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A Systemic Vision of Belief
Systems and Ideologies

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"A SYSTEMIC VISION OF BELIEF SYSTEMS AND IDEOLOGIES"

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CERTIFICAN: Que el licenciado en Ciencias Matemáticas Don Josué Antonio Nescolarde Selva, ha realizado bajo nuestra inmediata dirección la Memoria que lleva por título "*A Systemic Vision of Belief Systems and Ideologies*" con el fin de que sea presentado como Tesis para aspirar al grado de Doctor.

Y para que conste firmamos el presente en Alicante a 31 de mayo de dos mil diez.

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INTRODUCTION

In this work, we are going to deal with a very special type of systems: *Deontical Impure Systems*. They are <u>Systems</u> because objects and relations among them exist. They are <u>Impure</u> because these objects are formed by material and/or energy beings. They are <u>Deontical</u> because between its relations it has, at least, one that fulfills at least one of the deontical modalities: *obligation, permission, prohibition, faculty and analogy*. We are talking about the human societies. Not to a society in individual, but to any human society, at any time and place.

We know that the human being is a social animal. It is a common fact. Moreover, the human being is defined like a rational being. In addition, it is a common fact. Nevertheless, this is very certain? Nobody can deny that between the creations of the human being they are the logic, mathematics, philosophy, science, jurisprudence, etc., that is to say, all products of the rationality, the abstract thought. Nevertheless, the human sociability goes further on that own of an animal the herd. Societies bases, cohesion, develops, degenerates and even it dies based on their *belief systems*. Moreover, these are not rational. The species *Homo sapiens* develop so-called *belief systems*. This is a set of beliefs reinforced by culture, theology, experience and training, as to how the world works, cultural values, stereotypes, political viewpoints, etc. In agreement with Ortega y Gasset "*in the beliefs we lived, we move and we are [...] the beliefs constitute the base of our life, the land on which occurs [...] All our conduct, even the intellectual, depends on which is the system of our authentic beliefs. In them [...] acts latent, as implications of whatever specifically we do or we thought [...] the man, at heart, is believing or, which is equal, the deepest stratum of our life, the one that maintains and carries all the others, is formed by beliefs..*". Beliefs like convictions; religious beliefs, but also scientists, philosophical and relative to the sphere of the daily life. If a stimulus is received, it may be interpreted with the effective aid of the belief system, to be whatever the belief system might lead the recipient to rationalize. A belief system need have no basis in reality so long as it consistently provides adequate explanations. It takes to us to define the human being like *Homo religious*.

Figure I.1 (Hitchins, 2007) shows how might be brought together an individual's and society's belief system and might mutually sustain each other.
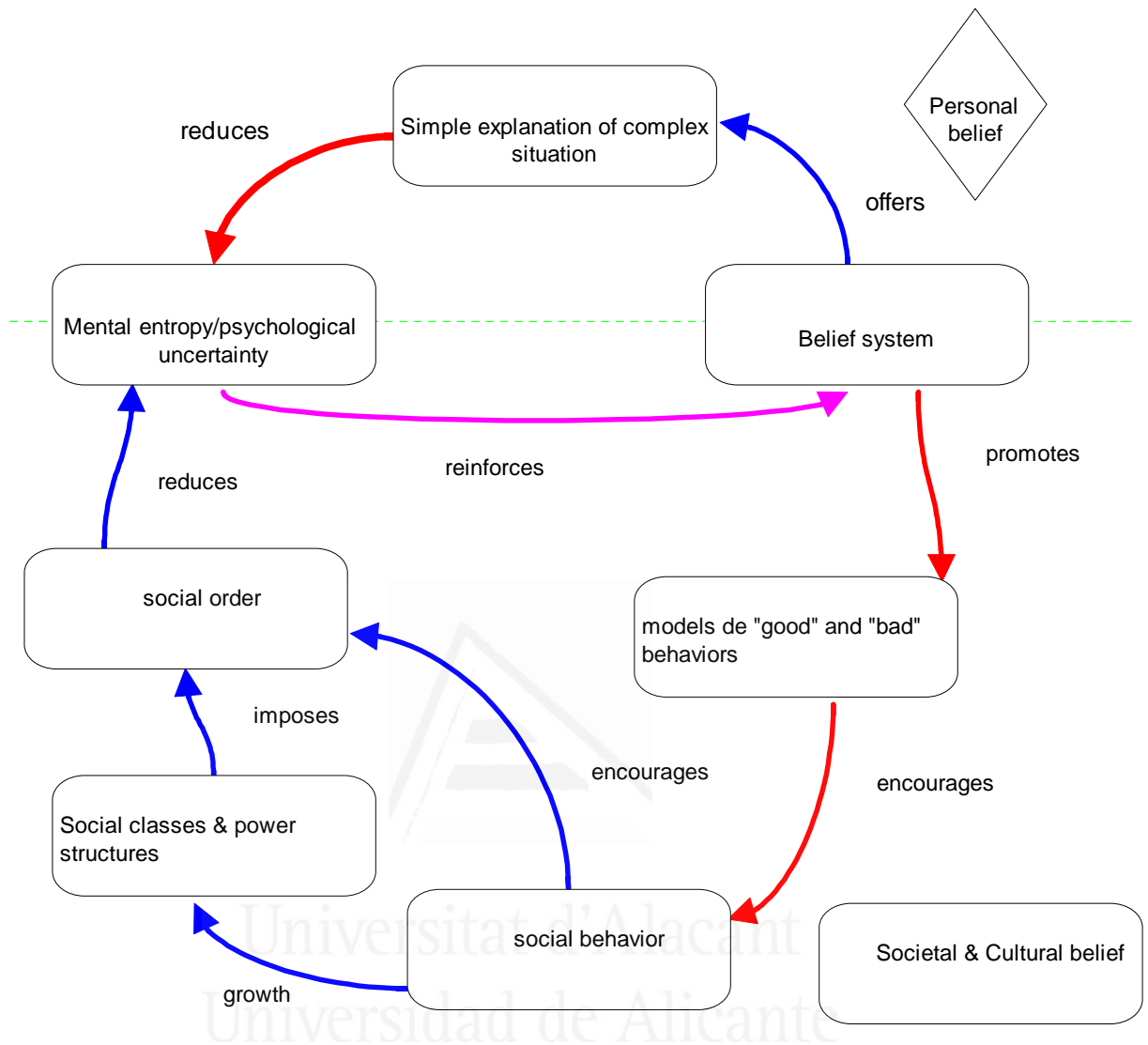
Figure I.1

1) The top loop shows that an individual's belief system gives a believer a straightforward world vision, so that he can find satisfactory explanations and interpretations of events and situations. This reduces the individual's psychological uncertainty, so reinforcing his faith in his belief system.

2) Lower loops show the relationships between belief and society. A shared belief system is at the heart of a culture. Shared belief systems sustain the beliefs systems, promote social cohesion, and enable the growth of social classes and power.

Conflict between two groups, including war, may be defined as *a battle between beliefs systems* (Hitchins, 2007). Symbols emerge strongly in such conflicts: they may be revered objects as stones, writings, buildings, flags or badges; whatever they may be, they may symbolize the central core of the belief system. When people become symbols, the real person may become obscured behind the projected symbolic image or person.

Organizations develop their own in-house culture and belief system, too, which leads them to act and behave in ways that might not seem entirely rational to an outsider.

For the development of the work, we must formulate tenth initial hypotheses that we will expose briefly in this introduction.

FIRST HYPOTHESIS: *All belief system is of irrational nature. The process of elaboration of the symbolic universe, leads to exciting conclusions on the search of emotional security of the human being.*

SECOND HYPOTHESIS: *The articulated language human has harnessed the creation and dominion of concepts that have determined the thought, world visions and culture.*

THIRD HYPOTHESIS: *The symbols end up postulating itself as explanatory axes of the universal reality in their globality and on these explanatory routes were constructed the myths, that form a superstructure of all belief system and ideology.*

FOUR HYPOTHESIS: *All belief system is of numinous-religious nature.*

FIFTH HYPOTHESIS: *All belief system has a mathematical structure forming a topology.*

SIXTH HYPOTHESIS: *All human society is a multilevel system with a material structure (the own society), an ideological superstructure (belief systems, values, etc) and a supersuperstructure with two parts: mythical (origin and justification) and utopic (final goal).*

SEVENTH HYPOTHESIS: *It exists a mechanism of denotative images and connotative projections between structure and superstructures.*

EIGHTH HYPOTHESIS: *All belief system produces materializations on the social structure. The materializations are of two classes:*

1) *Monostagical or textual materializations (Literature, architecture, painting, etc. and science and technology).*
2) *Bistagical or deontical materializations with a first step of institutional materialization and a second step forming normative relations (legal, uses, customs, etc.)*

NINTH HYPOTHESIS: *The social systems are open and conservative systems.*

TENTH HYPOTHESIS: *Strong stimuli on the social system produce responses nonwished by the own system forcing to this one to an adaptation, a total exchange or to their disappearance. Any significant exchange of the system as much tolerates an exchange in the ideological superstructure as in the mythical-utopic supersuperstructure and because of it, a total exchange of the world vision of the individuals and materializations.*

In this work we will deeply develop the third, fifth, sixth, seventh, eighth, ninth and tenth hypothesis from the logical and mathematical point of view.

Throughout this study, we are going to demonstrate that to the belief systems just like their materializations have mathematical structures, concretely topological structures. Nobody ignores that the mathematics are a language, most rational of the languages used by the human being, where the propositions and theorems are deduced following very strict rules formulated by rational principles. Nevertheless, if the beliefs systems have mathematical structure, it is to say rational structure, the own beliefs are not rational.

In addition, it will be allowed us to make the following reflections:.

1) In the social model that lead the development of the present civilization, the *Elysian Fields* have been tried to reach from the conflict, sexual difference and

of classes, unequal distribution of the wealth, fear to the punishment, submission to the power, war, but also with an advance of the knowledge and development of science and technology.

2) The historical data teach us that the Gods, by powerful that have been, only can survive in the measure in which they are useful to construct, to justify, to fix and to maintain a certain model of society. However, when this one becomes, it also changes the mythical structure of the deity that is the pattern of that society. We are seeing now a social change, harnessed by the economic crises. New Gods can appear in the horizon. The time will say if they will be better or worse than the present ones.

1. PERCEPTIONS AND IMPURE SETS

1. 1. INTRODUCTION

The idea that societies and its associate phenomena, such as culture, language, literature, ethic, laws, economics, etc., could more adequately be understood and studied if regarded as systems i.e., as networks of relations that can be hypothesized for a certain set of assumed observables made it possible to hypothesize how the various socio-semiotic aggregates operate. Nevertheless, in spite of common premises, the functional approach has never been quite unified for the reason that, in the General Theory of Systems two different and *incompatible* interpretations have been circulated:

1) The theory of static systems (*synchronic theory*) that has wrongly been identified as the exclusive "functional" or "structural" approach: the system is conceived of as a static or *synchronic* net of relations, in which the value of each item is a function of the specific relation into which it enters. While the function of elements as well as the rules governing them is thus detected, there is hardly any way to account for change and variation. The factor of time-succession has thus been avoided from the system and ruled to lie beyond the scope of functional hypotheses. Obviously, from the point of view of such an abstract model, the possible concurrent existence of different options within one system at a given moment need not necessarily be considered if these are, in principle, reducible. From the synchronous point of view, the system has a structure of objects and relations. As is well known, it is more efficient from the methodological point of view to start by developing a *theory of closed systems*.

2) The theory of dynamic systems (*diachronic theory*): It does not concern the internal structure of the system. The system has two semiotic environments (M. Lloret-Climent, J.L. Usó-Domènech, B.C. Patten, F. Vives-Maciá, 2002; Patten, B.C, 1978, 1982; Usó-Domènech, J.L., J. Mateu, and B.C. Patten. 2002; Usó-Domènech, J.L., M. Lloret-Climent, F. Vives-Maciá, B.C. Patten, and P. Sastre-Vazquez, 2002; Usó-Domènech, J.L., G. Stübing, J. López Vila, and P. Sastre Vázquez. 2002): a stimulus (input) environment **H'** and response (output)

environment **H''**. The system in itself consists of a succession of states through a temporary interval.

This work initiates a subjective approach to a type of complex system: Human Ecosystems, referred to as *Deontic Impure Systems* (DIS) to capture a set of properties fundamental to the distinction between human and natural ecosystems. A deontic system is one in which at least one of its relations has properties taken from the set {*permission, prohibition, obligation, faculty, analogy*}. Being based on ontic possibility (*aletic modality*), these properties are significant in distinguishing human from nonhuman nature for the following reasons:

1) *Obligation* is a property of assumed constraints, with imperative norms of conduct, and that it makes describing possible acts or proposals like obligatory; they are deontically significant because obligatory relations comprise of the system's structure, creating rigidity, sometimes necessary for the existence of the own system. Also can exist obligatory stimuli coming from environment (another systems) and simultaneously, the system can produce obligatory responses towards environment.

2) *Permission* is the property of relations allowing the existence of these, not forcing its fulfilment; it is deontically significant because, unlike the obligation, permission resists the rigidity of the system, introducing a flexibility allowing its evolution. Allowed internal relations exist and allowed stimuli and responses also exist.

3) *Prohibition* is a property of imposed constraints of imperative character, preventing the development of determined relations; these are needed in deontic systems because they prevent conducts nonwished by the system and that developed they would be possible to be put in danger its own existence.

4) *Faculty* is the property of relations that allows the relation and allows the not-relation. Deontic systems must exhibit this property because it supposes the decision-making and it increases the degrees of freedom of the system, doing it dynamic. It reinforces the flexibility of the system and sometimes its instability.

Deontic systems contain Objects and Subjects:

1) *Subjects* are the human beings. We can distinguish him like observer (subjectively outside the system) and that by definition is the own Subject, or comprising of the system. In this case he acquires the category of object.

2) *Objects* (relative beings) are significances, which are consequence of the perceptuales beliefs on the part of the Subject of a material or energetic objects (absolute beings) with certain characteristics.

Sets of Objects will form an impure set of first order;

1) An impure set is whose referential elements (absolute beings) are not counted as abstract objects and has the next conditions: a) They are real (material or energetic absolute beings). b) They exist independently of Subject. c) Subject develops perceptual significances on them. d) True things can be said about them. e) Subject can know these true things about them. f) They have properties that support a robust notion of mathematical truth.

2) The systems of interest are called Deontic Impure Systems (DSI) to emphasize their essential characteristics.

We try to do it from both contradictory points of view: synchronous and diachronic, trying to find a nexus of union between both: Theory of Alysidal Sets and Coupling Functions. The DIS (*Deontic Impure System*) approach is the following one:

1) Objects are *perceptuales significances* (relative beings) of material or energetic objects (absolute beings).

2) The set of these objects will form an *impure set* of first order.

3) The existing relations between these relative objects will be of two classes: *transactions* of matter and/or energy and *inferential relations*.

4) Transactions can have *aletic modality*: necessity, possibility, impossibility and contingency.

5) Ontic existence of possibility causes that inferential relations have *deontic modality*: obligation, permission, prohibition, faculty and analogy.

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6) We distinguished between theorems (natural laws) and norms (ethical, legislative and costumary rules of conduct).

7) Each relation has intensity and direction.

8) Between these relative objects it exists, not an only relation, but *sheaves* of relations and going in both directions, clockwise and nonclockwise.

9) The sheaves also have intensity.

10) An inferential relation has *modal and neutrosophic components*.

11) In each sheaf there will be generating and generated relations.

12) Sheaves of both directions between two relative objects form a *freeway*. Relative objects united by freeways form a chain (network).

13) This network is a chain of transmission of direct or indirect causality. Therefore in our approach network will be denominated chain.

14) Being all the DIS' objects directly or an indirectly related to each other, it will be formed by a single chain with multiple ramifications.

15) An *Alysidal* set will be that whose elements are chains.

16) Coupling functions between alysidal sets can be established.

17) Special coupling function of recognition denominated *gnorpsic function* can be established.

18) Gnorpsic function allows operations of connection between systems.

19) Both semiotic environments **H'** and **H''** are also systems.

20) Clockwise sheaves Z form stimuli from **H'** semiotic environment to DIS.

21) Clockwise sheaves Y form response from DIS to **H''** semiotic environment.

22) Conditions of permission and prohibition of stimuli and responses are established.

23) One demonstrates that DIS is inconsistent or incomplete whenever the sheaf of stimuli is allowed by the system.

24) One settles down a semantics of relations and chains on the part of the observant Subject.

1.2. PREVIOUS SEMIOTIC HYPOTHESES

We will begin studying the synchronous approach, but we must establish a series of previous hypotheses.

1.2.1. Signs, significant and significance

Reality contains relative evidence, and the mental ways of communication and their extension, represented in the devices constructed by the social man, need to be understood. Beings do not have an intrinsic meaning and they only transform themselves into signs when we invested them with meaning. The signs are significant units that they take the form from words, images, sounds, gestures and objects, studied within a system of semiotic signs, like means or code.

Definition 1.1: *We define as* sign *to the unit able to transmit representative contents, that is to say, it is a being denominated significant, that is perceived due to the senses, and that in the communicative process is carrying of a information for the Subject.*

In any process, we can distinguish while it has a *significant* like inherent property, and having *significance* when it is related to the rest of processes of the Reality, that the Subject considers like system. (Sastre-Vazquez, P.. Usó-Doménech, J.L., Y. Villacampa, J. Mateu and P. Salvador. 1999; Usó-Domènech, J.L., G. Stübing, J. López-Vila, and P. Sastre Vázquez, 2002; Usó-Domènech, J.L., J. Mateu. 2004; Villacampa, Y. and Usó-Domènech, J.L. 1999; Villacampa-Esteve, Y., Usó-Domènech, J.L., Castro-Lopez-M, A. and P. Sastre-Vazquez, . 1999; Usó-Domènech, J.L. and Villacampa, Y., 2001)

 Definition 1.2: *The existence of information is independent of the fact that there is a Subject able to decode the message, which it is attempted to communicate. This objective information is termed* significant.

Definition 1.3: *The information in a message acquires meaning if a Subject decodes the message. This subjective information is termed* significance.

Therefore, the significant is an ontic property, considering that the significance will be it of system of meaning. Significant is absolute and infinite, significance is relative and finite. Significant it comes from the absolute being and significance generates the relative being. The significant is interpreted as the material or physical form of the sign

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and is something that can be caught (perception) by some of the traditional senses of the human being. The significance, on the other hand is a *mental constructo*. In our approach, the significant has a veritative value equal to 1, that is to say, $v(S) = 1$, whereas the significance has like veritative value a real number positive $v(s)$, between 0 and 1, corresponding 0 to *absolute ignorance of significant* (therefore of the process) and 1 to *absolute understanding*, that is to say, $v(S) = v(s)$.

Chandler (1998, 2004) insists on a phenomenon that, at least, has two faces: Reality (its perception) is distorted by our systems of signs, but that perception of the Reality is not independent of these signs. It does not exist the sign without significant and significance. Within this vision, the significant is considered as the form of the sign and the significance like the content. Eco (1973) affirms that all process can be given without we have no present object to explain what is, reason why we can try it assigning the explanation to a code. Independently of which it is made to explain, always significant will exist (visual, verbal, etc., or interpreters of signs). All it (Chandler, 2004), surrounds a philosophical discussion about the roll of the signs in the construction of the Reality. In this sense, modality has talked about to the status of Reality decided or demanded by a sign. In semiosis, an interpreter makes judgments of modality about this sign according to his own experience in the influential world, his environment and his social beliefs in the form in which he constructs his own judgments of modality. Modality name comes from the model of Peirce (1992-1998) that introduces the concept of referring as something within the world of the experience, referred to signic vehicle.

Definition 1.4: *We define as* semiotic modality *to the reference to the value of truth of the significance of a sign, distinguishing three aletic categories: present time, necessity and hypothetical possibility*.

