspect regards metalanguage, i.e., the elaboration of a model itself that, as Lotman points out, must keep a homeomorphism relation with the object. This can be detected by the diagram structure itself that results from the modeling procedure, which spatializes the most elementary constitutive relations of the observed language phenomenon. Thus, it establishes an equivalence relation with it, which would allow reconstructing it through continuity that can be outlined based on some properties found in the diagram. Besides this aspect, there is still an indispensable device found in the model through which it is possible to discriminate the complexity of exchanges continuously built between different systems. It is the semiotic boundary. According to Lotman:

The boundary is an essential element of the spatial metalanguage of a cultural description. The nature of the boundary is determined by the dimensionality of the space it delimits (and *vice versa*). Since in the cultural model the continuity of space is broken at the extreme points, the boundary always belongs but to one space – the internal or external – and never to both at the same time (LOTMAN, 1975, p.110).³⁹

³⁸ For the full reference: see footnote 36.

³⁹ For the full reference: see footnote 36.

The boundary is associated to the “sum of bilingual translatable ‘filters’” (LOTMAN, 2005, p.208)⁴⁰ through which the translating process between one sphere and another and the re-coding of systems occur. One of the main characteristics of the boundary is its ambivalence, because it allows us to discriminate the translating equivalences and limits the semiotic individuality of each one.

When stating that a boundary belongs to the internal or external space and never to both simultaneously, Lotman regards the observer’s point of view when elaborating the model once it mandatorily assumes the perspective of a specific system in order to further on outline the boundary. Because the exchange between different spheres in a relation implies an asymmetric relation similar to exchanges between two brain hemispheres, Lotman (1975)⁴¹ states that the internal space tends to defend itself whereas the external one breaks the boundary in order to bring about transformations in its opposition. This elucidates why the exchanges between systems are not harmonious, balanced and predictable.

The boundary consists of an absolutely indispensable space property of the model which allows us to understand why it is capable of representing the dynamics of the observed system and, therefore, keeping a homeomorphic bond with it to encompass the extra systemic. That is why Lotman states that “every model of culture can be described spatially” (1975, p.121),⁴² and it tries to discriminate a set of relations that may only irrupt due to the division of the space indifferent systems. Without it, no model would be capable to represent the intellectual dynamics of culture, mainly its capability to continuously expand.

Final Considerations

The coherence of Lotman’s thinking that, as we attempted to point out, uses the subjacent reasoning instead of the modeling procedure to elaborate its formulation on an “intellectual invariant” of culture, allows us to understand how the author’s own writings work as important metatexts that make us not only understand his theoretical

⁴⁰ LOTMAN, I. On the Semiosphere. *Sign Systems Studies*, Tártu, n. 33.1, pp.205-229, 2005.

⁴¹ For the full reference: see footnote 36.

⁴² For the full reference: see footnote 36.

attitude but also the epistemological perspective of the study of culture when seen by semiotics and the modelling processes.

As it occurs with the brain, Lotman seems to indicate that the main function of the sign systems that compose culture is to produce and process information, which is only possible by exchanges established between different systems. This allows us to understand that any attempt to understand a language could never limit itself to its mere description. This is more evident in the visuality of a specific textual arrangement, given the necessity to learn the boundary that is built between it and other sign systems and which inevitably leads to the discussion on the processes that resulted in the configuration of the observed cultural text. Even because, as we pointed out, it is an intelligent object of culture, every cultural text brings the marks or exchanges that resulted in its composition in its materiality. It is this intellectual dimension of the text that enables it to incite the production of meanings because, as Lotman states, “[t]he formation of meaning has no place in a static system” (LOTMAN, 1996d, p.71).⁴³

Therefore, it seems that the perspective of language study itself, as indicated by Lotman, already offers an important indicative of the semiotic understanding of culture proposed by him. For the author, this is why understanding implies producing models and/or diagrams that aim to explain dynamic processes which characterize the intellectual action of culture whose intelligibility cannot do without the boundary limitation that is established between at least two systems.

It can be said that the modeling mechanism consists in a “thinking exercise” (DUPUY, 2000, p.30),⁴⁴ without which the “knowledge is not explained” (MACHADO, 2003, p.152)⁴⁵ and which, in this case, involves a double movement: first, the formulation of models and/or diagrams built on the basis of observation of the functioning of specific phenomena, in an attempt to learn the relation between variants and invariants; second, the confrontation between different diagrams to then raise inferences on the possible organization forms of language and, consequently, of culture, considering its specificities and eventual common topological models. This elucidates why the theoretical and scientific attitude found in Lotman’s formations presupposes an analytical procedure in which any attempt to understand language must, first, consider

⁴³ In Spanish: “La formación de sentido no tiene lugar en un sistema estático.”

⁴⁴ For the full reference: see footnote 8.

⁴⁵ In Portuguese: “o conhecimento não é explicitado.”

the discrimination of its constructive process, given the need to learn how an expressive form, in fact, organizes culture. Disregarding this aspect is opposing exactly the intellectual function that Lotman delegates to culture.

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