Note 1.1: *Constituent elements of a system are symbols. Of this fact, it is deduced that a system is not more than a symbolic representation of the Reality.*

In agreement with Saussure (1977), signs are organized in codes of two ways: paradigms and sintagms. These two dimensions are represented like axes of a bi-dimensional space, where the vertical axis corresponds to paradigm and the horizontal

axis represents sintagm. In a three-dimensional space, the plane of paradigm is the one of selection whereas the plane of sintagm corresponds to combination. The sintagm is a combination ordered of significants, which they act among them, forming a totality with sense, in form of chain of elements often ordered of linear form. These combinations are constructed within a set of rules and syntactic conventions. Sintagmatic relations are the varied forms in which the elements of a same system can be related. A significant is sintagmatically related of synchronous form to other significant ones of the same level and constituting their context. Sintagms are defined as sequential (and therefore temporary). They can also represent space relations.

Consequence 1: *Sintagms are created according to the concatenation of significants in paradigmatic sets, chosen according to their property, conventional or required, by means of a determined system of rules, like the grammar.*

Consequence 2: *In sintagms, the significance of a sintagmatic unit comes determined by means of its relation with other sintagmatic units. Sintagms tend to narrow these same significances according to the context.*

Consequence 3: *In a paradigm, the significance comes determined by the way like difference from other significances, in the sense that the paradigms conceive a possible world plurality.*

Consequence 4: *Paradigms expand the Reality, whereas sintagms contracts it.*

1.2.2. The doxical filter

The significant coming from the sign becomes significance after passing through a filter or sieve, to which we will denominate doxical filter. This filter consists of two essential components: language and belief system.

1.2.2.1. The language

Language is in the origin of the systemic conception of the Reality. Language is possible to be defined like a symbolic substitute of the Reality, or as a system of signs. Different classes from objects exist, that they are characterized by different mental acts

through which we perceived them from its surroundings (Meinong, 1904). Objects of sensorial perception are different from objects of the thought, but these last ones are not less "objective" than the previous ones: they are apprehended through the thought but he does not constitute them. According to the terminology of Meinong, meaning subsists, whereas the individual beings and the qualities exist. In this sense, objects of the thought can be real without existing in the technical sense defined by Meinong. Mathematical objects are of this class. The first condition is (Agazzi, 1992) that these objects are there, and this is not made through an act of the discourse, but through the presence of these objects in the Subject's thought. Phenomenological situation is so perhaps that an object, simply by the fact to be present, offers to the Subject a irrefutable and only witness of itself. Referential situation is the situation of phenomenological presence of the object. And the truth of a sentence is the coincidence with the situation of its phenomenological presence. It is to notice that meant or understandings they are only partially faithful with respect to any particular phenomenological presence or referential situation that could denote. Some form of modalization (aletical, deontical or doxical) necessarily accompanies the communication. A great epistemological separation between thought and language exists. All organization of a language depends on a complex structure. An biunivocal correspondence between the perception of the Reality and the linguistic system is unthinkable. One operates from a superior order, from a mesosystem that would include them and in where both, appear like elements and not like closed and independent units. Horizontal forces of all system are those that determine their potential of significance. This means that no language is neutral. and that no space of representation is not neutral either. That is to say, the systemic conception, like any other semiotic conception, in the same way represents the Reality that other nonsystemic conceptions. By virtue of all the exposed one previously we can expose the following principle:

Principle of Semiotic Incompleteness: *It is not possible to totally characterize a structure of objects or processes, through a language (formal or not), or to totally even dominate a portion of "truth" that this language can express on these objects or processes through its deductive operation.*

Language is relative as well. How can we speak about absolute being, then? We can and we cannot. But that we cannot completely speak about it, it is not a reason to stop speaking about it (Wittgenstein, 1972), because we can incompletely represent its completeness We would not be able to speak about anything, because languages are incomplete. Language is used inside a context. Depending of this context th language will be different.

1.2.2.2. The Belief System

Reason cannot prove the beliefs it is based upon. Beliefs arise through experience. Nevertheless, experience needs of previous beliefs and reason to be assimilated, and reason needs of experience to be formed, as beliefs need reason as well. Beliefs, reason and experience, are based upon each other. Context is dynamic, and formed upon beliefs, reason and experience. It is there where the relative being lies. Since the relative being id dependant of our context, it is also dependant of our beliefs, reasoning, and experiences. Contexts are dynamics because they are changed constantly as we have new experiences; change our beliefs, and our ways of reasoning.

Definition 1.5: Belief systems Ϝ (Borhek, J.T. and Curtis, R.F., 1983*) are structures of norms that are interrelated and that vary mainly in the degree in which they are systematic. What is systematic in the Belief system is the interrelation between the several beliefs.*

Perceived Reality is constructed by means of systems of signs, being affected and being changed by means of Belief systems. Peirce (1992-1998) demonstrates that semiosis process has been half-full culturally, that is to say, within a certain Belief system. Subject cannot understand a sign without talking about to a system learned socially and that grants a sense to him to perception. In the same way, the classification of signs in closed typologies can be deceptive, since the status of the sign depends strongly on the form in which the sign is used within the Belief system. A significant one can nevertheless be iconic in a belief context and, to be symbolic in another context.

Consequence 1.5: *Signs cannot be classified in terms of categories without reference to the intentions of the Subject within individual belief contexts (Chandler, 1998).*

Consequence 1.6: *Sign within the semiosis process is not a monolithic and arbitrary being, but that is opened to the uses and interpretations within a language L and of a Belief system B (Eco, 1973; Chandler, 1998).*

Definition 1.6. A concept *is a set of inherent properties to the perception (significant) of a referring one, that translated in significance, registers similarities and differences on which the classes and classifications are based, and that within the natural language appear in, for example, names, adjectives and intransitive verb.*

Definition 1.7: *A system with concepts is* a semiotic system *when the ways of representation and the functional ones form pairs. The function is determined by semantic properties (significance) within the physical restrictions (significant).*

Note 1.2: *All system is, by definition, semiotic system, since by its own essence of interpretation of the Reality it cannot do without concepts.*

However, the one that gives rise to the concept it is not interpretation of the representation but the derived semantics. Such interpretation would derive from the Epistemology or ideological concept (belief system).

Definition 1.8: *We define as* Semiotic Environment*, to the environment formed by the epistemologies and associated with the Belief systems surrounding to the Subject.*

If semiotic environment conditions the content or message, it now appears problematic in the distinction between form and a content, introducing the idea that as much expression (significant) as content (significance) has substance and forms.

1.2.3. The conception of system

Let $\aleph$ be the Reality, being τ a part thereof, such that $\tau \subset \aleph$. Let S be a Subject conceiving the Reality through his doxical filter, made up of the own beliefs system Ŧ of his culture, and by a certain language L. Let K be the operator of knowledge. The

subject S is in a certain psychic state of organization of the Reality during a determined objective temporary interval $[t_0, t_n]$, fulfilling the:

Hypothesis 1.1 (Subjective condition): *The conception on the part of S of the ℵ will depend on the own conception that S has of itself within the Reality ת in which is including this Subject.*

Hypothesis 1.2 (Condition of rationality): *A subject S is rational if he fulfills some conditions to be described as rational. S is rational if he knows the laws of the logic.*
If $KP_1 \wedge K(P_1 \rightarrow P_2) \mapsto KP_2$.

Hypothesis 1.3: *The concept of system Σ is an abstract mental construction with an organisational concept of Reality, conceived by the Subject, by means of a perception (own or amplified) and ratiocination, through significances extracted from Reality and expressed by means of a specific language L.*

Hypothesis 1.4 (External condition): *The behavior of the system Σ(ת) is determined by the Belief system Ŧ that subject S conceiving this system assumes like true, about itself, the conceived system and its environment.*

Hypothesis 1.5: *A system is an organization of the knowledge on the part of the subject S that fulfils the following conditions:*
   a) *The subjective condition.*
   b) *The condition of rationality.*
   c) *The external condition.*
   d) *S knows what is a system.*

Let us suppose that we so have a set Γ formed by N subject that $\Gamma = \{S_1, S_2,..., S_N\}$ located "inside" of the system like observable and a Subject S located "outside" like observer. We will have a set formed by N operators of knowledge $K_1, K_2,..., K_N$, one for each subject. An expression as $K_1 P_1$ can be read as *Subject S1 knows P1.* Then

$K_1 K_2 P_1$ can be read as *S1 knows that S2 knows P1.* $K_1 P_1 \wedge K_1 (P_1 \rightarrow P_2) \rightarrow K_1 P_2$ can be interpreted like *if S1 knows P1 and knows that* $P_1 \rightarrow P_2$, *then knows P2.*

Hypothesis 1.6 (Internal condition): *Vision of a system Σ(ת) interpreted by the set formed by different subjects Γ inside the system, is determined by the Belief system Ŧ that said subjects or its majority conceives like true, about themselves, of the system and about its environment.*

Hypothesis 1.7: *A deontical system is an organization of the knowledge on the part of the subject S that fulfils the conditions of hypothesis 5 and 6 and the following others:*
  a) *Other subjects (human beings) are elements of the system.*
  b) *Some existing relations between elements have deontical modalities.*
  c) *A purpose (purposes) exists.*

Hypothesis 1.8: *Within the set of subjects Γ will exist two subgroups, Γ₁ and Γ₂ and so that cardΓ₁< cardΓ₂, being subgroup Γ₁ formed by subject directors, that is to say, those that they establish, make fulfill simultaneously and fulfill (or not) the relations with deontical modality (norms), and being subgroup Γ₂ formed by subject actors who fulfill (or not) the relations with deontical modality (norms). Therefore, and in reference to the subjects, there will be a hierarchic structure, understanding hierarchy like control structure and responsibility structure.*

Hypothesis 1.9: *The Subject S has so many relations with the reality that cannot extract of them a key to include them all.*

Absolute truth of the representations cannot be established, but it is possible to be shown when a given proposition is represented like true or no. The truth is *constructo* of semiosis, and like so it is the truth of a particular social group, within a Semiotic Environment, raising from values and beliefs of that group.

Consequence 1.7. *Reality has many collectors and therefore multiple subjective realities exist, that are product of definitions given by the Belief systems, and like such, they are not equal in status. Realities are confronted to each other, are fight places.*

LeShan and Margenau (1982) propose that the organization of the knowledge divides to the Reality in experience *dominions* and in each one of them certain observable phenomena are pronounced. Some dominions keep a direct relation to each other and when this happens it is possible to make a series of formulations defined on its relations. When the dominions are related to others according to the scales of dimensions or complexity usually it says that they form a *hierarchy*. In these conditions, the observable phenomena in a dominion cannot be conceived nor be predicted generally from another dominion. But if it is considered in opposed direction, we verified that the observable phenomena in the second dominion can be explained taking care of the phenomena of first. According to these authors, an important general law relative to the dominions is the following one: *the observable phenomena that appear in any dominion legitimately are related between itself.* In accordance with the present state of the knowledge and science, no dominion of experience is but real that another one. Each one exactly is so been worth as another one. "*Nature has neither rind nor bone*", said Goethe. We chose a dominion according to the sights that we have. Even though the dominions are related in a successive order no of them is more real than the other.

The dominions enter greater groupings called *spheres* and each sphere has a one special organization of the reality (its Metaphysical system) that is necessary so that the data of that sphere are valid. LeShan and Margenau divide the spheres of experience in five:

a) Sphere of things too small to be seen or touched at least theoretically: the Microcosm. It is the field of the Quantum Mechanics.

b) Sphere of the tactile line of vision and, until the limits of the instrumentation. It could be called also sensorial or of average existence.

c) Sphere of too great things or things that theoretically happen too fast to be seen or to be touched: Macrocosms. It is the field of the relativistic Physics.

d) Units of conduct with sense of alive things: conduct units that are over the reflections.

e) The inner human experience of the man, even the one of the own physical body.

The three first spheres are those in which the natural scientists apply their methods. What a sphere is an insurmountable problem - an impossibility- does not display any

difficulty in the other. A unique rationality does not exist either that governs the entire universe, all the Reality.

Hypothesis 1.10: *The essence of the organization of the Reality is in the fact that the data of each sphere of experience must be taken taking care of their own value without preconceptions. What can differ in each sphere of experience are not only observable and the its relations, they are not only the definitions of space, time, state and observer, but that can also defer the same methods from study for each dominion.*

In the sphere of the conduct units we could establish several different subspheres according to the human being exists or not:

a) Subsphere of the strictly biological thing.
b) Subsphere of the ecological relations (collective).
c) Subsphere of the conduct with sense or molar conduct referred the human being.
d) Subsphere of the molar conduct referred the human colectivity (social conduct).

In subspheres b and d, the possibility of prediction through statistical mathematical models exists, but that only indicates the probability of a tendency and the certainty of an only direction does not exist.

A deontical system will exclusively have in account spheres two and four, in subspheres b, c and d with respect to the system and sphere five with respect to the Subject S. We must, consider the following considerations:

1) **Entropy:** in spheres four and five, the second law of the thermodynamics is not verified of an exact way. Processes have negative entropy (neguentropy). The activity to molar human has a strong antientropic component and the same it happens with the sphere of the inner life.

2) **Purpose:** In spheres four and five the presence of a special observable is detected: the purpose. In sphere two, the state of a system in the present time determines what the state will be in a later time. In the sensorial spheres, the causality is the present state of the things and nothing else. The result of the action has not any effect in the action that is carried out only because of the way in which the things are in the present. In the sphere of molar conduct the result

of an action determines partly what it happens. As Leibniz says: *The spirits build in accordance with the laws of the final causes; the bodies build in accordance with the laws of the efficient causes.*

3) **Time:** The time is not the Newtonian time that flows everywhere of a way uniforms and inexorable in a direction. This it is the *objective time*. Molar conduct comes determined, partly, by the way in which the individual (or the colectivity) perceives the future. Cultural variations within a same society can produce noticeable differences in the way to perceive the time and to fit the behavior (LeShan, 1942). It is the subjective, personal or collective time, first depending on the individual, the second of the culture and even of the social groups within the same culture. However, in the subjective time, in those situations in which exactitude is needed, or in those situations in which it is necessary to define periods, it includes the time of the clock, the objective time. This way the objective time is a special case of the subjective time. If $[t_0, t_n]$ is one objective time interval and $[t_0^S, t_f^S]$ is one subjective time interval of the part of Subject S, then for this S $[t_0, t_f] \subseteq [t_0^S, t_f^S]$.

4) **Space:** Sphere 2 uses the Euclidean space In sphere four and five it is necessary to distinguish a *geographic space* and a *space of conduct*. The geographic space has a stable Euclidean component and a changing component according to the changes produced in the visual and tactile sphere. It can be more or less humid or dry; it can be cultivated field of trees or routes of communication, etc. The conduct space changes not only with our perception of changes like the mentioned ones in the previous paragraph, but that changes when changing our own conscience. Two people who are to 10 meters of a forest can be or not be to the same distance of the trees with respect to their inner experience and their to molar conduct. Two different cultures value of different form the territory where they are based, its limits, etc. The Euclidean geometric space is a special class of human space. Man perceives the human space that includes the geometric space. So that the Euclidean space is a special case of the personal or subjective space. If L is one objective space and L^S is one subjective space of the part of Subject S, then for this S $L \subseteq L^S$.

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5) **Prediction:** In the visual and tactile sphere the prediction is mechanical (determinist). Nevertheless, in the sphere of the molar conduct (sphere 4), the prediction is probabilistic and relative, never absolute. It is possible to be predicted that the probability that a situation occurs is greater than another one or than in certain individuals the probability that takes place it is greater than in others. After produced the event or the experience it can be that that event or that experience was certain and was inevitable. Before taking place, it is not possible generally to be predicted.

6) **Language:** In sphere 2 (visual and tactile) the daily natural language generally is useful and adapted, although there are relations in which the mathematical language is needed to express them. The same happens in the sphere of molar conduct. In this sphere the mathematical language is generally probabilistic and with use of the language of the modal logic. In sphere 5 of the inner life, it is not possible to use the daily language. Metaphors are used generally. No pertinent language to the data has been developed. There is no possibility of carrying out measurements, to quantify the data.

7) **Variation:** The behavior of S and the elements of Γ is not a constant. The tried "*human nature*" is not the same one in all the parts and all the times. A immutable and inexorable "*human nature*" does not exist.

Hypothesis 1.11: *We considered the concept of Necessity according to the context "absolute obligation". Here, Necessity no longer talks about a property of the parts of a speech, but to the property added to the real existence of a cognoscible being if we come from finite and contingent beings. The necessity of the human acts and in as much these, has to be ontically possible, contingent, will be a gnoseolgical property affecting to the intellectual ordering of phenomena but not such phenomena. It cannot be disobeyed natural laws (theorems). Nevertheless, in any case, it can be controlled by means of other, natural laws. Normative laws (norms, nontheorems) estimate, of necessary way, the breach possibility. This is its necessity. "Normative Law" and " Natural Law" are not analogued, but sintagms that include an ambiguous concept, nonanalogous to that, with much concession, we can metaphorically interpret.*

Consequence 1.8: *All system in whose relations exist deontic modalities will be put under relations with aletics modalities. That is to say, all system whose structure is formed by norms also will have a necessary structure of theorems.*

If we denoted like DS a system with deontic relational structure and AS a system with aletic relational structure, then $DA \subset DS$. That is to say, nobody deontic system is put under the necessity (understood like absolute obligation) of the theorems or natural laws, still ignoring the component human beings of this system its existence or interpreting them according to its belief system.

1.2.4. Subject and System

Let S be a Subject, Σ the system's concept, $\Sigma(ת)$ the conception that ת is a system. We shall refer to the knowledge operator as K and the belief operator as B. Therefore we may say that (Halpern, 1985):

1) If S knows that ת $\rightarrow \Sigma(ת)$ and also knows that ת, then it should also know that $\Sigma(ת)$: K(ת $\rightarrow \Sigma(ת)) \rightarrow ($ K ת $\rightarrow K\Sigma(ת))$.
2) S only knows what is true: K $\Sigma(ת) \rightarrow \Sigma(ת)$.
3) If S knows $\Sigma(ת)$, it knows what it knows: K $\Sigma(ת) \rightarrow KK\Sigma(ת)$.
4) *Rule of necessarity* [K(ת $\rightarrow \Sigma(ת)) \rightarrow ($ K ת $\rightarrow K\Sigma(ת))] \wedge [$ K $\Sigma(ת) \rightarrow \Sigma(ת)] \wedge [$ K $\Sigma(ת) \rightarrow KK\Sigma(ת)]$.
5) *Rule of non-monotonicity*: If for a subject S, with $\Sigma(ת)$ and Ŧ, does not belong to the Belief system $\Sigma(ת) \notin$ Ŧ, then $\neg$ K $\Sigma(ת) \in$ Ŧ, and we can state that Ŧ is a Stable Belief System.

Then for a subject S, we may establish the following axioms:

        a) Axiom 1.1: K $\Sigma(ת) \rightarrow \Sigma(ת)$.

        b) Axiom 1.2: B $\Sigma(ת) \rightarrow K\Sigma$.

        c) Axiom 1.3: B $\Sigma(ת) \rightarrow \Sigma(ת)$.

        d) Axiom 1.4: K $\Sigma(ת) \rightarrow KK\Sigma(ת)$.

        e) Axiom 1.5: B $\Sigma(ת) \rightarrow KB\Sigma(ת)$.

        f) Axiom 1.6: K $\Sigma(ת) \rightarrow B\Sigma(ת)$.

g) **Axiom 1.7:** ¬ **B** Σ(ת) → **K** ¬ Σ(ת).

h) **Axiom 1.8:** ¬ **B**¬ **K** Σ(ת) → **K** Σ(ת).

i) **Axiom 1.9:** ¬ **K** Σ(ת) → **B**¬ Σ(ת).

j) **Axiom 1.10:** ¬ **K**¬ Σ(ת) → **B** Σ(ת).

1.3. PERCEPTUAL BELIEFS

Gershenson (2001) defines two types of being: *absolute being* and *relative being*. The first one is independent of the observer S, infinite. The relative being is dependant of the Subject, therefore finite, and different in each individual. The absolute being is far from materialism. Materialism is relative, and we cannot say for sure if beings are absolutely only materialistic or not, because we do not know what matter is absolute. Subject can only suppose about what things are absolute, he cannot be absolutely sure, he can only speculate, because they are absolutely infinite and Subject is not. Subject cannot say that something is absolutely true or false. He can only assert beings in a relative way and he could assign truth valour or vectors to them, but these would be relative to his context. The being would be the conjunction of relative being and absolute being, with the corresponding confusion derived from the fact to define and to speak about something that is absolute and relative, infinite and finite at the same time. That is what we do every day. Beings do not have an intrinsic meaning and they only transform themselves into signs when we invested them with meaning.

1.3.1. Connotation and denotation

Consequence 1.9: *Linguistic sign is not only an element that enters the communication process, but that is an organization comprising of the meaning process.*

Significance of a linguistic sign also depends on the code in where it is located, since the codes give a scheme, compound also by belief conventions, within as the linguistic sign it acquires sense. It allows so much the interpretation as text interpretation (*systems*), each one of these organized in agreement of codes and subcodes reflecting values, attitudes, beliefs, assumptions and practices. This implies a certain stability in the relations between significant and significance, restricting the amount of possible interpretations.

Consequence 1.10: *Semiotic systems are not synonymous or equivalent and the same thing in systems based on different units cannot be described.*

Definition 1.9: *We define* denotation *like the literal, obvious definition or of the common sense of the significance of a sign.*

Definition 1.10: *We define* connotation *to socio-cultural and individual associations, the ideologies derived from the belief systems, and the emotional ones belonging to the psychology of the Subject, and that is indirect function of the Semiotic Environment (context) in which is immersed.*

Both distinctions involve the use of learned codes. The significance tends to be multiplied from an individual sign, until it is equipped with many meaning that goes beyond which now the sign says. Different orders from meaning or levels of significance exist:

1) The first order of significance is exactly the one of the denotation, in whose level it exists a sign t consisting of significant and significance.
2) The connotation is a significance of second order that uses the denotative sign (with significant and significance) like its significant, with an additional associate significance.

This distinction considers to the connotation as a sign that is derived from significant of a denotative sign, so that the denotation takes us to a chain of connotations. Denotation is an underlying and primary significance.

Consequence 1.11: *The significant S or significance s depends entirely on the level in which it operates the analysis. Then, which is significance in a level of the context, it can be significant in another one.*

The subject receives two types of semiotic stimuli:

a) Significant of the own process or being.

b) The significant of the transmitted semiotic stimulus or significant of the significance (connotation).

This fact forces to distinguish two types of significant:

Definition 1.11: *We define as* A-significant (A-S) or significant of first order, *to the significant that it is inherent to the beings, processes or phenomena of the referring context.*

Definition 1.12: *We define as* B-significant (B-S), significant of second order or connotation, *to the significant of significance s.*

Connotation B-S has a veritative value $v'(B-S)=1$, having simultaneously, a relative veritative value or connotative veritative value $v(s) \in [0,1]$. That is to say, we received solar light rays with significant S and a significance s of the light, Sun, etc, concepts with a veritative value $v(s) \in [0,1]$, having relative significant (B-S) with a veritative value $v'(B-S)=1$.

Consequence 1.12: *Changes in the form of the significant can generate different connotations.*

Let F be a Belief system and L be a language both forming a doxical filter.

Definition 1.13: *Each significance s is function of the components of a doxical filter, that is to say, the Belief system and its associated language, so that s=f(F, L). This function f we will denominate* significance function.

Consequence 1.13: *The definition of the connotation of a sign is the set of possible senses or significances, depending on contexts and Subjects.*

Consequence 1.14: *The denotation is most stable and apparently verifiable of the connotations.*

Consequence 1.15: *If the sign is something that interposes, interpreted by the Subject, we can affirm that the sign always has connotation, and denotation is only the dominant connotation, arriving to be interpreted like the true meaning of a being, process or text.*

Consequence 1.16: *The relative veritative value of denotation or denotative veritative value will be* $v'(B-S)=1$.

Consequence 1.17: *All the B-significant including in the conceptual space of perception of the Reality (context), will be denotative, therefore, they will have for the Subject an denotative veritativo value equal to 1.*

We are going to call s to the systemic significance being a denotative significance. We will call ζ to the set of significant (signs) of Reality and ζ_Σ to the set of systemic significants, that is to say, the part of signs that have been limited by the Subject when establishing the borders of the system, and so that $\zeta_\Sigma \subset \zeta$.

Definition 1.14: *We define as a* denotative systemic significance (d-significance) s_Σ *iff it is a function defined in* ξ *so that if* $\xi_\Sigma \subset \xi$ *then* $s_\Sigma(\xi_\Sigma) \subseteq \xi_\Sigma$

Note 1.3: *A denotative sistemic significance (d-significance) is the significance of the absolute beings.*

Note 1.4: *The concept of denotative sistemic significance (d-significance) agrees with the one of the relative beings.*

1.3.2. Perceptual beliefs

Let S be a subject, and O an object under specified conditions. The Maddy's conditions (Maddy, 1990, 1996). for physical perceptions are the following:
The S perceives O if:

1) There exists O. It is the *absolute being*.

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2) S has perceptual beliefs pB about O, in terms of the appropiate sort of concepts. Rather than talking about a physical object belief, one talks about the concept of a physical object or *relative being*. This is based on the assumption that having a concept of a physical object entails that one has the physical object beliefs.

3) O causes S's beliefs B about O.

Definition 1.15: *To the significances, that are consequence of the perceptuales beliefs pB on the part of the Subject S of an object O with certain characteristic C, we called* perceptual significances (p-significance) *and we will denote it like ps.*

1.4. THE IMPURE SETS

A set is a mathematical object. We can to establish three possible theses (Benacerraf, 1973; Maddy (1990, 1996):

1) Knowledge of mathematical objects requires a causal relation between those objects and Subject. There is taken to be a consequence of the causal theory of knowledge.

2) On the Platonist's account there can be no causal relations between mathematical objects and other entities. There is results from the characterization of mathematical objects as abstract.

3) We know some mathematics.

Mathematical perception is that it be as similar as possible to physical perception.

Definition 1.16: *We define as* impure sets (Maddy, 1990) *those sets whose referential elements (absolute beings) are not counted as abstract objects and has the next conditions:*

a) *They are reals (material or energetic absolute beings).*

b) *They exist independently of Subject.*

c) *S develops p-significances on them.*

d) *True things can be said about them.*

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    e) Subject can know these true things about them.

    f) They have propeties that support a robust notion of mathematical truth.

Maddy considers two main lines of objection:

1) There are not states in the Platonic sense of real objects, separate from the activity of Subject. This objection is countered by appealing to Quine&Putnam type indespensability arguments (Quine, 1969): there is not way to account for the practice and utility of mathematics other than through assuming the existence of some mathematical objects, and these will generally include sets.The only strong arguments against these indespensability claims are Field-type proposals for nominalizing mathematics (Field, 1980, 1989).

2) Even if it is granted that sets exist, if dues not follow the Subject perceives a set rather than some other sort of physical or abstract object. Subject's perception involves, among other things, a *numerical belief nB* (Booth, R., 2002). Objections concern the bearer of this numerical property about which Subject has his belief. The first proposal is that the physical stuff has the numerical property but Frege's objection to this: the physical stuff has no determinate numerical properties.

3) There exist four options, for something that divides up the physical stuff (MacCallum, 2000):

    a) The sets exist.

    b) The Aggregate: Some would say, the objects, meaning by this the physical stuff divided up by the property of being an object.

    c) The concept: A numerical statement is a statement about a concept.

    d) The class: what is usually called the class of objects.

Sets, aggregates, concepts and classes require numerical properties. Subject S is perceiving a set not because he perceives that it is a set, but because he perceives something that bears a numerical and mathematical properties and his theoretical concerns, based on Quine/Putman arguments, tell him that this bearer of the mathematical properties is a set.

Let Ψ be a mathematical object, (i.e. an impure set of rank one) under same specified conditions. Previous arguments concerning the bearer of the numerical property have establishe this:

1) **<u>Condition 1</u>:** *is that there be an impure set in front of S.*

2) **<u>Condition 2</u>:** *is that S has a perceptual belief about the impure set in front of him. It is not necessary that S perceive that the bearer of numerical property is a set, only that theoretical considerations tell him that the object of his belief is a set. S may not know that is a set he is perceiving even if he has pBs concerning the set.*

3) **<u>Condition 3</u>:** Ψ *causes S's nBs about* Ψ. *This stablish the necessary link between causal interaction and perception. In according Maddy (1990), the mathematical concept (nB) of a set is as independent of language as the physical concept of object; both are formed prior to acquisition of the relevant linguistic abilities.*

Definition 1.17: *We define as* s-impure *sets those sets formed by the p-significances of impure sets, that act like referring in the Subject's mind, by means of the numerical and perceptual beliefs.*

Note 1.5: *P-significances are d-significances of objects pertaining to impure sets.*

Definition 1.18: *We define as* s-impure set of second order *to the set whose elements are s-impure sets.*

2. STRUCTURE

2.1. RELATIONS

Systemic philosophy asks the question, "*How can we understand systems?"* We look at the world in terms of facts and events in the context of wholes, and we understand them as integrated sets purposefully arranged in systemic relations. Systemic relations express (for subject S) causality within the system. Three essential types of causality exist, the relation cause-effect, relation effect-cause and, finally, inferential relation.As Beaugrande and Dressler say (1997), the "*relations of causality regulate the way in which a situation or an event influences in the conditions that are to occur so that it happens another event*". Relational determination is causal and causal connections are of two classes: *transactions and relations*.

Definition 2.1: A binary transaction *is direct exchange of energy and matter between two absolute beings.*

Binary transactions have the following properties:

1) Transactions are ontic or "*real*" categories.
2) Transactions have priority in model formulation since they imply transferences of matter or forces between absolute beings without which relations could not be defined.
3) Nevertheless, given an established ontic dominion, relations can initiate and condition transactions and in this sense to be high-priority.

Definition 2.2: A binary relation *is indirect consequence of these direct exchanges, extended to two or more absolute being in a certain time interval* $[t_0, t_f]$.

Binary relations have the following properties:

1) Relations are epistemic or "*virtual*" categories, implicit in transactions.
2) It is impossible to define that it is first in a system: transactions or relations.

Definition 2.3: Inferential interactions *are defined how the transactions or relations between relative beings whose p-significance is* informational, *extending physical matter and forces that sublie in their absolute beings.*

2.2. THE FUNDAMENTAL STRUCTURE

For our approach, we shall use the hypothesis of system linkage, developed by Lloret et al. (1998).

Definition 2.4: *A* semiotic system *is a system whose set object M is formed by the significance of ontological entities or relative beings and whose relational set R_I is formed by inferential relations.*

Consequence 2.1: *Every system formulated by the Subject S is a semiotic system.*

Omphalical Belief condition: of the Greek language "*omphalos*" (*ομφαλος*), the *axis mundi* is a symbol representing the point of connection between sky and earth. This places it at the center of the world: at its omphalos (navel), the world's point of beginning. *The Reality א has not an objective center. Nevertheless, Subject S is the subjective center of everything what it surrounds to him, of the Reality. He is the omphalos.*

Janus Belief condition*: Subject S thinks that the Reality (an system $\Sigma(ה)$) is outside him. **It is part of the Reality and its center and simultaneously is separated. He thinks (he believes) about the existence of environment according to the conception of the Cartesian dualism: "*I and my environment*". The sight towards inside (on himself) and outwards (environment).***

Consequence 2.2: *Semiotic systems are oriented, causal and functional systems defined by a Subject which is considered external (by the Omphalical and Janus conditions) and whose object set responds to information.*

Definition 2.5: *A* simple impure system-linkage *Σ≡ (M, R) is a semiotic system consisting of the par formed by an impure object set M the elements of which are p-significances (relative beings) of entities belonging to Reality (absolute beings) or certain attributes of these, and a set of binary relations, such that R ⊂ P(M x M) = P(M²). That is* $\forall r \in R / r \subset M\ XM$ *being* $r = \left\{ \left(x_i, y_j \right) \in MxM\ /\ x_i, y_j \in M \right\}$

The simple empty system-linkage is defined by $\varnothing \equiv (\varnothing, \varnothing)$. Impure system-linkage, as a semiotic system, will be *closed* if the Subject dispenses with external environment to it and *open* if it does not do so.

Definition 2.6: *An impure system-linkage defined within an impure object set M is a simple system S = (M, R) or a finite union of simple systems-linkage $\Sigma = \cup^n_{i=1} \Sigma_i$ such that Σ_i are simple systems. This shall be denoted as $\Sigma \equiv (M, R)$ such that $R \subset P(\cup_{finite} M^2)$.*

Note 2.1: *An impure system-linkage shall be open iff the Subject recognises the existence of an external environment to it.*

Definition 2.7: *We will denominate* variable *to the p-significance of an absolute being or of some of their specific attributes.*

Let M be an impure object set formed by p-significances of absolute beings or their attributes. So that

$$\amalg = \{M\} \cup \{MxM\} \cup \{MxMxM\} \cup ... \cup \left\{ \underbrace{MxMxMx...xM}_{n} \right\} = \{M\} \cup \{M^2\} \cup \{M^3\} \cup .... \cup \{M^n\}$$

If $Card\ M = m$ then $Card \amalg = m + m^2 + m^3 + ... + m^n = \dfrac{m(m^n - 1)}{m - 1}$

2.2.1. The sheaf of relations

Between two variables x_1 and x_2 belonging to an impure object set M there may be multiple relations $r_1, r_2,....,r_m$ of different physical and informational characteristics, etc.

Definition 2.8: *We define* sheaf of relations *and we denote it as* h_{ik} *to the multiple relations existing between two variables* x_i *and* x_k, $x_i, x_k \in M$

A sheaf may be *monorelational* if there is a single relation between two variables. It shall be *bi-relational*, if there are two, and *n-relational* if there are n relations. The *empty sheaf* indicates the non-existence of relations between two variables.

Let Ж be *the set of all the possible binary relations, does not matter as it is the nature of the relation.* To this set Ж we will call *space of relations.* We define a relational set R like $R \subset$ Ж, that is to say $\forall r_i \in R / r_i \in$ Ж. The relations form *tuplets* thus we defines a *set of tuplets* $\amalg$ so that:

$$\amalg = \begin{cases} L_1 = \left\{ x_0, x_2, ..., x_{n-1} \right\} = \left\{ l_0^1, l_1^1, ..., l_{n-1}^1 \right\} \\ L_2 = \left\{ (x_0, x_0), (x_0, x_1), ..., (x_{n-1}, x_{n-1}) \right\} = \left\{ l_0^2, l_1^2, ..., l_{n^2-1}^2 \right\} \\ L_3 = \left\{ (x_0, x_0, x_0), (x_0, x_0, x_1), ..., (x_{n-1}, x_{n-1}, x_{n-1}) \right\} = \left\{ l_0^3, l_1^3, ..., l_{n^3-1}^3 \right\} \\ .... \\ L_n = \left\{ \left(\overset{\leftarrow.........n.........\rightarrow}{x_0, x_0, ..., x_0} \right), ..., \left(\overset{\leftarrow.........n.........\rightarrow}{x_{n-1}, x_{n-1}, ..., x_{n-1}} \right) \right\} = \left\{ l_0^n, l_1^n, ..., l_{n^n-1}^n \right\} \end{cases}$$

That is

$$\amalg = L_1 \cup L_2 \cup ... \cup L_n = \overset{n}{\underset{i=1}{\cup}} L_i$$

The super index indicates the number of variables, which form a tuplet, and the sub index is a natural number where the relation between the variables that form the la tuplet is codified. Its codification is as follows:

We shall consider the tuplet l_i^k and we make the divisions

$$i:n \rightarrow \begin{cases} remainder = r_1 \\ quotient = c_1 \end{cases}$$

$$c_1:n \rightarrow \begin{cases} remainder = r_2 \\ quotient = c_2 \end{cases}$$

....

$$c_{k-2}:n \rightarrow \begin{cases} remainder = r_{k-1} \\ quotient = c_{k-1} \end{cases}$$

Thus, the tuplet l_i^k represents the relation

$$x_{c_{k-1}} \rightarrow x_{r_{k-1}} \rightarrow x_{r_{k-2}} \rightarrow .... \rightarrow x_{r_2} \rightarrow x_{r_1}$$

Example 2.1: Should the system contain 5 variables

The decodification of l_{14}^3 is

$$14:5 = \begin{cases} remainder = 4 \\ quotient = 2 \end{cases} \qquad 2:5 = \begin{cases} remainder = 2 \\ quotient = 0 \end{cases} \qquad x_0 \rightarrow x_2 \rightarrow x_4$$

***

We denominate set $\amalg$ as *space of abstract tuplets*, as it entails all the possibilities of existing chains in the system.

Each element l_i^k, $i = 0, 1,...,n^n-1$; $k =1, 2,...,n$; constitutes a tuplet of variables.

We define *a space of sheaves* such as

$$H = \begin{cases} H_1 = \{x_0, x_1,...,x_{n-1}\} = \{h_0^1, h_1^1,...,h_{n-1}^1\} \\ H_2 = \left\{ \left(x_0 \overset{h_{00}}{\Longrightarrow} x_0 \right), \left(x_0 \overset{h_{01}}{\Longrightarrow} x_1 \right),..., \left(x_{n-1} \overset{h_{(n-1)(n-1)}}{\Longrightarrow} x_{n-1} \right) \right\} = \{h_{00}, h_{01},..., h_{nn}\} = \{h_0^2, h_1^2,.., h_{n^2-1}^2\} \\ H_3 = \left\{ \left(x_0 \overset{h_{00}}{\Longrightarrow} x_0 \overset{h_{00}}{\Longrightarrow} x_0 \right), \left(x_0 \overset{h_{00}}{\Longrightarrow} x_0 \overset{h01}{\Longrightarrow} x_1 \right),..., \left(x_{n-1} \overset{h_{(n-1)(n-1)}}{\Longrightarrow} x_{n-1} \overset{h_{(n-1)(n-1)}}{\Longrightarrow} x_{n-1} \right) \right\} = \{h_0^3, h_1^3,.., h_{n^3-1}^3\} \\ .... \\ H_n = \left\{ \left(x_0 \overset{h_{00}}{\Longrightarrow} x_0 \overset{h_{00}}{\Longrightarrow},...., \overset{h_{00}}{\Longrightarrow} x_0 \right),.., \left(x_{n-1} \overset{h_{(n-1)(n-1)}}{\Longrightarrow} x_{n-1} \overset{h_{(n-1)(n-1)}}{\Longrightarrow},..., \overset{h_{(n-1)(n-1)}}{\Longrightarrow} x_{n-1} \right) \right\} = \{h_0^n, h_1^n,.., h_{n^n-1}^n\} \end{cases}$$

The space of sheaves refers solely to the sheaf h, and not to the variables related. The subindex indicates the order of the tuplet and the supraindex indicates the number of variables existing in the tuplet. The symbol $\Rightarrow$ indicates the existence of a sheaf. Its coding is equal to the foregoing.

From the space of sheaves H we will choose H_1 or set of binary sheaves.

Note 2.2: *Sheaves h_{nn} are feedback loops.*

Definition 2.9: *We define the* Lexicon $\Im$ *to set formed by p-significances (relative beings) of absolutes beings or their attributes or either by notions, terms (variables and constants, predicates and verbal forms and logical constants).*

Note 2.3: $M \equiv L_1 \equiv H_1 \subseteq \Im$

Definition 2.10: *We will call* binary sheaf *to the set of existing relations between two elements of an s-impure set.*

Sheaf has the following properties:

1) It exists the empty binary sheaf.
2) It exists the sheaf with a single relation (monorelational sheaf).
3) Each one of the p existing relations in a binary sheaf is compatible with the other relations of same binary sheaf.
4) All element of M is related to same itself by means of one sheaf.
5) If Δ is Cartesian product *MXM* the fact that a ordered pair $\left(x_i, x_j\right)$ is in ΔH usually it is denoted like h_{ij}.
6) Δ admits a matrix representation, whenever the dominions of sheaf are finite. Let n be the number of elements of set $\Im$. Then *the matrix associated* to Δ is *the Boolean matrix* with n rows and n columns.

$$M_{\Delta} = \begin{bmatrix} h_{00} & h_{01} & \cdots & h_{0n} \\ h_{11} & h_{12} & \cdots & h_{1n} \\ \cdots & \cdots & \cdots & \cdots \\ h_{n1} & h_{n2} & \cdots & h_{nn} \end{bmatrix}$$

Let Δ_i be a set such as $\Delta_i \subset \Delta$. H_i also admits a matrix representation with r rows and c columns.

$$M_{\Delta_i} = \begin{bmatrix} h_{11} & \cdots & h_{1c} \\ \cdots & h_{ij} & \cdots \\ h_{r1} & \cdots & h_{rc} \end{bmatrix}$$

given by

$$h_{ij} = \begin{cases} 1 & if \quad x_i \Rightarrow x_j \\ \\ 0 & if \quad \neg(x_i \Rightarrow x_j) \end{cases}$$

Let us suppose that $M_1 \subset M$ and $M_2 \subset M$. We make observe that the matrix associated to M_1 and M_2, $M_{\Delta_1} = [h_{ij}]$ and $M_{\Delta 2} = [h'_{ij}]$ allow us to make easily, in the finite case, basic the set operations by means of logic operations between the matrix entrances. Since we are going to operate with Boolean values, that is to say, values of veracity with which we may conduct the logical operations of negation, conjunction, disjunction, conditional and biconditional, we are going to denote, to simplify the annotation, the disjunction like a sum and the conjunction like a product. It is easy to verify that:

a) The associated matrix to $M_1 \cup M_2$ is $M_{\Delta 1} + M_{\Delta 2}$, where the sum of matrix "+" is understood component to component.

b) The associated matrix to $M_1 \cap M_2$ is $M_{\Delta 1} * M_{\Delta 2}$, where the product of matrix "*" is understood component to component.

c) The associated matrix to $\bar{M}_1$ is $\neg M_{\Delta}$, in where all the Boolean entrances of the matrix are denied.

d) The associated matrix to $M_1 \backslash M_2$ is $M_{\Delta 1} * (\neg M_{\Delta 2})$, $M_1 \subseteq M_2$ iff $M_{\Delta 1} \rightarrow M_{\Delta 2}$, it is to say $\forall i, j, \quad h'_{ij} \rightarrow h''ij$.

e) $M_1 - M_2$ iff $(M_{\Delta 1} \rightarrow M_{\Delta 2}) \wedge (M_{\Delta 2} \rightarrow M_{\Delta 1})$, it is to say iff $M_{\Delta 1} = M_{\Delta 2}$.

The domain of a binary sheaf h_{ij} is the set of all the first components of h_{ij} and its rank is the set of all the second components. Formally:

$$\text{Domain } h_{ij} = \{ \ x_i \in M \ / \ \exists \ x_j, \ (x_i \ , \ x_j) \in h_{ij} \ \}$$
$$\text{Rank } h_{ij} = \{ \ x_j \in M \ / \ \exists \ x_i, \ (x_i \ , \ x_j) \in h_{ij} \ \}$$

Definition 2.11: *Given a relation R we will call* inverse relation *and we denote it like* R^{-1}, *to relation* $R^{-1} \subseteq MxM$ *defined by* $\forall x_i, x_j \in M, (x_j, x_i) \in R^{-1} \leftrightarrow (x_i, x_j) \in R.$

Definition 2.12: *The* inverse *one of a sheaf* h_{ij}, *indicated* h^{-1}_{ji} *is obtained investing each one of the pairs that belong to h, thus:*

$$h^{-1}_{ji} = \{ \ (x_i \ , \ x_j) \ / \ (x_j \ , \ x_i) \in h_{ij} \} \wedge \{ \ x_i \ h_{ij} \ x_j \ \leftrightarrow \ x_j \ h^{-1}_{ji} \ x_i \}$$

The domain of the inverse one of a sheaf is always the rank of h_{ij} and the rank of h_{ji}^{-1} is the domain of h_{ij}.

Definition 2.13: *We define as* clockwise sheaf *(sheaf of direct relations) and we denote as d-h_{ij} if the p relations forming the sheaf go of element x_i to element x_j. We can represent it like* $x_i \overset{d-hij}{\Longrightarrow} x_j$

Definition 2.14: *We define as* nonclockwise sheaf *(inverse sheaf or sheaf of inverse relations) and we denote as l-h_{ii} if the p' relations forming the sheaf go of element x_j to element x_i. We can represent it like* $x_i \overset{l-hij}{\Longleftarrow} x_j$

Definition 2.15: *We define as* reciprocal relation *between two elements x_i and x_j belonging to set M if the relation is to time a clockwise and nonclockwise relation.*

Definition 2.16: *We define* as reciprocal sheaf *and we denote as r-h_{ij} if the p-relations forming the sheaf is going from element x_i to element x_j and going from element x_j to*

element x_i. *We can represent it like* $x_i \overset{r-hij}{\longleftrightarrow} x_j$ *and such that*

$$d - h_{ij} \cap l - h_{ij} = \left\{ r_{ij} \right\} = r - h_{ij}.$$

Between two elements x_i and x_j can exist of complementary form *d-h$_{ij}$, l-h$_{ij}$ and r-h$_{ij}$ sheaves.*

Within same sheaf, independent and dependent relations can exist.

Definition 2.17: *If h$_{ij}$ and h$_{jk}$ are sheaves, their* composition $h_{ij} \circ h_{jk}$ *is defined as:*

$$h_{ij} \circ h_{jk} = \{ (x_j , x_k) \in M \times M \ / \ \exists \, x_k \in M \ / \ (x_j , x_k) \in h_{jk} \ \wedge \ (x_i , x_j) \in h_{ij} \}$$

In general, the composition is not commutative.

Definition 2.18: *We define as* independent relation, *to that it does not depend on other existing ones in same sheaf.*

Definition 2.19: *We define as* dependent relation, *to that it depends on other existing ones in same sheaf, and so that* $r_i = f(r_1,...,r_n)$ *being* $(r_1,...,r_n)$ *independent between itself.*

Definition 2.20: *To the dependent relation that comes conditioned by other independent relations, it receives the name of* generated relation, *and to the independent ones that they condition, we will call* generating relations *to them.*

Definition 2.21: *To the independent relation that is not generating we will denominate it like* singular relation.

Property 2.1: *The generated relations are independent to each other.*

By property 1, we will consider the generated relations like independent between itself.

Definition 2.22: *Let h_{ij}, h_{jm} be two sheaves $h_{ij}, h_{jm} \subseteq \mathfrak{I}_2 X \mathfrak{I}_3$. We define as* composition *of sheaves* *and we denote as* $h_{ij} \circ h_{jm}$ *to sheaf* $h_{im} \subseteq \mathfrak{I}_1 X \mathfrak{I}_3$ *defined by*

$$\forall x_i \in \mathfrak{I}_1, \forall x_m \in \mathfrak{I}_3, x_i \overset{h_{im}}{\Longrightarrow} x_m \leftrightarrow \exists x_l \in \mathfrak{I}_2 \text{ such as } \left(x_i \overset{h_{il}}{\Longrightarrow} x_l \right) \wedge \left(x_l \overset{h_{lm}}{\Longrightarrow} x_m \right)$$

The associated matrix to the sheaf $h_{ij} \circ h_{jm}$ is $M_{\Delta 1} \bullet M_{\Delta 2}$

2.2.2. The freeway

Definition 2.23: *We define as* freeway *between two elements x_i and x_j and we denote as Φ_{ij} to the set constituted by the sheaves $d\text{-}h_{ij}$, $l\text{-}h_{ij}$ and $r\text{-}h_{ij}$. We can represent it like*

$x_i \Longleftrightarrow x_j$.

Therefore, in a freeway Φ_{ij} there will be three directions: clockwise sheaf, reciprocal sheaf and nonclockwise sheaf.

We will denominate Φ to the space of freeways.

$$\Phi = \begin{cases} \Phi_0 = \{x_0, x_1, ..., x_{n-1}\} = \{\phi_0^1, \phi_1^1, ..., \phi_{n-1}^1\} \\ \Phi_1 = \left\{ \left(x_0 \overset{\phi_{00}}{\Longleftrightarrow} x_0 \right), \left(x_0 \overset{\phi_{01}}{\Longleftrightarrow} x_1 \right), ..., \left(x_{n-1} \overset{\phi_{(n-1)(n-1)}}{\Longleftrightarrow} x_{n-1} \right) \right\} = \{\phi_{00}, \phi_{01}, ..., \phi_{nn}\} \end{cases}$$

Note 2.4: *Freeways φ_{nn} are feedbacks loops.*

Note 2.5: $M = L_1 = H_1 = \Phi_0 \subseteq \mathfrak{I}$. That is to say, the impure set object is simultaneously set of empty relations, empty sheaves and empty freeways.

The domain of a binary freeway φ_{ij} is the set of all the first components of φ_{ij} and its rank is the set of all the second components. Formally:

$$\text{Domain } \varphi_{ij} = \{ x_i \in M \,/\, \exists \, x_j, \ (x_i, x_j) \in \varphi_{ij} \}$$
$$\text{Rank } \varphi_{ij} = \{ x_j \in M \,/\, \exists \, x_i, (x_i, x_j) \in \varphi_{ij}\}$$

Note 2.6: *Inverse freeway does not have sense.*

Definition 2.24: *If φ_{ij} and φ_{jk} are sheaves, their* composition $\varphi_{ij} \circ \varphi_{jk}$ *is defined as:*

$$\varphi_{ij} \circ \varphi_{jk} = \{ (x_j, x_k) \in M \times M \ / \ \exists \, x_k \in M \ / \ (x_j, x_k) \in \varphi_{jk} \wedge (x_i, x_j) \in \varphi_{ij} \}$$

In general, the composition is not commutative.

2.2.3. The chains

Definition 2.25: *A* chain $\wp_i^k$ *will be an abstract chain, the elements or variables of which are related by means of freeways, that is,* $\wp_\omega^k = x_i \Longleftrightarrow x_j \Longleftrightarrow .... \Longleftrightarrow .x_\omega$

1) We represent the chain like $\wp_i^k$, in where the subscript i represents the number of constituent variables (p-significances) of the chain, and the supraindex k an arbitrary number of identification.

2) In every chain $\wp_i^k$ there will be a number of freeways equal to the number of variables which are components of the chain less one, that is, if the number of variables which are components of the chain is n, the number of freeways will be n – 1.

3) Each constituent variable will be a *node*.

4) Each freeway that leaves from a node will form a *branch*.

5) The initial node will be the *root node*.

6) The terminal will be an *apical node*. In a chain can have an single node root but several terminals.

7) The chain having more nodes will be denominated *trunk* and its terminal node will be *top apical node*.

8) Chains whose root node is connected by means of a freeway with the apical node are *cyclical chains*.

2.3. THE ALYSIDAL SET

The concept of Alysidal (from the Greek αλυσιδα: *chain*) set is essential in the approach of Deontical Impure Systems, in order to be able to formulate a theory of connection of

systems, inputs from **H'** environment and outputs to **H''** environment (Patten, 1978, 1982).

Definition 2.26: *We define as* alysidal set *to the set whose elements are chains formed by relative beings united by freeways of inferential relations and/or transactions.*

The alysidal sets has the following properties:

a) A relative object (p-significance) considers a monochain, that is to say, element of an alysidal set.

b) An alysidal set can be considered like a special class of system in where their elements (chains) are not interrelated.

c) Each alysidal element can be considered either like a system in itself or like a subsystem.

d) The emptiness alysidal set $\varnothing$ exists.

e) For an alysidal set A_{al}, the difference $U - A_{al}$, where U is the universe of discurse, is called the complement of A and it is denoted by A_{al}^{C}. Thus A_{al}^{C} is the set of everything that is not in A_{al}.

f) An ordered pair is a pair of alysidal elements with an order associated with them. If alysidal element are represented by $\wp_{i}^{k}$ and $\wp_{j}^{l}$, $i \begin{cases} = j \\ \neq j \end{cases}, k \neq l$, then we write the ordered pair as $\left(\wp_{i}^{k}, \wp_{j}^{l}\right)$.

Two ordered pairs $\left(\wp_{i}^{k}, \wp_{j}^{l}\right)$ and $\left(\wp_{n}^{u}, \wp_{m}^{v}\right)$ are equal if and only if $\wp_{i}^{k} = \wp_{n}^{u}$ and $\wp_{j}^{l} = \wp_{m}^{v}$.

g) Let A_{al} and B_{al} be two alysidal sets. The set of all ordered pairs $\left(\wp_{i}^{k}, \wp_{j}^{l}\right)$, where $\wp_{i}^{k}$ is an element of A_{al} and $\wp_{j}^{l}$ is an element of B_{al}, is called the Cartesian product of A_{al} and B_{al} and is denoted by $A_{al} \text{X} B_{al}$.

Let A_{al} and B_{al} be two Alysidal sets. The operations between alysidal sets are the following ones:

Union: The union of alysidal sets A_{al} and B_{al}, denoted by $A_{al} \bigcup B_{al}$, is the set defined as

$$A_{al} \bigcup B_{al} = \left\{ \wp_i^k \middle| \wp_i^k \in A_{al} \vee \wp_i^k \in B_{al} \right\}$$

Intersection: The intersection of alysidal sets A_{al} and B_{al}, denoted by $A_{al} \bigcap B_{al}$, is the set defined as

$$A_{al} \bigcap B_{al} = \left\{ \wp_i^k \middle| \wp_i^k \in A_{al} \wedge \wp_i^k \in B_{al} \right\}$$

Difference: The difference of alysidal sets A_{al} from B_{al} , denoted by $A_{al} - B_{al}$, is the set defined as

$$A_{al} - B_{al} = \left\{ \wp_i^k \middle| \wp_i^k \in A_{al} \wedge \wp_i^k \notin B_{al} \right\}$$

Note that in general $A_{al} - B_{al} \neq B_{al} - A_{al}$

2.4. COUPLING OF ALYSIDAL SETS

2.4.1. Binary alysidal relations

Definition 2.27: *We define as* binary alysidal relation $\Re_{al}$ *between two alysidal elements* $\wp_n^k, \wp_m^l$ *of an alysidal set* A_{al} *and we denote as* $\wp_n^k \Re_{al} \wp_m^l$ *to the freeway existing between these two alysidal elements.*

We do not have to forget that the elements of an alysidal set are chains. Like a chain is formed by n nodes connected by freeways of relations, will not be the same alysidal relation if this part of a node x_i that of another different x_j from $\wp_n^k$. For the same reason, it will not be the same alysidal relation if it arrives to $\wp_m^l$ at a same node that to another different one from the same chain $\wp_n^k$. Therefore, the possible number of binary alysidal relations between $\wp_n^k$ and $\wp_n^k$ elements will be nxm and we propose the representation of the binary alysidal relation will be $\wp_n^k \overset{nxm}{\underset{al}{\Re}} \wp_m^l$.

Definition 2.28: *We define as* alysidal product *between two alysidal sets A_{al} and B_{al} and we denote as* $A_{al} \overset{nxm}{\underset{al}{X}} B_{al}$ *the set of all ordered binary alysidal relations* $\wp_n^k \overset{nxm}{\underset{al}{\Re}} \wp_m^l$, *where* $\wp_n^k$ *is an element of A_{al} and $\wp_m^l$ is an element of B_{al}.*

For example, we suppose the alysidal set A_{al} formed by the following elements $\wp_{n1}^1, \wp_{n2}^2, \wp_3^3$ and the alysidal set B_{al} formed by $\wp_{m1}^1, \wp_{m2}^2, \wp_{m3}^3, \wp_{m4}^4$. We can represent the alysidal product $A_{al} \overset{nxm}{\underset{al}{X}} B_{al}$ in the following table (Table 2.1):

TABLE 2.1.

A_{al}\\B$_{al}$	$\wp_{m1}^1$	$\wp_{m2}^2$	$\wp_{m3}^3$	$\wp_{m4}^4$
$\wp_{n1}^1$	$\wp_{n1}^1 \overset{n1xm1}{\underset{al}{\Re}} \wp_{m1}^1$	$\wp_{n1}^1 \overset{n1xm2}{\underset{al}{\Re}} \wp_{m2}^2$	$\wp_{n1}^1 \overset{n1xm3}{\underset{al}{\Re}} \wp_{m3}^3$	$\wp_{n1}^1 \overset{n1xm4}{\underset{al}{\Re}} \wp_{m4}^4$
$\wp_{n2}^2$	$\wp_{n2}^2 \overset{n2xm1}{\underset{al}{\Re}} \wp_{m1}^1$	$\wp_{n2}^2 \overset{n2xm2}{\underset{al}{\Re}} \wp_{m2}^2$	$\wp_{n2}^2 \overset{n2xm3}{\underset{al}{\Re}} \wp_{m3}^3$	$\wp_{n2}^2 \overset{n2xm4}{\underset{al}{\Re}} \wp_{m4}^4$
$\wp_{n3}^3$	$\wp_{n3}^3 \overset{n3xm1}{\underset{al}{\Re}} \wp_{m1}^1$	$\wp_{n3}^3 \overset{n3xm2}{\underset{al}{\Re}} \wp_{m2}^2$	$\wp_{n3}^3 \overset{n3xm3}{\underset{al}{\Re}} \wp_{m3}^3$	$\wp_{n3}^3 \overset{n3xm4}{\underset{al}{\Re}} \wp_{m4}^4$

The number of subbinary alysidal relations will be:

$$n_1 xm_1 + n_1 xm_2 + n_1 xm_3 + n_1 xm_4 + n_2 xm_1 + n_2 xm_2 + n_2 xm_3 + n_2 xm_4 + n_3 xm_1 + n_3 xm_2 + n_3 xm_3 + n_3 xm_4$$

In general $\sum_{i=1}^{n}\left(\sum_{j=1}^{m} n_i xm_j\right)$

We can see that $A_{al} \overset{nxm}{\underset{al}{X}} B_{al} = B_{al} \overset{mxn}{\underset{al}{X}} A_{al}$

Note that $A_{al} \overset{n}{\underset{al}{X}} \varnothing = \varnothing \overset{n}{\underset{al}{X}} = \varnothing$ because there is no element in $\varnothing$ to form ordered binary alysidal relations with elements of A_{al}.

Definition 2.29: *If* $\underset{al}{\overset{nxn}{\Re}} \subseteq A_{al} \underset{al}{\overset{nxn}{XA}}$ *one says that* $\underset{al}{\overset{nxn}{\Re}}$ *is a* binary alysidal relation in A_{al},

and $\underset{al}{\overset{nxn}{\Re}}$ *"relates" alysidal elements of A_{al} to each other.*

The trivial alysidal relation in A_{al} are the universal alysidal relation $\underset{al}{\overset{nxn}{\Re}} = A_{al} \underset{al}{\overset{nxn}{XA}}$ y la

and the empty alysidal relation $\underset{al}{\overset{nxn}{\Re}} = \varnothing.$

Of between the diverse properties that can (or not) have a binary alysidal relation in A, most interesting

1. Reflective: if $\wp_n^k \underset{al}{\overset{nxn}{\Re}} \wp_n^k, \forall \wp_n^k \in A_{al}$

2. Nonreflective: if $\wp_n^k \neg (\underset{al}{\overset{nxn}{\Re}})\wp_n^k, \forall \wp_n^k \in A_{al}$

3. Symmetrical: if $\forall \wp_n^k, \wp_m^l \in A_{al}, \wp_n^k \underset{al}{\overset{nxm}{\Re}} \wp_m^l \Rightarrow \wp_m^l \underset{al}{\overset{mxn}{X}} \wp_n^k.$

4. Antisymmetrical: if $\forall \wp_n^k, \wp_m^l, \wp_r^z \in A_{al}, (\wp_n^k \underset{al}{\overset{nxm}{\Re}} \wp_m^l) \wedge (\wp_m^l \underset{al}{\overset{mxrr}{X}} \wp_r^z) \Rightarrow \wp_r^z = \wp_m^l.$

5. Nontransitive: if $\forall \wp_n^k, \wp_m^l, \wp_r^z \in A, (\wp_n^k \underset{al}{\overset{nxm}{\Re}} \wp_m^l) \wedge (\wp_m^l \underset{al}{\overset{mxrr}{X}} \wp_r^z) \Rightarrow \left(\wp_n^k \neg \left(\underset{al}{\overset{nXz}{\Re}} \right) \wp_r^z \right)$

2.4.2. Coupling functions (Freeway theory)

We considered that the existing relation between chains is a freeway. It indicates that it goes in both directions. We do not consider the intensity, at least in this stage of the theory.

Definition 2.30: *We define* coupling correspondence *between two alysidal sets A_{al} and B_{al} a map $f_{al}:A_{al} \rightarrow P(B_{al})$ from the elements(chains) of the alysidal set A_{al} to the power set of B_{al}.*

Property 2.2: *For all alysidal element $\wp_n^k$ in A_{al}, $f_{al}(\wp_n^k)$ is not empty. In other words, each alysidal element in A_{al} maps to a non-empty subset of B_{al}; or in terms of a coupling relation R_{al} as subset of $A_{al} \underset{al}{\overset{nxm}{X}} B_{al}$, R_{al} projects to A_{al} surjectively*

Coupling relation R_{al} is freeway of relations.

Definition 2.31: *We define a multivalued coupling function as a total relation; i.e. every input is associated with one or more outputs.*

Definition 2.32: *We define a well-defined coupling function f_{al} to that associates one, and only one, output to any particular input.*

True coupling functions are single-valued. However, a multivalued coupling function from A_{al} to B_{al} can be represented as a single-valued coupling function from A_{al} to the set of nonempty subsets of B_{al}.

The coupling function cannot be unique. Let A_{al} the alysidal set domain, B_{al} be the alysidal set codomain. Let $\wp_n^k \in A_{al}$ be an alysidal element formed by n nodes and $\wp_m^l \in B$ other element formed by m nodes. Between $\wp_n^k$ and $\wp_m^k$ will be nxm possible freeways of connection. We denote as $\underset{al}{\overset{nxm}{f}}$.

Definition 2.33: *We define a partial coupling function f_{al}^p $\underset{al}{\overset{nxm\,P}{f}}$ as a binary coupling relation that associates each element of an alysidal set, sometimes called its alysidal domain, with at most one element of another alysidal set, called its alysidal codomain. However, not every element of the alysidal domain has to be associated with an element of the alysidal codomain. (Figure 2.1).*

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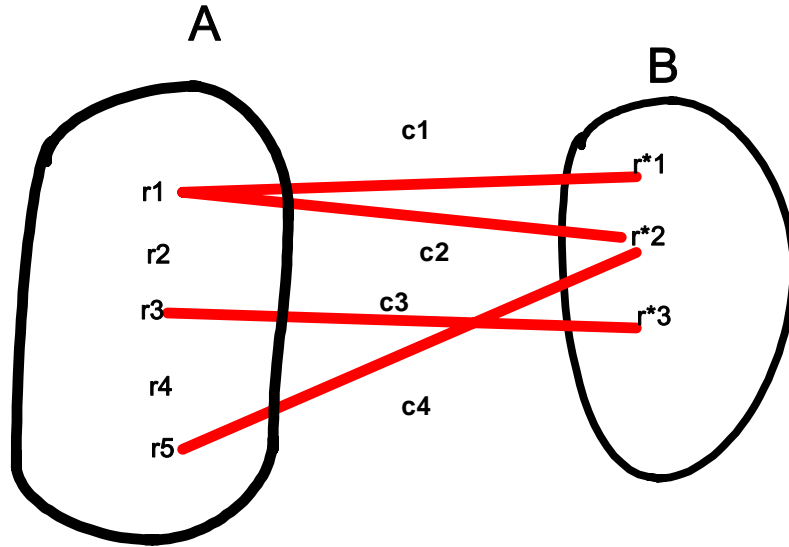
Figure 2.1.

Example 2.2: In figure 2.1 exists the following coupling binary correspondences:

$$\left(\wp_1,\wp_1^*\right)\left(\wp_1,\wp_2^*\right)\left(\wp_3,\wp_3^*\right)\left(\wp_5,\wp_2^*\right)$$

Let n_1, n_3, n_5 be the number of nodes of alysidal elements of $\wp_1, \wp_3, \wp_5$ and m_1, m_2, m_3 be the the number of nodes of alysidal elements of $\wp_1^*, \wp_2^*, \wp_3^*$. The alysidal correspondence possibilities will be:

$$c_1 \rightarrow n_1 x m_1$$
$$c_2 \rightarrow n_1 x m_2$$
$$c_3 \rightarrow n_3 x m_3$$
$$c_4 \rightarrow n_5 x m_2$$

Then the number of partial coupling functions wil be $n_1 x m_1 + n_1 x m_2 + n_3 x m_3 + n_5 x m_2$.

$$***$$

If every element of the alysidal domain of a binary alysidal relation f_{al} is associated to exactly one element of its alysidal codomain, then $f^p{}_{al}$ is termed a total coupling function, or simply a coupling function. A total coupling function is a partial coupling function; this is consistent with the concept that the whole is a part of itself.

Definition 2.34: *The* domain *of a partial coupling function* $f : A_{al_{al}} \xrightarrow{nxm} B_{al}{}^{P}$ *is* B_{al}.

Definition 2.35: *Let* $\overset{nxm}{\underset{al}{f}}$ *be a coupling function whose alysidal domain is an alysidal set*

A_{al}*. It is an* injective coupling function *if, for all* $\wp_n^k$ *and* $\wp_m^l$ *in* A_{al} *such that*

$$\overset{nxm}{\underset{al}{f}}\left(\wp_n^k\right)= \overset{nxm}{\underset{al}{f}}\left(\wp_m^l\right), \text{ we have } \wp_n^k = \wp_m^l.$$

1) For any alysidal set A_{al}, the identity coupling function on A_{al} is an injective coupling function.

2) Coupling functions with left inverses are always coupling injections.

3) Conversely, every coupling injection $\overset{nxm}{\underset{al}{f}}$ with non-empty domain has a left inverse $\overset{mxn}{\underset{al}{g}}$.

4) Injections may be made invertible. In fact, to turn an injective coupling function $\overset{nxm}{\underset{al}{f}}: A_{al} \to B_{al}$ into a bijective coupling function (hence invertible), it suffices to replace its alysidal codomain B_{al} by its actual alysidal range $J_{al} = \overset{nxm}{\underset{al}{f}}\left(A_{al}\right)$.

   That is, let $\overset{mxn}{\underset{al}{g}}: A_{al} \to J_{al}$ such that $\overset{mxn}{\underset{al}{g}}\left(\wp_n^k\right)= \overset{nxm}{\underset{al}{f}}\left(\wp_n^k\right)$ for all $\wp_n^k$ in A_{al}; then $\overset{mxn}{\underset{al}{g}}$ is bijective. Indeed, $\overset{nxm}{\underset{al}{f}}$ can be factored as $incl_{J,B}og$, where $incl_{J,B}$ is the inclusion coupling function from J_{al} into B_{al}.

5) If $\overset{nxm}{\underset{al}{f}}$ and $\overset{mxn}{\underset{al}{g}}$ are both injective coupling function, then the composition $\overset{nxm}{\underset{al}{f}}$ o $\overset{mxn}{\underset{al}{g}}$ is an injective coupling function. The composition of two injective coupling functions is an injective coupling function.

6) If $\overset{mxn}{\underset{al}{g}} \circ \overset{nxm}{\underset{al}{f}}$ is an injective coupling function, then $\overset{nxm}{\underset{al}{f}}$ is an injective coupling

function (but $\overset{mxn}{\underset{al}{g}}$ need not be).

7) $\overset{nxm}{\underset{al}{f}}: A_{al} \to B_{al}$ is injective iff, given any coupling functions $\overset{mxn}{\underset{al}{g}}$,

$\overset{mxn}{\underset{al}{h}}: C_{al} \to A_{al}$ whenever $\overset{nxm}{\underset{al}{f}} \circ \overset{mxn}{\underset{al}{g}} = \overset{nxm}{\underset{al}{f}} \circ \overset{nxm}{\underset{al}{h}}$, then $\overset{mxn}{\underset{al}{g}} = \overset{nxm}{\underset{al}{h}}$. In other words,

injective coupling functions are precisely the monomorphism in the category

Alysidal Set of alysidal sets.

8) If $\overset{nxm}{\underset{al}{f}}: A_{al} \to B_{al}$ is an injective coupling function and A_{al}' is an Alysidal

subset of A_{al}, then $\overset{mxn}{\underset{al}{f}}^{-1}\left(\overset{nxm}{\underset{al}{f}}\left(A_{al}'\right)\right) = A_{al}'$. Thus, A_{al}' can be recovered from its

image $\overset{nxm}{\underset{al}{f}}\left(A_{al}'\right)$.

9) If $\overset{nxm}{\underset{al}{f}}: A_{al} \to B_{al}$ is an injective coupling function and A_{al}' and A_{al}'' are both

alysidal subsets of A_{al}, then $\overset{nxm}{\underset{al}{f}}\left(A_{al}' \cap A_{al}''\right) = \overset{nxm}{\underset{al}{f}}\left(A_{al}'\right) \cap \overset{nxm}{\underset{al}{f}}\left(A_{al}''\right)$.

10) Every function $\overset{nxm}{\underset{al}{h}}: C_{al} \to B_{al}$ can be decomposed as $\overset{nxm}{\underset{al}{h}} = \overset{nxm}{\underset{al}{f}} \circ \overset{nxm}{\underset{al}{g}}$ for a

suitable coupling injection $\overset{nxm}{\underset{al}{f}}$ and coupling surjection $\overset{nxm}{\underset{al}{g}}$. This decomposition

is unique up to isomorphism, and $\overset{nxm}{\underset{al}{f}}$ may be thought of as the inclusion

function of the range $\overset{nxm}{\underset{al}{h}}(C_{al})$ of $\overset{nxm}{\underset{al}{h}}$ as an alysidal subset of the Alysidal

codomain B_{al} of $\overset{nxm}{\underset{al}{h}}$.

11) If $f:A_{al}\overset{nxm}{\underset{al}{\rightarrow}}B_{al}$ is an injective coupling function, then B_{al} has at least as many alysidal elements as A_{al}, in the sense of cardinal numbers.

12) If both A_{al} and B_{al} are finite with the same number of Alysidal elements, then $f:A_{al}\overset{nxm}{\underset{al}{\rightarrow}}B_{al}$ is an injective coupling function iff $\overset{nxm}{\underset{al}{f}}$ is a surjective coupling function

Definition 2.36: *A coupling function* $f:A_{al}\overset{nxm}{\underset{al}{\rightarrow}}B_{al}$ *is* surjective iff *its alysidal range* $\overset{nxm}{\underset{al}{f}}\left(A_{al}\right)$ *is equal to its alysidal codomain B_{al}.*

A surjective coupling function is called a coupling surjection.

1) For any alysidal set A_{al}, the identity coupling function id_A on *A* is surjective. There always exists a coupling function "reversible" by a coupling surjection. Every coupling function with a right inverse is a coupling surjection.

2) The converse is equivalent to the axiom of choice: coupling function $f:A_{al}\overset{nxm}{\underset{al}{\rightarrow}}B_{al}$ is a coupling surjective function iff there exists a function $g:B_{al}\overset{nxm}{\underset{al}{\rightarrow}}A_{al}$ such that, $\overset{nxm}{\underset{al}{f}}$ **o** $\overset{nxm}{\underset{al}{g}}$ equals the identity function on B_{al}. Note that $\overset{nxm}{\underset{al}{g}}$ may not be a complete inverse of $\overset{nxm}{\underset{al}{f}}$ because the composition in the other order, $\overset{nxm}{\underset{al}{g}}$ o $\overset{nxm}{\underset{al}{f}}$ may not be the identity on A_{al}. In other words, $\overset{nxm}{\underset{al}{f}}$ can undo or "*reverse*" $\overset{nxm}{\underset{al}{g}}$, but not necessarily can be reversed by it.

3) Coupling surjections are not always invertible (bijective coupling function).

4) If $\overset{nxm}{\underset{al}{f}}$ and $\overset{nxm}{\underset{al}{g}}$ are both surjective, then $\overset{nxm}{\underset{al}{f}}$ o $\overset{nxm}{\underset{al}{g}}$ is a surjective coupling function.

5) If $\overset{nxm}{\underset{al}{f}}$ o $\overset{nxm}{\underset{al}{g}}$ is a surjective coupling function, then $\overset{nxm}{\underset{al}{f}}$ is a surjective coupling

   function (but $\overset{nxm}{\underset{al}{g}}$ need not be).

6) $\overset{nxm}{\underset{al}{f}}:A_{al} \rightarrow B_{al}$ is a surjective couplng function iff, given any coupling

   functions $\overset{nxm}{\underset{al}{g}}, \overset{nxm}{\underset{al}{h}}:B_{al} \rightarrow C_{al}$, whenever $\overset{nxm}{\underset{al}{g}}$ o $\overset{nxm}{\underset{al}{f}} = \overset{nxm}{\underset{al}{h}}$ o $\overset{nxm}{\underset{al}{f}}$, then $\overset{nxm}{\underset{al}{g}} = \overset{nxm}{\underset{al}{h}}$. In

   other words, surjective coupling functions are precisely the epimorphism in the
   category Alysidal Set of alysidal sets.

7) If $\overset{nxm}{\underset{al}{f}}:A_{al} \rightarrow B_{al}$ is a surjective coupling function and B_{al}' is an alysidal

   subset of B_{al}, then $\overset{nxm}{\underset{al}{f}}\left(\overset{nxm^{-1}}{\underset{al}{f}} (B_{al}') \right) = B_{al}'$. Thus, B_{al}' can be recovered from its

   preimage $\overset{nxm^{-1}}{\underset{al}{f}} (B_{al}'))$.

8) For any coupling function $\overset{nxm}{\underset{al}{h}}:A_{al} \rightarrow C_{al}$ there exists a coupling surjection

   $\overset{nxm}{\underset{al}{f}}:A_{al} \rightarrow B_{al}$ and a coupling injection $\overset{nxm}{\underset{al}{g}}:B_{al} \rightarrow C_{al}$ such that $\overset{nxm}{\underset{al}{h}} =$

   $\overset{nxm}{\underset{al}{g}}$ o $\overset{nxm}{\underset{al}{f}}$.

9) Every coupling surjection induces a coupling bijection defined on a quotient of
   its alysidal domain. More precisely, every coupling surjection
   $\overset{nxm}{\underset{al}{f}}:A_{al} \rightarrow B_{al}$ can be factored as a projection followed by a coupling

   bijection as follows: Let $A_{al}/\approx$ be the equivalence classes of the alysidal set A_{al}

   under the following equivalence relation: $\wp_n^k \approx \wp_m^l$ iff $\overset{nxm}{\underset{al}{f}}(\wp_n^k) = \overset{nxm}{\underset{al}{f}}(\wp_m^l)$.

   Equivalently, $A_{al}/\approx$ is the alysdal set of all preimages under $\overset{nxm}{\underset{al}{f}}$. Let $P(\approx) : A_{al}$

   $\rightarrow A_{al}/\approx$ be the projection map which sends each $\wp_n^k$ in A_{al} to its equivalence

class $[\wp_n^k]_{\approx}$, and let $\overset{nxm}{\underset{al\ P}{f}} : A_{al} / \approx\ \to B_{al}$ be the well-defined coupling function

given by $\overset{nxm}{\underset{al}{f}} \left([\wp_n^k]_{\approx}\right) = \overset{nxm}{\underset{al}{f}} \left(\wp_n^k\right)$. Then $\overset{nxm}{\underset{al}{f}} = \overset{nxm}{\underset{al\ P}{f}}$ o $P(\approx)$.

10) If $\overset{nxm}{\underset{al}{f}} : A_{al} \to B_{al}$ is a surjective coupling function, then A_{al} has at least as

many alysidal elements as B_{al}, in the sense of cardinal numbers.

11) If both A_{al} and *Bal* are finite with the same number of alysidal elements, then

$\overset{nxm}{\underset{al}{f}} : A_{al} \to B_{al}$ is a surjective coupling function iff *f* is an injective coupling

function.

Definition 2.37: *A* bijective coupling function *is a coupling function* $\overset{nxm}{\underset{al}{f}}$ *from an*

alysidal set A_{al} to an alysidal set B_{al} with the property that, for every $\wp_m^l$ in B_{al}, there is

exactly one $\wp_n^k$ in A_{al} such that $\overset{nxm}{\underset{al}{f}} \left(\wp_n^k\right) = \wp_m^l$.

Alternatively, $\overset{nxm}{\underset{al}{f}}$ is a bijection coupling function if it is a one-to-one coupling

correspondence between those alysidal sets.

1) A bijective coupling function from an alysidal set to itself is also called an
   alysidal permutation.

2) The set of all bijection coupling functions from A_{al} to B_{al} is denoted as $(AB)_{al}$.

3) A coupling function $\overset{nxm}{\underset{al}{f}}$ is bijective iff its inverse coupling relation $\overset{nxm\ -1}{\underset{al}{f}}$ is a

   coupling function. In that case, $\overset{nxm\ -1}{\underset{al}{f}}$ is also a coupling bijection.

4) The composition $\overset{nxm}{g} \circ \overset{nxm}{f}$ of two coupling bijections $\overset{nxm}{f}$ $(AB)_{al}$ and $\overset{nxm}{g}$ $(BC)_{al}$ is a coupling bijection. The inverse of $\overset{nxm}{g} \circ \overset{nxm}{f}$ is ($\overset{nxm}{g} \circ \overset{nxm}{f}$)$^{-1}$ = $\overset{nxm^{-1}}{f} \circ \overset{nxm^{-1}}{g}$. A coupling bijection is composed of a coupling injection and a coupling surjection. On the other hand, if the composition $\overset{nxm}{g} \circ \overset{nxm}{f}$ of two coupling functions is a bijective coupling function, we can only say that $\overset{nxm}{f}$ is an injective coupling function and $\overset{nxm}{g}$ is <u>a</u> surjective coupling function.

5) A coupling relation $\overset{nxm}{f}$ from A_{al} to B_{al} is a bijective coupling function iff there exists another coupling relation $\overset{nxm}{g}$ from B_{al} to A_{al} such that $\overset{nxm}{g} \circ \overset{nxm}{f}$ is the coupling identity function on A, and $\overset{nxm}{f} \circ \overset{nxm}{g}$ is the coupling identity function on B. Consequently, the alysidal sets have the same cardinality.

6) If A and B are finite alysidal sets, then there exists a bijection coupling function between the two alysidal sets A_{al} and B_{al} iff A_{al} and B_{al} have the same number of alysidal elements.

7) For any alysidal set A_{al}, the identity coupling function id_A from A_{al} to B_{al}, defined by $id_X(\wp_n^k) = \wp_n^k$, is bijective coupling function.

8) If A_{al} is an alysidal set, then the bijective coupling functions from A_{al} to itself, together with the operation of functional coupling composition (^{o}), form a symmetric of $_{al}A$, which is denoted by S(A_{al}).

9) For an alysidal subset A_{al}' of the domain with cardinality $|A_{al}'|$ and alysidal subset B_{al}' of the codomain with cardinality $|B_{al}'|$, one has the following equalities:

$$\int\limits_{al}^{nxm} f\left(A_{al}{}'\right)=\left|A_{al}{}'\right|$$

$$\int\limits_{al}^{nxm-1} f\left(B_{al}{}'\right)=\left|B_{al}{}'\right|$$

.

If A_{al} and B_{al} are finite alysidal sets with the same cardinality, and

$f:A_{al}\overset{nxm}{\underset{al}{\longrightarrow}}B_{al}$, then the following are equivalent:

1. $\int\limits_{al}^{nxm} f$ is a coupling bijection.

2. $\int\limits_{al}^{nxm} f$ is a coupling surjection.

3. $\int\limits_{al}^{nxm} f$ is a coupling injection.

10) At least for a finite alysidal set A_{al}, there is a bijection between the set of possible total orderings of the alysidal elements and the set of coupling bijections from A_{al} to A_{al}. That is to say, the number of permutations of elements of A_{al} is the same as the number of total orderings of that set.

2.4.3. Coupling functions (Sheaf theory)

We suppose now that they are not clockwise freeways but sheaves going from the alysidal set A_{al} to the alysidal set B_{al}. All the conditions previously expressed for coupling functions will be fulfilled, with the exception of the nonexistence of the inverse function. It is because the sheaf goes in a single direction (clockwise) and reversibility possibility does not exist.

2.4.4. The gnorpsic function

How one has specified in previous paragraphs, if alysidal element $\wp_i^k$ of A_{al} has n nodes and the alysidal element $\wp_j^l$ of B_{al} has m nodes, the space of possibilities of coupling will be nxm. Nevertheless, in this space of possibilities, a single one "is chosen" so much by alysidal element $\wp_i^k$ as by the $\wp_j^l$. The other possibilities are rejected, how if alysidal element $\wp_j^l \in B_{al}$ "knew" in that certain node must make coupling. Therefore,

we will have to define a function of knowledge or gnorpsic (of the Greek γνωρψία: to know) associated to the connection between alysidal element $\wp_i^k \in A_{al}$ and the $\wp_j^l \in B_{al}$.

Definition 2.38: *We define as* gnorpsic function *and we denote as* $\overset{m_j}{\underset{n_i}{\omega f}} \wp_i^k \to \wp_j^l$ *the function that determines that node n_i (departure node) of alysidal element $\wp_i^k \in A_{al}$ is connected with node m_j (arrival node) of alysidal element $\wp_j^l \in B_{al}$.*

If connection of n_i (departure node) is only with a single arrival node m_j, the function will be mononorsic and we denote as $\overset{m_j}{\underset{n_i}{1 f}} \wp_i^k \to \wp_j^l$. If connection of n_i (departure node) is with two arrival node m_j, m_k, the function will be bignorsic and we denote as $\overset{m_j,mk}{\underset{n_i}{2 f}} \wp_i^k \to \wp_j^l$. If connection of n_i (departure node) is only with three arrival node m_j, m_k, m_l the function will be trinorsic and we denote as $\overset{m_j,m_k,m_l}{\underset{n_i}{3 f}} \wp_i^k \to \wp_j^l$. If connection of n_i (departure node) is with many arrival node m_j, m_k, m_l, …,m_ω the function will be polinorsic and we denote as $\overset{m_j,m_k,...,m_\omega}{\underset{n_i}{\omega f}} \wp_i^k \to \wp_j^l$.

Subindex n_i indicates the departure node, supraindex m_j the arrival node and supraindex ω the order of coupling.

1) Each pair of connected alysidal elements will have, therefore, one gnorpsic associate function.
2) Gnorpsic function will depend on modales components such as necessity, obligation, permission and faculty.

2.5. THE IMPURE SYSTEM

2.5. 1. The Impure System

Definition 2.39: *A* simple multirelational impure system Σ_S *shall be defined:*

1) *As the pair formed by set object M and a set of n-tuplet relations $R \subseteq \coprod$ and we denote as $\Sigma_S = (M, \Re)$*

2) *As the pair formed by the object set M and a set of n-tuplet relations $\Re \subseteq \coprod$ and we denote as $\Sigma_S = (M, \Re)$ with $\Im$ being the lexicon, such that $\Im = \{\Xi\} \wedge$ {notions, terms: variables and constants, predicates and verbal forms and logical constants}, being $\Xi = M = \{l_0^1, l_1^1, ..., l_{n-1}^1\} = \{x_i\}_{i=1,...,n}$ a s-impure set and $\Re$ the set of freeways.*

Note 2.7: *In the first case the Lexicon defines a semio-ontic simple complex-multirelational*-impure *system. In the second case, it defines a semio-ontic simple complex-multirelational-impure system.*

For our purposes, we have used the second option.

Definition 2.40: A complex multirelational impure system *defined within an impure set object M is a simple multirelational impure system $\Sigma_S = (M, \Re)$ or a finite union of simple multirelational impure systems $\Sigma_\cup = \bigcup_{i=1}^{n} (\Sigma_S)_i$ such that $(\Sigma_S)_i$ are simple multirelational impure systems.*

Definition 2.41: *An* n-complex multirelational-impure system *defined within a Lexicon $\Im$ or simply* an impure system *is a* simple complex-multirelational-impure system $\Sigma_{CS} = (\Im, \Re)$ *or a finite union of simple complex-multirelational-impure systems $\Sigma = \bigcup_{i=1}^{n} (\Sigma_{CS})_i$ and such that $(\Sigma_{CS})_i$ are complex-multirelational-impure systems.*

Note 2.8: *By comfort, we will denote the impure systems like Σ. We choose this letter due to being the first of the word "system" in Greek: Σύστημα.*

Definition 2.42: *In an impure system* $\Sigma = (M, \Re)$, *the structure is considered* hierarchic *iff no subset of M is a loop.*

2.5.2. Impure System and its Environment

In the same way as in the impure system, the Subject S could perceive it as closed or open, according to whether or not it ignores the existence of an environment H, theoretically external to it. We suppose the existence of both environments H' and H''(Lloret-Climent et al. 2001, 2002; Patten, 1978, 1982; Usó-Doménech et al., 2002[a, b], 2004). Nevertheless, although subject S conceives they how something chaotic, anarchical and not structured, also are structures. Therefore, we can consider stimuli (inputs) how clockwise sheaves (d-sheaves) coming from some alysidal element belonging to some alysidal set being in stimulus environment **H'**.

We will denominate $A_{al}^{H'}$ to the alysidal set belonging to **H'**, and $^{H'}\wp_i^k \in A_{al}^{H'}$ a departure alysidal element, h_{ij} a stimulus sheaf and $\wp_j^l \in \Sigma$ the arrival chain. Let

$$\omega \int_{n_i}^{m_j} {}^{H'}\wp_i^k \rightarrow \wp_j^l$$ be the gnorpsic function.

Definition 2.43: *In an impure system* $\Sigma = (M, \Re)$, *a sheaf will be a* stimulus (input) sheaf *iff*:

$$\left\{ \exists\, ^{H'}\wp_i^k \in A_{al}^{H'}, \exists\, \wp_j^l \in \Sigma \,/\, \omega \int_{n_i}^{m_j} {}^{H'}\wp_i^k \rightarrow \wp_j^l \right\}$$

Definition 2.44: *In an impure system* $\Sigma = (M, \Re)$, *a variable x will be an* entrance variable *iff:*

$$\left\{ \exists x \in \wp_j^l \exists h_{ij}, \omega \int_{n_i}^{m_j} {}^{H'}\wp_i^k \rightarrow \wp_j^l \right\}$$

We can consider responses (outputs) how clockwise sheaves (d-sheaves) coming from some chain belonging to impure system to some alysidal set being in reponse environment **H''**. We will denominate $B_{al}^{H''}$ to the alysidal set belonging to **H''**, and

${}^{H''}\wp_i^k \in B_{al}^{H''}$ an arrival alysidal element, h_{ij} a response sheaf and $\wp_j^l \in \Sigma$ the departure chain. Let $\overset{m_j}{\underset{n_i}{{}^\omega f}} \wp_i^k \rightarrow^{H''} \wp_j^l$ be the gnorpsic function.

Definition 2.45: *In an impure system* $\Sigma = (M, \Re)$*, a sheaf will be a* response (output) sheaf *iff*:

$$\left\{ \exists \wp_i^k \in \Sigma, \exists^{H''} \wp_j^l \in B_{al}^{H'} / \overset{m_j}{\underset{n_i}{{}^\omega f}}{}^{H'} \wp_i^k \rightarrow^{H''} \wp_j^l \right\}$$

Definition 2.46: *In an impure system* $\Sigma = (M, \Re)$*, a variable x will be an* exit variable *iff:*

$$\left\{ \exists x \in \wp_i^k, \exists h_{ij}, \overset{m_j}{\underset{n_i}{{}^\omega f}} \wp_i^k \rightarrow^{H''} \wp_j^l \right\}$$

Definition 2.47: *In an impure system* $\Sigma = (M, \Re)$*, a variable* x_i *will be an* internal variable *iff:*

$$\left\{ \exists x_j \in M, \exists h_{ij} \in H / \left(x_i \overset{h_{ij}}{\Longrightarrow} x_j \right) \in H \right\} \wedge \left\{ \exists x_k \in M, \exists h_{ki} \in H / \left(x_k \overset{h_{ki}}{\Longrightarrow} x_{i_i} \right) \in H \right\}$$

2.6. THE STRUCTURE

In "a real" sense, the structure of a DIS will be formed by all the legislative body (*legal structure*) that conforms any type of human society, from most primitive to the most developed. We will establish an analogy with the human being: the existence of relations with positive imperative modality (*obligation*) would constitute the skeleton of the system. The negative imperative modality (*prohibition*) would be the immunological system of protection of the system. The modality *permission* the muscular system, that gives the necessary flexibility to the system, in as much to the modality *faculty* its neurocerebral system, because it allows him to make decisions. Transactions of energy, money, merchandise, population, etc., would be the equivalent one to the sanguineous

system. These economic transactions and inferential relations, depend, as well, of the existence of a legislative body (*Mercantile Code*), with their obligations, prohibitions and permissions that regulate them. As much stimuli as responses can be transactions of raw materials, energy, merchandise, currency, etc, along with inferential relations of ideas, culture, etc.

2.6.1. The structural function

Definition 2.48: *In an impure system* $\Sigma = (M, \Re)$, *the structural entrance-exit is the function* $f_{\Im} : \Im \to P(H)$ *such that for the whole sub set*

$$\Xi = \left\{ l_{k1}^1, l_{k2}^1, ..., l_{km}^1 \: / \: ki \in \{0, 1, ..., n-1\} \right\} \subseteq \Im$$

$f_{\Im}(\Xi) = \Im_l \in P(H)$ *being* $\Im_l$ *has to be the set of all the sheaves existing between* $l_{k1}^1, l_{k2}^1, ..., l_{km}^1$.

Definition 2.49: *In an impure system* $\Sigma = (M, \Re)$, *the structural exit-response function is the function* $g_{\Im} : \Im_l \to P(\Im)$ *such that for the whole sub set* $A = \left\{ h_{m1}^k, h_{m2}^k, ..., h_{mn}^k \right\} \subseteq P(\Re)$ *is* $g_{\Im}(A) = \Im_l^* \subseteq \Im$ *with* $\Im_l^*$ *being the set formed by all the elements* l_{k1}^1 *such that between them the sheaves* $h_{m1}^k, h_{m2}^k, ..., h_{mn}^k$ *exist.*

Definition 2.50: *In an impure system* $\Sigma = (M, \Re)$, *and with* $\Xi = \left\{ l_1^0, l_2^0, ..., l_i^0 \right\} \subseteq \Im$ *the following is fulfilled:*

$$\left(f_{\Im} \cup g_{\Im} \right) \Im_I (\Xi) = \left\{ l_k^0 \in \Im \: / \: \exists h_1, h_2 \in \Re; (\Xi \Rightarrow l_k^0) \in h_1 \vee (l_k^0 \Rightarrow \Xi) \in h_2 \right\}$$

That is $\left(f_{\Im} \cup g_{\Im} \right) \Im_I (\Xi)) f_{\Im} | \Im_I (\Xi) \cup g_{\Im} | \Im_I (\Xi)$

Definition 2.51: *The structural functional impure system* $\Sigma = (\Im, \Re)$ *is the function* $F : \Im \to P(H)$ *and defined as*

$$F(\Xi) = \begin{cases} f_{\Im} | \Im_E (\Xi) \\ f_{\Im} | \Im_I (\Xi) \cup g_{\Im} | \Im_I (\Xi) \\ g_{\Im} | \Im_S (\Xi) \end{cases}$$

Definition 2.52: *In an impure system $\Sigma = (M, \Re)$, given a sheaf $h \in H$, the* structural entrance-exit function associated with the sheaf $h \in \Re$ *is the function $f_r : \Im \rightarrow P(H)$ defined as* $f_r(\Xi) = A \in P(H); A = \left\{ l_k^0 \in \Im / \exists h \in \Re(\Xi \Rightarrow l_k^0) \in h \right\}.$

Theorem 2.1: *In an impure system $\Sigma = (M, \Re)$, the structural entrance-exit function and the entrance-exit associated with a sheaf satisfy* $f_\Im(\Xi) = \bigcup_{h \in \Re} f_r(\Xi).$

Proof.

1) If $l_i^0 \in f_\Im(\Xi) = M_\Im \Rightarrow \exists h \in \Re$ such that $(\Xi, l_i^0) \in h \Rightarrow l_i^0 \in f_\Im(\Xi) \subset \bigcup_{h \in \Re} f_\Im(\Xi)$

2) If $l_i^0 \in \bigcup_{h \in \Re} f_\Im(\Xi) \Rightarrow \exists h_0 \in \Re$ such that

$l_i^0 \in f_{h_\Im}(\Xi) \Rightarrow (\Xi, l_i^0) \in h_0 \in \Re \Rightarrow l_i^0 \in f_\Im(\Xi)$

Definition 2.53: *In an impure system $\Sigma = (M, \Re)$, given a sheaf $h \in \Re$, the* structural entrance-exit function associated with a relation $h \in \Re$ *is the function $g_r : \Im \rightarrow P(H)$ defined as* $g_r(X) = Á*_l Î P(H); \qquad Á*_l = \left\{ l_k^o Î Á /(l_k^0 Þ X) Î h \right\}$

Theorem 2.2: *In an impure system $\Sigma = (M, \Re)$, the structural entrance-exit function and the stimulus response associated with relations $r \in \Re$ satisfy* $g_\Im(\Xi) = \bigcup_{r \in \Re} g_r(\Xi)$

Proof.

The demonstration is analogous to that of Theorem 2.1

$$F_r(\Xi) = \begin{cases} f_r(\Xi) \\ f_r(\Xi) \cup g_r(\Xi) \\ g_r(\Xi) \end{cases}$$

Theorem 2.3: *In an impure system $\Sigma = (M, \Re)$, the structural function and the structural function associated with a relation satisfy $F(\Xi) = \bigcup_{r \in \Re} F_r(\Xi)$.*

Proof.

The demonstration is analogous to that of Theorem 2.1.

3. PHENOMENOLOGIC AND SEMIOTIC COMPONENTS OF RELATIONS

3.1. COMPONENTS OF RELATIONS

We will leave from the following considerations:

1) A Deontical Impure System (DIS) is a alysidal set equipped with an only element, because all the relative beings are related to each other, forming an only chain or network of relations.

2) Two DIS have environments: stimulus environment **H'** and response environment **H''**.

3) Both environments are alysidal sets with multiple elements.

We will have to establish several components in the relations of an impure system (DIS):

1) Phenomenological components that do not depend on the Subject.

2) Semiotic components, depending of the Subject, that are divided as well in:
   a) Neutrosophic components.
   b) Modal components.

3.1.1. Phenomenological components

In the present state of this approach, we distinguished four main phenomenological components: directionality, intensity, connection energy and volume. With respect to the directionality of relations, sheaves and freeways, we have mentioned its characteristics in a previous work, reason why we create nonnecessary mentioning its properties in this work.

3.1.1.1. Intensity of relations, sheaves, freeways and chains

A fundamental question in this approach to Impure Systems is the intensity or forces of a relation. We know by disciplines like Physics, Chemistry, Sociology, Psychology, etc., that a same class of relation can have different intensity. We thought advisable to introduce the concept of *degree of intensity of a relation.*

Definition 3.1: *We define as* degree of relational intensity *of a relation r between two p-significances (relative beings), and we will denote it like I_r the a real number $I_r \in [0,1]$ that it measures, by direct or indirect procedures, the intensity or forces of a relation*

Note 3.1: *If $I_r = 1$ we will call* rigidity *with respect to a relation r and if $I_r = 0$ we will call* independence *with respect to this relation*.

Definition 3.2: *We define as* degree of intensity of a sheaf h_{ij} *formed by n independent relations, and we will denote it like I_h, the real number $I_r \in [0,1]$ so that $I_h = \dfrac{\sum\limits_{i=1}^{n}(I_r)_i}{n}$.*

Note 3.2: *If $I_h = 1$ we will call* rigidity of sheaf *and if $I_h = 0$ we will call* flexibility of sheaf

We will consider like positive the degree of intensity of d-sheaf and like negative, the one of l-sheaf. In r-sheaf, the clockwise will be positive degree of intensity, and negative the nonclockwise one. Therefore, if in a reciprocal relation its clockwise sense has a degree of intensity I_{ij}. Its nonclockwise sense has a degree of intensity I_{ji}, the degree of intensity of the reciprocal relation will be $\overset{\leftrightarrow}{I}_{ij} = I_{ij} + I_{ji}, \overset{\leftrightarrow}{I}_{ij} \leq 0, \overset{\leftrightarrow}{I}_{ij} \geq 0$. The degree of intensity of r-sheaf will be, of course, the sum of the degrees of intensity of all the reciprocal relations that form it, divided by the number of them.

The degree of intensity of a highway will be:

$$I_{hw} = \frac{I_{d-b} + I_{l-b} + I_{r-b}}{3}$$

being I_{d-b} the degree of intensity of d-sheaf, I_{l-b} the degree of intensity of l-sheaf and I_{r-b} the degree of intensity of r-sheaf and $I_{hw} \geq 0, I_{hw} \leq 0$.

Note 3.3:. *The positivity and negativity have not a strict physical sense but of directionality.*

1) *If* $h_{ij} > 0$ *it means that sheaf has greater intensity in the direction* x_i *to* x_j.

2) *If* $h_{ij} < 0$ *it means that sheaf has greater intensity in the direction* x_j *to* x_i.

3) *If* $h_{ij} = 0$ *it means that sheaf has the same intensity in the two directions.*

Note 3.4: *Both senses of the same reciprocal relation* $\overset{\leftrightarrow}{r}$ *within a same sheaf can have different intensity, is to say* $I_{r_{AB}} \neq I_{r_{BA}}$.

Definition 3.3: *We define as* degree of intensity of a chain $\wp_i^k$ *formed by m sheaves, and we will denote it like* $I_{\wp}$, *the real number* $I_r \in [0,1]$ *so that* $I_{\wp} = \dfrac{\displaystyle\sum_{i=1}^{m}(I_h)_i}{m}$

Note 3.5: *If* $I_{\wp} = 1$ *we will call* linking *and if* $I_{\wp} = 0$ *we will call* no-not bound *and we will represent it like* $\neg \wp_i^k$.

Definition 3.4: *We define as* degree of intensity of an Impure System Σ *formed by* ω

chains and we will denote it like I_Σ, *to a real number* $I_r \in [0,1]$ *so that* $I_\Sigma = \dfrac{\sum\limits_{I=1}^{\omega} (I_{\wp})_i}{\omega}$

Note 3.6: *If $I_\Sigma = 1$ and we will call* rigid impure system *and if* $I_\Sigma = 0$ *we will call* incoherent impure system *and we will represent it like* $\neg\Sigma$.

3.1.1.2. Energy of connection

Definition 3.5: *By* energy of connection E_Σ *we define the average energy necessary to break connections (relations) between two elements in an Impure System Σ separating its components elements..*

Therefore

$$E_\Sigma = \frac{\sum\limits_{i=1}^{n} E_{ri}}{m}$$

being m the number of sheaves.

Let m be the number of sheaves having an energy of rupture of connection E_r minor who the energy E_Σ of connection of impure system Σ is to say $E_r < E_\Sigma$. Elements of the impure system fulfilling this condition are denominated *of weak connection.* In the opposite case, they will be *of strong connection* being stronger whichever greater is its energy of rupture in relation to the energy of connection of the impure system.

We considered all incident stimulus in an impure system Σ is a relation located within a d-sheaf, coming from an alysidal set located in the stimulus environment **H'** (Lloret-Climent et al., 1998, 2001, 2002; Patten, 7978, 1980, 1982; Patten et al., 1976, 1981, 1982; Usó-Doménech et al., 2002[a,b]) and so that $A_{al} \subset$ **H'**, and affecting a certain node of a certain chain of the impure system Σ. Of course, this relation that unites a node n_i

of a chain $\wp_i^k \in A_{al}$ of the alysidal set A_{al} with a node m_j of a chain $\wp_j^m \in \Sigma$ will have a certain energy of connection. However, for Σ, this energy of connection becomes stimulus energy E_Z. Let us suppose entering within the impure system Σ. And originating of the stimulus environment **H'**, a set of stimuli Z, with an energy E_Z and so that $E_Z > E_r$ and $E_Z \leq E_\Sigma$. If the energy by group of stimuli Z entering the impure system coming from the stimulus environment $_{H'}$ is greater than the energy of rupture of the elements of weak connection, the system will experience a loss of order, and therefore of structuring and information. And to the inverse one, if the group of stimuli Z has an inferior energy to the energy of rupture of the elements of weak connection, impure system will experience a net gain of order, and therefore of structure and information.

Definition 3.6: *We define as* threshold of resistance u_Σ *of an impure system Σ to the marked one by its energy of connection* E_Σ.

3.1.1.3. Volume of impure system

An essential notion in the Theory of Impure Systems is the one of Volume Λ. We are not talking about a physical volume, but to an abstract concept, that nothing has to do with a space occupation, in the same way that "color" in the theory of quarks, nothing has to do with the color defined by the Optics.

Let Σ be an Impure System, formed by an s-impure set $M \subset \Im$ con $cardM = k$, a set of chains $\rho = \{\wp_i^k ; k > 0\}$ with card $\rho = \omega$, a set of sheaves H with cardH = m, and a set of relations R with cardR = n.

Definition 3.7: *We define as* volume of an Impure System Σ and we denoted it like *Λ to the product $\Lambda = k.\omega.m.n$.*

Definition 3.8: *We define as* fundamental volume *of an Impure System Σ and we will*

denote like Λ_P to the following product $\Lambda_P = k.m.n$.

Definition 3.9: *We define* size of impure system Σ to the doublet formed by $\left(\Lambda, u_\Sigma\right)$.

Definition 3.10: *We will say that a system Σ_1 with $\left(\Lambda_1, u_\Sigma^1\right)$ is* greater *than another system Σ_2 with $\left(\Lambda_2, u_\Sigma^2\right)$ if $\Lambda_1 \geq \Lambda_2, u_\Sigma^1 > u_\Sigma^2$.*

The development of the structures receiving stimuli of the stimulus environment **H'**, constitutes a developed historical process in the time interval $T = \left[t_0, t_n\right]$. It represents the accumulation of information making a more efficient use of the energy in a later while $\left[t_{n+1}, t_\omega\right]$. The necessary energy for the alteration of the system increases with the size of this one. We can verify it in the small physical systems, of molecular to subatomic, in where the disruption energy diminishes when increasing the size of the system. Nevertheless, in biotic systems an apparent paradox can be displayed. As Margalef says (1980), the life has tended to assimilate or surpassing the environmental impacts although always faces the possibility. Or rather, the certainty, that sooner or later some nonassimilable group of stimuli will arrive $E_Z \geq E_\Sigma$. During the evolutionary development of the system, as the threshold rises describing the form to deal with environment **H'**, it seems as if the nonassimilable stimuli were less and less frequent and therefore, less probability exists in the disintegration of the system. This argument is logical. If we suppose the rank of energies like a statistically normal distribution, as the system structure becoming that their energy of connection is every greater time, the external energy necessary to hit negatively also will be every greater time, happening to the end of the rank of smaller frequency and therefore, of smaller probability of appearance. This phenomenon must consider understanding the asymmetries, as much in succession as in evolution. If the system is a biological organism, it can learn to deal with recurrent phenomena, but before most dangerous it only fits the genetic evolution, although a very prolonged individual history (Margalef,

1980) can lead to an elevation of the resistance threshold, even before powerful impacts and of very loft frequency.

In the case of complex systems of the type human society, components of our approach DIS, are the cultural evolution, with their corresponding knowledge acquisition, development of technologies and social advances, elevating the resistance threshold and diminishing the probability of inassimilable stimuli, against which many present ideologies defend. On this class of relations the advantage is based that have the structures of greater size on those of so large minor, which is related to the attainment of a stability at a higher level, done of local instabilities. They are understood that the great systems and subsystems in size have greater longevity, as if they had a prize at evolutionary level. They combine segments of the natural continuous (Margalef, 1980) extending in space and time. This is applied so much to the whole ecosystems, like a human societies and its components.

Within this context it is understood that the survival of the DIS will depend on its capacity to combine certain stimuli coming from **H'** being able to be material and energetic or population transactions (emigration flows) calls *resources*, combined with stimuli of nonmaterial order: beliefs, values, ideas, etc., or to combine the variation of select resources and inferential relations on the space or the time.

3.2. SEMIOTIC COMPONENTS

We distinguished two main semiotic components: neutrosophic and deontical components.

3.2.1. Neutrosophic components

We are based on the denominated neutrosophic logic [Gershenson. C (2001); Liu, F. (2001[a,b]); F. Smarandache, (1999, 2003); F. Smarandache, J. Dezert, A. Buller, M. Khoshnevisan, S. Bhattacharya, S. Singh, F. Liu, Gh. C. Dinulescu-Campina, C. Lucas, C. Gershenson, (2001); Haibin Wang, Praveen Madiraju, Yanqing Zhang, Rajshekhar Sunderraman, (2005)] whose characteristics are:

The Main Principle: *Between an idea <A> and its opposite <Anti-A>, there is a continuum-power spectrum of neutralities <Neut-A>.*

Definition 3.11 (Robinson, 1996): *A number x is sad to be infinitesimal iff for all positive integers n one has $|x| < \dfrac{1}{n}$.*

Let $\varepsilon > 0$ be such infinitesimal number.

Definition 3.12 (Robinson, 1996): *We define as* non-standard finite numbers $1^+ = 1 + \varepsilon$, *a number where 1 is its standard part and ε its non-standard part.*

The number 1^+ is infinitely small but greater than 1.

Definition 3.13 (Robinson, 1996): *We define as* non-standard finite numbers $^-0 = 0 - \varepsilon$ *a number where 0 is its standard part and ε its non-standard part.*

The number $^-0$ is infinitely small but less than 0.

Definition 3.14: *We define* a non-standard unit interval *to interval* $]^-0, 1^+[$.

Numbers $^-0$ and 1^+ belong to the non-standard unit interval.

The Fundamental Thesis of Neutrosophy: *Any idea <A> is T% true, I% indeterminate, and F% false, where T, I, F $\subset$]⁻0, 1⁺[³.and such as*

a) $T \subset]^-0, 1^+[$.

b) $I \subset]^-0, 1^+[$

c) $F \subset]^-0, 1^+[$

with

$$\sup T = t\_\sup, \inf T = t\_\inf$$
$$\sup I = i\_\sup, \inf I = i\_\inf$$
$$\sup F = f\_\sup, \inf F = f\_\inf$$
$$n\_\sup = t\_\sup + i\_\sup + f\_\sup$$
$$n\_\inf = t\_\inf + i\_\inf + f\_\inf$$

1) Although T, I, F can be intervals, any real sub-unitary subsets: discrete or continuous, single-element, finite or infinite, union or intersection of various subsets, etc, in the theory exposed here, we will consider them like intervals.

2) The neutrosophic components T, I, F are at each instance dependant on many parameters, and therefore they can be considered set-valued vector functions or even operators. The parameters can be: time, space, etc. and and of hidden or unknown variables, such as:

$$T\left(s,t,w_1,w_2,...,w_n\right), I\left(s,t,w_1,w_2,...,w_n\right), F\left(s,t,w_1,w_2,...,w_n\right).$$

3) T, I and F try to reflect the dynamics of ideas, significances and propositions.

4) T, I and F try to reflect the dynamics of ideas, significances and propositions.

Plato defines three abstract ideals that must guide the life of the men: kindness, beauty and truth. Both first they are properties or qualities of the man and the things. Nevertheless, the truth is not a property. It is a characteristic or quality of the enunciations, judgments, propositions, theorems, laws, that are declarations as well. The truth is a semiotic property of the propositions. Propositions can be true (or false) of different ways or in different senses. It will depend on the type of established proposition. LeShan and Margeneau (1982) establish three types of propositions (and therefore of truths):

a. Empirical proposition: When the proposition and its associate truth are in agreement with the perception (*perceptual experience*). The empirical truth will depend on outer tests on the content of the propositions.

b. Analytical proposition: It is that fundamental consequence of certain axioms or assumptions. The veracity is contained in the same proposition. The logical proposition belongs to this group, but also the theological ones. The axioms determine the veracity. Therefore, the truth is within the system of beliefs derived from that particular logic.

c. Scientific proposition: They are those that combine the analytical truth derived from reasonable axioms with the empirical truth. They derive from validated and accepted theories and that they are logical or mathematical constructions related, which have equipment connections with the perceptual experience through correspondence rules.

Only in the third type of propositions one occurs: $\left(T_{sur}, I_{sur}, F_{sur}\right), \inf T_{sur} \geq 1, \sup F_{sut} \leq 0$, that is to say, it corresponds to aletic modality of the necessity and to the surely probabilistic event. With respect to second classes, the analytical proposition, its truth will depend on its context, is to say of its logical system. In another logical system, it will lack true value. In the present state of our approach, we will not distinguish between the three truths and we will suppose each proposition (inferential relation) equipped with the three-neutrosophic components.

The Main Laws of Neutrosophy: *Let <a> be an attribute, and (T, I, F) $\subset$] $^-$0, 1$^+$ [^{3}. Then:*

1) *There is a proposition <P> and a referential system {R}, such that <P> is T% < a >, I% indeterminate or <Neut- a >, and F% <Anti- a >.*

2) *For any proposition <P>, there is a referential system {R}, such that <P> is T% < a >, I% indeterminate or <Neut- a >, and F% <Anti- a >.*

3) $< a >$ is at some degree *<Anti- a >, while <Anti- a > is at some degree $< a >$.*

Let be the Reality, ת being a part thereof, such that ת $\subset$ א. Let S be a Subject, conceiving the Reality through his doxical filter, made up of the own beliefs system Ŧ of his culture, and by a certain language L. Subject S is in a certain psychic state of organization of the Reality during a determined objective temporary interval $[t_0, t_n]$. In our approach:

1) All inferential relation in a referential system (DIS) Σ is a proposition <P>.
2) The proposition <P> is T%, I% indeterminate, and F% .

This representation characterizes the imprecision of knowledge or linguistic inexactitude, due to the *Principle of Semiotic Incompleteness*, received by one or various Subjects. The sources of uncertainty can be:

a) *Stochasticy*: the case of intrinsic imperfection where a typical and single value does not exist.
b) *Incomplete knowledge*: ignorance of the totality, linguistic inexactitude, limited view on a system because of its complexity.
c) *Acquisitions errors*: intrinsically imperfect observations, the quantitative errors in measures.

In addition, it leads us to the own probability:

1) The *objective probability* process uncertainty of random type (stochastic) introduced by the chance.
2) We will interpret, of intuitive way, the *subjective probability* of an event like the belief degree in that this one happens when the random experiment is made. Nevertheless, it has been considered often that the probability is simply the

belief degree that is due to assign to a proposal. The probability of occurrence of an event is the degree of belief on the part of an individual that an event happens, based on all the evidence to its disposition. Under this premise it is possible to be said that this approach is adapted when single is an opportunity of occurrence of the event. That is to say, that the event will happen or it will not happen that single time. The value of probability under this approach is a personal judgment.

Vagueness is another form of uncertainty is the character of those which contours or limits lacking precision, clearness, etc.

Definition 3.15: *We define* indeterminacy I *as the degree of uncertainty, vagueness, imprecision, undefined, unknown, inconsistency and redundancy.*

Consequence 3.1: *The subjective probability will measure indeterminacy.*

Let R be generated relation and r_i the n generating relations. T, I and F they are respectively the probabilities really, indetermination and falsification of one relation. Applying the theorem of Bayes, we will be able to obtain the respective probabilities of the generated relation that is conditioned by the generating relations, independent between it.

$$T(R) = \sum_{i=1}^{n} T(R|r_i) T(r_i)$$

$$I(R) = \sum_{i=1}^{n} I(R|r_i) I(r_i)$$

$$F(R) = \sum_{i=1}^{n} F(R|r_i) I(r_i)$$

Therefore we will have each generated relation will have the three neutrosophic components

$$(T(R), I(R), F(R)) = \left(\sum_{i=1}^{n} T(R|r_i) T(r_i), \sum_{i=1}^{n} I(R|r_i) I(r_i), \sum_{i=1}^{n} F(R|r_i) F(r_i) \right).$$

and so that
$$(\inf T(R) + \inf I(R) + \inf F(R)) \geq {}^- 0$$
$$(\sup T(R) + \sup I(R) + \sup F(R)) \leq 3^+$$

Let R_1, R_2 be two independent relations of same sheaf h, so that their neutrosophic probability is

$$P(R_1) = (T(R_1), I(R_1), F(R_1)); P(R_2) = (T(R_2), I(R_2), F(R_2))$$

Then we define:

$$(T(R_1), I(R_1), F(R_1)) \oplus (T(R_2), I(R_2), F(R_2)) = (T(R_1) \oplus T(R_2), I(R_1) \oplus I(R_2), F(R_1) \oplus F(R_2))$$

$$(T(R_1), I(R_1), F(R_1)) \langle - \rangle (T(R_2), I(R_2), F(R_2)) = (T(R_1) \langle - \rangle T(R_2), I(R_1) \langle - \rangle I(R_2), F(R_1) \langle - \rangle F(R_2))$$

$$(T(R_1), I(R_1), F(R_1)) \otimes (T(R_2), I(R_2), F(R_2)) = (T(R_1) \otimes T(R_2), I(R_1) \otimes I(R_2), F(R_1) \otimes F(R_2))$$

and

$$P(R_1 \cap R_2) = P(R_1) \otimes P(R_2) = (T(R_1) \otimes T(R_2), I(R_1) \otimes I(R_2), F(R_1) \otimes F(R_2))$$
$$P(R_1 \cup R_2) = P(R_1) \oplus P(R_2) \langle - \rangle P(R_1) \otimes P(R_2) =$$
$$[T(R_1) \oplus T(R_2) \langle - \rangle T(R_1) \otimes T(R_2), I(R_1) \oplus I(R_2) \langle - \rangle I(R_1) \otimes I(R_2), F(R_1) \oplus F(R_2) \langle - \rangle F(R_1) \otimes F(R_2)]$$

Let us suppose the case of sheaf h formed by three independent relations R_1, R_2, R_3. Then:

$$P(h) = (T(h), I(h), F(h)) = P(R_1 \cup R_2 \cup R_3)$$

Then

$$T(h) = T(R_1) \oplus T(R_2) \oplus T(R_3)\langle - \rangle T(R_1) \otimes T(R_2)\langle - \rangle T(R_1) \otimes T(R_3)\langle - \rangle T(R_2) \otimes T(R_2) \oplus T(R_1) \otimes T(R_2) \otimes T(R_3)$$

$$I(h) = I(R_1) \oplus I(R_2) \oplus I(R_3)\langle - \rangle I(R_1) \otimes I(R_2)\langle - \rangle I(R_1) \otimes I(R_3)\langle - \rangle I(R_2) \otimes I(R_2) \oplus I(R_1) \otimes I(R_2) \otimes I(R_3)$$

$$F(h) = F(R_1) \oplus F(R_2) \oplus F(R_3)\langle - \rangle F(R_1) \otimes F(R_2)\langle - \rangle F(R_1) \otimes F(R_3)\langle - \rangle F(R_2) \otimes F(R_2) \oplus F(R_1) \otimes F(R_2) \otimes F(R_3)$$

Generalizing for sheaf h constituted by n independent relations:

$$h = \bigcup_{k=1}^{n} T(R_k),$$

then

$$T(h) = \sum_{k=1}^{n} T(R_k)\langle - \rangle \sum_{i<j}^{n} \big(T(R_i) \otimes T(R_j)\big) \oplus \sum_{i<j<k}^{n} \big(T(R_i) \otimes T(R_j) \otimes T(R_k)\big)\langle - \rangle ... \oplus (-1)^{n+1} \prod_{k=}^{n} T(R_k)$$

$$I(h) = \sum_{k=1}^{n} I(R_k)\langle - \rangle \sum_{i<j}^{n} \big(I(R_i) \otimes I(R_j)\big) \oplus \sum_{i<j<k}^{n} \big(I(R_i) \otimes I(R_j) \otimes I(R_k)\big)\langle - \rangle ... \oplus (-1)^{n+1} \prod_{k=}^{n} I(R_k)$$

$$F(h) = \sum_{k=1}^{n} F(R_k)\langle - \rangle \sum_{i<j}^{n} \big(F(R_i) \otimes F(R_j)\big) \oplus \sum_{i<j<k}^{n} \big(F(R_i) \otimes F(R_j) \otimes F(R_k)\big)\langle - \rangle ... \oplus (-1)^{n+1} \prod_{k=}^{n} F(R_k)$$

This probability of relations and sheaves uses a subset-approximation for the truth-value like imprecise probability, but also subset-approximation for indeterminacy and falsity values. Also, it makes a distinction between *relative sure relation*, relation which is sure only in some particular world(s): P(rsr) = 1, and *absolute sure relation*, relation which is sure in all possible worlds: P(asr) = 1[+]; similarly for *relative impossible relation* and *absolute impossible relation* and for *relative indeterminate relation* and *absolute indeterminate relation*.

3.3. MODAL COMPONENTS

The inferential relations express the logical relation denominated inference, that is to say, they indicate that the sequence in which it is integrated, will really have a value as long as the expressed thing in the previous sequence is fulfilled. Halliday and Hassan (1977) formulate it of the following way: *'possibly a if it is thus, then b'*. The hypothetical inference has not necessary but merely probable character, and is also a type of synthetic or enlarging reasoning. Hypotheses can very be varied, but they have in common the one that are formulated *to explain* a observed phenomenon. Peirce (Haack, 1993; Murphey, M.G. 1993; Peirce, C.S., 1870) establishes at least three types:

1) *About organizations or facts nonobserved at the moment for formulating the hypothesis, but observable in the future verifying it.*

2) *About organizations or facts that somebody could observe, although at the moment it is impossible to repeat the observation, since they are done of the past.* They are observable in principle, but inobservables organizations or facts actually to belong to the past. It is a frequent case in sciences of the nature. But the hypothesis is not a type of exclusive reasoning of natural sciences. In human sciences also hypotheses on the past explaining what are formulated we know of the present.

3) *About organizations or facts that are inobservables actually and also in principle, because they are beyond the perceivable thing directly by the senses.* In agreement with Peirce, therefore, the scientific activity does not respond to an exclusively positivista model that it only admits like organizations or real facts those that are directly observable. The scientist resorts constantly to hypothesis about inobservables realities to explain the observed realities, so that, without losing the connection with the sensible experience, he extends looking for it his rationality.

Induction and hypothesis look like in their enlarging character, as soon as that both extend the knowledge beyond merely observed: individuals or characters (induction and hypothesis respectively). In that they are distinguished of the deduction, that has

explanatory character merely. However, induction and hypotheses are two different ways of enlarging reasoning. By means of the induction, we concluded that made similar to the observed facts they are true in nonexamined cases. By means of the hypothesis, we concluded the existence of a fact very different from all the observed one, from which, according to the known laws, would be necessarily something observed. The first one is a reasoning of the individuals to the general law; the second, of the effect to the cause. The first one classifies, the second explains. Induction and hypothesis are separated forms of inference: it is impossible to infer hypothetical conclusions inductively.

Inferential relations imply ontic signs and flows of signals which take semantic meaning within the established habitual epistemic forms between interactive pairs from s-impure object set. Categories are understood to be the supreme *or universal genres of the entities, which may be predicated from any subject.* So that each category is a universal idea beneath which various related ideas are contained under the first. From this it may be inferred that the category may be taken, either by the supreme genre of a specific class of beings or either by the series or collection of genres and species, which are contained and placed under a supreme genre. As the categories are simply nothing more in fact than various classes of beings or realities which people and constitute Reality, it follows from here that

1) The categories are divisions of the present entity created.
2) In all categories there is something on which they agree and something on which they differ: They agree in that every category means an *objective reality, a thing* with it, yet less universal, forming an ordered collection or series of a *real essence* (*res*)*:* They differ from each other in that each categorical essence has a *means of being special.*

The study of modal logic has developed enormously and has broadened the field of what should be interpreted as its own subject. G.H. von Wright (1971) distinguishes various "*families*" of modal concepts, suggesting that the field of comprehension of

modality is growing. We shall distinguish:

1) *Aletical* modes *(possible-necessary-impossible-contingent)*.

2) *Deontical* modes *(obligation-permission-prohibition-analogy)*.

3) *Doxical* modes *(knowledge-doubt-belief-uncertainty)*

4) *Epistemical* modes (*verified- undecided-falsified*).

All the families having these structural affinities could be termed modal concepts and it is possible to speak of their formal study as generalised modal logic. In the same way we could speak of *modal systems being those which in any of their relations have at least one of those categories or that the Subject conceiving it should use modal concepts.* In our approach we will distinguish two main classes of modality: aletical (ontic) and deontical (semiotic).

3.3.1. The aletical components

Aletic modal component constitute the bottom drop curtain or substratum of the DIS. They are "natural" modalities, in the form sense they leave from the theorems or natural laws. Aletical modality constitutes an only concept, that it is possible to be outlined of the following way:

$$\textit{Necessity } (n) \quad [] \qquad \textit{impossibility } (i) \quad \neg\Diamond$$

$$\textit{Contingency } (c) \quad \neg[] \qquad \textit{Possibility } (p) \quad \Diamond$$

The two modalities of each column (n and c, i and p) form *a modal aletical opposition,* that is to say, they are excluded in extension and they are implied in comprehension:

$$[]r \Updownarrow \neg[]r, \ []r \Leftrightarrow \neg[]r \quad \textit{sphere of the necessity}$$

$$\neg\Diamond r \Updownarrow \Diamond r, \ \neg\Diamond r \Leftrightarrow \Diamond r \quad \textit{sphere of the possibility}$$

Both component of a line (n and i, c and p) they do not constitute an opposition. Forward edge (n and i) belongs to *the sphere of the necessity.* If r constitutes an event, a fact of the phenomenon, a property of the object or an inferential relation in our theory, we have in classic logic: $r_{\neg\Diamond} \Leftrightarrow \neg r_{[]}, r_{[]} \Leftrightarrow \neg r_{\neg\Diamond}$. That is, the impossibility of r is equivalent to the necessity of no-r. With respect to the second line (c and p), it belongs to *the sphere of the possibility* sight that *the contingency implies the pluripossibility.* And, therefore, the composibility of r and no-r: $r_{\neg[]} \Leftrightarrow (r_{\Diamond} \wedge \neg r_{\Diamond})$

Inversely, the possibility of r or goes jointly with the one of no-r, and r is contingent, or no, to knowing no-r is impossible, and then r is necessary by virtue of $\neg r \Leftrightarrow r_{[]}$.

$$\Diamond r \Leftrightarrow ([]r \Updownarrow \neg[]r)$$

Let us see the first diagonal (n and p). The necessity of r (excluding the one from no-r), is equivalent to *the unipossibility* of r, therefore *necessity implies classically possibility:* $[]r \Rightarrow \Diamond r$

It is a univalent possibility, against the pluripossibility of the contingency. Inversely, the possibility is against weakly to the necessity due to partial consubstantiality with the contingency. On the other hand, the possibility is also against weakly to the contingency by its partial identity with the necessity.

With respect to the second diagonal (i and c), it contains a strong modal opposition: the impossibility, whereas negative necessity is totally opposite to the contingency. In short, the impossibility strongly is against the other three poles of the concept: *an impossible thing is expelled from the Reality* whereas the other three poles stay within the Reality. In addition, this last ontic opposition, is not own of the classic logic.

Whereas category, and in agreement with Hegel, the necessity implies the contingency already because it forms a bipole, because the synonymous of the necessity is not-contingent and reciprocally.

We will notice that *the dominion of composibility and its paper of contingency, determined accurately the limited and determined necessity, when drawing up the border that separates it of the impossibility.* Reciprocally, *all concrete contingencies imply necessities that determine their field of composibilidad rigorously.*

Definition 3.16: Possibility *is composibility, that is to say, compatibility of A with other terms or connections of terms taken like reference*

The same negative definition of the possibility idea as "*absence of contradiction*" only in this context reaches some sense, because a "*absence of contradiction*", thought absolutely, does not mean anything; nor, therefore, the call means nothing "*logical possibility*" that many define indeed by the "*absence of contradiction*". It has to sobrentender itself like "*absence of contradiction of something*" (of A); but this something must be given like complex. Otherwise: absence of contradiction, since everything what can be thought is complex, stops being an negative-absolute concept and it is pronounced like contextual.

The "*absolute possibility*" is therefore a development limit of the idea of composibility (*composibility of Á with same itself)* that will only have a differential meaning if it assumes that Á is simple and therefore, unthinkable; then if A is complex, when "*relating it to same itself* " we are unavoidably inserting it in outer contexts, through multiple components. The idea of possibility is, therefore, based on the operations by which we constructed the concept of A; but this is not applied to the operations, but to the constructed objects and in relation to other objects, like *system.* That is to say, the possibility is *objective.* The formal-modal logical concept of possibility is obtained applying this same idea of composibility, and with no need to appeal (at the moment, and at least) to possible worlds.

 Let r be an inferential relation. We will define the following properties:

Property 3.1: *The possibility of an inferential relation implies its existence:* $\Diamond r \rightarrow r$.

Property 3.2: *The necessity of an inferential relation implies its existence:* $\Box r \rightarrow r$.

Property 3.3: *The possibility of an inferential relation implies the necessity of its possibility:* $\Diamond r \rightarrow \Box \Diamond r$.

Property 3.4: *The necessity of an inferential relation implies its possibility* □r → ◊r.

Property 3.5: *The not-possibility of an inferential relation implies the necessity of its not-existence:* ¬ ◊r → □¬r.

Property 3.6: *The not-possibility of the not-existence an inferential relation implies the necessity of its existence:* ¬ ◊¬ r → □r.

Property 3.7: *The not-necessity of the existence an inferential relation implies the possibility of its not-existence:* ¬□r → ◊¬r.

Property 3.8: *The not-necessity of the not-existence of an inferential relation implies the possibility of its existence:* ¬□¬r → ◊r.

3.3.2. The deontical components

Deontic modal components are own, in first instance, of the existence of the life, at least of organized life and developed to the end, of the existence of the human being. Let r be an inferential relation.

Definition 3.17: *We* define the *operator* O *who means "obligatory" that it does possible to describe acts or propositions like obligatory.*

Definition 3.18: *From the operator of obligation and the logical negation it is possible to define the* operators of prohibition (Ph) *and* permission (P):

$$Or \equiv Ph\neg r \equiv \neg P\neg r$$

Whose reading is: "(Obligatory r) iff (prohibited non-r) iff (not allowed non-r)".

We may represent this last phrase of the following way (where G is a constant that means, "*influences*", it is an individual of which the previous thing is preached and → it is the conditional material) OR →□(GA → R).

If S means the fact that the norm determined in the inferential relation has been violated, then: Op →□(¬p → S).

Definition 3.19: *We called* rule of not monotony *to the coherence exigency according to which a valid inference is not less valid by the addition of new premises:*

$$O r_1 \rightarrow O r_2$$

$$O r_1 \wedge P r_3$$

_____

$$O r_3$$

Definition 3.20: *We defined* the operator of faculty *like:* Fr ≡ Pr ^ P¬r *and it is interpreted like "(Facultative r) iff (Allowed r and allowed not r)".*

The operator of faculty seems more suitable to express the following consideration: "*Subject S is free to consider the inferential relation r*". It would be: "*the conduct to consider the inferential relation r is facultative*" or "*It is facultative that is expressed the inferential relation r*" or, which is the same, "*they are allowed both conducts: considering and not considering the inferential relation r*".

We will establish the following table of equivalences:

TABLE 3.1

$Or \equiv Ph\neg r \equiv \neg P\neg r$
$O\neg r \equiv Phr \equiv \neg Pr$
$\neg O\neg r \equiv \neg Phr \equiv Pr$
$\neg Or \equiv \neg Ph\neg r \equiv P\neg r$

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Definition 3.21 (Principle of permission): $Pr \lor P\neg r$ and it is interpreted like *about an act, on the part of the Subject, to infer a relation (or a proposition concerning an inferential act), either this one is allowed or allowed its negation.*

Definition 3.22 (Principle of deontical distribution): $P(r_1 \lor r_2) \equiv Pr_1 \lor Pr_2$ and it is interpreted like *the statement according to which the disjunction of two acts to infer a relation on the part of the Subject is allowed is equivalent, as well, to the disjunction of two statements: the one that affirms that the first act is allowed and the one that affirms that the second act is allowed.*

This last principle is written sometimes: $O(r_1 \land r_2) \equiv Or_1 \land Or_2$.

TABLE 3.2

$\neg r_1 \rightarrow (r_1 \rightarrow Or_2)$

$Or_1 \rightarrow (r_2 \rightarrow Or_1)$

$O\neg r_1 \rightarrow O(r_1 \rightarrow r_2)$

$Or_1 \rightarrow O(r_2 \rightarrow r_1)$

TABLE 3.3

$\neg r_1 \rightarrow \neg r_1 \lor Or_2$

$Or_1 \rightarrow \neg r_2 \lor Or_1$

$O\neg r_1 \rightarrow O(\neg r_1 \lor r_2)$

$Or_1 \rightarrow O(\neg r_2 \lor r_1)$

3.3.3. Relation between aletic and deontical components

Strictly speaking, *the obligatory thing cannot be necessary* according to the sense of the necessary thing previously expressed. The obligatory concept belongs to the semantic constellation of the ethics, moral, etc, that is to say, of the ideological belief systems to which the Subject belongs, and that nothing has to do with the expressed synthetic identities in a theorem. The dichotomy between the semantic and ontic plane must be dissolved, because all semantic is ontic since the words (or the signs) also are made physical, although "*artificia* ", worked and selected by the human species. It makes no sense *to force* planets to draw ellipses around the sun. It does not have sense either to say that the planets describe those orbits *forced* by the law of the gravitation, but that the law of the gravitation, in any case, explains, *propter quid*, a phenomenon that already was well-known previously (Kepler) to the formulation of this law. Possible solution to this type of arguments happens to establish a mixed, aletic-deontical logic in where some - all aletical axioms have not deontical costories that can also continue staying like principles in the deontical context. The reason, *ad hoc* elaborated is that, in deontical logic is not necessary to admit like axiom that *the obligation must be allowed,* which, in aletical terms, is absurd: *The necessity implies the possibility.* This incongruence has not to be understood like paradox, nor like mere gratuitous reconstruction and *ad hoc.* The true reason sublies in the necessity to save the phenomena, in this case: the analogy of which part between aletic and deontical terms. But the possibility of denying the same analogy is not cancelled this way. The correspondence (of aletic and deontical terms) between the worldly uses of these two classes of concepts (*ontics and semiotics)* does not constitute, seems to us either, a reason sufficient to maintain the analogies at all costs to begin with. Considering the concept of *Necessity* according to the absolute context: *Necessity* no longer talks about the property of the parts of a discourse, but to the property added to the real existence of a cognoscible being if we come *regressively* from finite and contingent beings.

On the other hand, if this analogy between necessity and obligation is subadded in an inequality analogy: the one that it mediates between natural (ontic) laws and normative

rules (*univocal from the perspective logical, ambiguous from the philosophical one*). Then, not even it is such analogy: Cannot be disobeyed ontic laws (theorems) but, in any case, be controlled by means of other laws, also ontic. Normative rules (norms, no theorems) estimate, of necessary way, the possibility of failing to fulfill them. *Normative Law* (rules) and *Natural Law* (theorems) is not analogous, but sintagmas including an ambiguous concept, nonanalogous to that, granting much, we can metaphorically interpret.

Ontic possibility (aletic modality) creates deontic modalities. In the human individual, the free will needs two components: possibility and decision (faculty). Human colectivity is the interaction between multiple individualities, and in there decisions these two modalities sublies. We are going to summarize this fact in the following figure (figure 3.1):
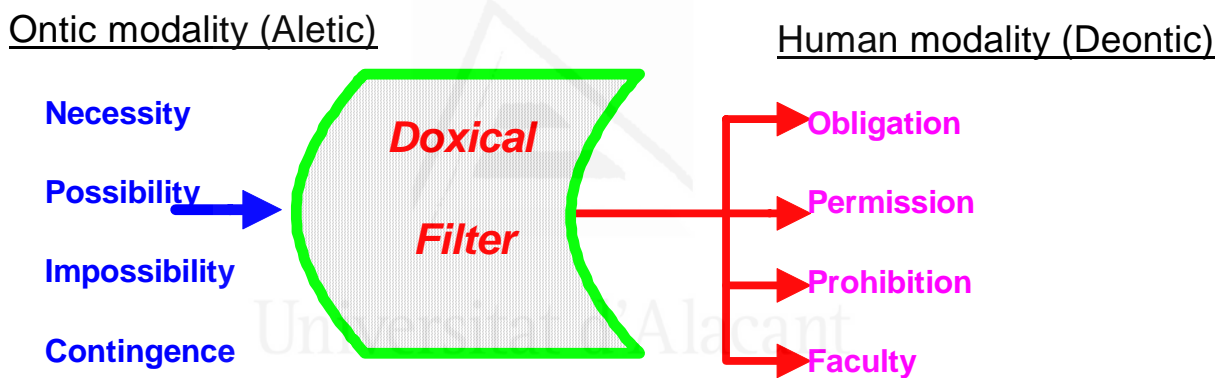
Figure 3.1.

It is the field of the possibility, where the Subject S conceives the deontical components, and where it infers the relations that characterize their peculiar vision of the Reality conceived like system.

In a freeway, we will find transactions and inferential relations. We will have to distinguish between two classes of transactions: *necessary transactions* and *allowed transactions*.

1) The first one are not influenced by human decision: we cannot prevent that the

Sun illuminates the Earth or the continue bombing of cosmic rays. Theorems (natural laws) are strictly necessary. We can break neither the law of gravity nor the second principle of thermodynamics.

2) In the second one (*allowed transactions*), its necessity is in conditional favor of deontic modality. For example, processes that are made within an atomic reactor in a nuclear power station are natural laws (theorems). Nevertheless, so that it happens will depend that a government forces the construction of the power station, or allows or prohibits it. Or of the facultative decision to ignite or not the reactor. And thus many examples.

3.3.4. Relation between semiotic components

It is possible to establish a relation between aletic, deontic and neutrosophic components (table 3.4):

TABLE 3.4

PHYSICAL WORLD	HUMAN WORLD		
Aletic components	Deontical components	Neutrosophic components	Probability theory
Necessity	*Obligation*	$(T_{sur}, I_{sur}, F_{sur})$ $\inf T_{sur} \geq 1, \quad \sup F_{sut} \leq 0$	*Sure event*
Impossibility	*Prohibition*	$(T_{imp}, I_{imp}, F_{imp})$ $\sup T_{inp} \leq 0, \quad \inf F_{imp} \geq 1$	*Impossible event*
Possibility	*Permission*	$(T_{ind}, I_{iind}, F_{ind})$	*Totally indeterminate event*
Contingence	*Faculty*	$(T_{cont}, I_{cont}, F_{cont})$ $\inf T_{cont} \leq 0, \quad \sup I_{cont} \geq 1, \quad \inf F_{cont} \leq$	*Chance*

3.4. THE DEONTICAL IMPURE SYSTEM (DIS)

Definition 3.23: *We say that an impure system is an* aletic impure system (AIS) *if any of its relations contained in any freeway, has nobody modality of possibility, impossibility, necessity and contingency.*

Definition 3.24: *We say that an impure system* is a Deontical Impure System *if it is an aletic impure system and if any of its relations contained in any freeway has nobody modality of prohibition, permission, faculty and analogy.*

Consequence 3.2: *By its own nature all DIS will be AIS but all AIS will not be DIS.*

Let $\amalg = \amalg_P \cup \amalg_{Ph}$ be, and let $\amalg_P$ be *the space of allowed abstract tuplets* and $\amalg_{Ph}$ *the space of prohibited abstract tuplets.* Let $l_i^k \in \amalg, i = 0, 1, 2, ..., n-1; k = 1, 2, ..., n$ be anyone tuplet. $Pl_i^k \in \amalg_P$ will be an allowed *tuplet.* $Phl_i^k \in \amalg_{Ph}$ will be *a prohibited tuplet.* We were with the difficulty to define allowed and prohibited sheaves and/or freeways. Since a sheaf tolerates the existence of multiple relations, some of them can be prohibited. Within the space of relations, Җ we will find allowed and prohibited relations. Then Җ = Җ$_P$ ∪ Җ$_{Ph}$, where Җ$_P$ is the space of allowed relations and Җ$_{Ph}$ is the space of prohibited relations We will consider *a sheaf allowed* the one that it has, at least, one allowed relation, is to say $\exists r_i \in h_m^n$ so that $r_i \in$ Җ$_P$, then $P h_m^n$.

Definition 3.25: *We define* multirelational deontical impure system *or simply* Deontical Impure system (DIS) *and we designate* $\Sigma = (\mathfrak{I}, \mathfrak{R}_P)$ *as an impure system, whose multirelational set will comprise sheaves or permitted chains that is,* $(Ph_n^n) \wedge (Pl_i^k)$.

4. PERMISSION AND PROHIBITION

4.1. PREVIOUS CONCEPTS: ENLARGED AND REDUCED THEORY

Two apparently contradictory points of view exist in DIS approach: synchronous and diachronic one. In previous chapters, we have affected the first one. Now we will establish some considerations from the diachronic point of view.

Let $\aleph$ be the Reality, $\beth$ being a part thereof, such that $\beth \subset \aleph$. Let S be a Subject, conceiving the Reality through his doxical filter, made up of the own beliefs system $\bar{F}$ of his culture, and by a certain language L. Subject S is in a certain psychic state of organization of the Reality during a determined objective temporary interval $[t_0, t_n]$.

1) Subject S conceives $\beth$ like a deontical impure system Σ.

2) S is the center of Σ (*restricted Omphalic condition*).

3) What is outside Σ is something structured that S does not ignore, either by agreement or by lack of knowledge.

4) In Patten's Environ Theory (Lloret-Climent et al., 1998, 2001, 2002; Patten, 1978, 1980, 1982; Patten et al., 1976, 1981, 1982; Usó-Doménech et al., 2002[a,b]) each component consists of two system-bounded environs, one which acts on the component, and the other which is acted upon by it. Each of there does not intersect the environs of the other component in a system. Therefore, the component itself is a part of two environs, one received and other generated. An environ comprises a partition -exhaustive and mutually exclusive- of the surrounding environment. Therefore, the input or stimulus environ **H'** the set of all within system interactions leading up to the component, and the output or response environ **H''** is the source or generator of new flows and future interactions. In this view, an object is linked to its surrounding world through its afferent input (stimulus) and efferent output (response) environs. A response environ comprises the transaction to components within the system generated by stimuli from the environments. The first **H'** *stimulus environment,* is defined by Σ during t_0 in the act of receiving incident stimulus from Z or set of stimulus.

We considered all incident stimulus in a DIS Σ as a relation located within a d-sheaf, coming from a nobody alysidal set A_{al} located in the stimulus environment **H'** and so that $A_{al} \subset$ **H'**, and affecting a certain node of a certain chain of Σ.

5) The second concept of environment **H''** is the *response environment*. This set Y of potential responses implicit in Σ. We considered all project response from a DIS Σ as a relation located within a d-sheaf, coming from certain node of a certain chain of Σ to a certain node of a certain chain of nobody alysidal set B_{al} located in the response environment **H''** and so that $B_{al} \subset$ **H''**.

6) Relations coming from node n_i of alysidal element $\wp_i^k \in A_{al} \subset$ **H'**, affecting node m_j of chain $\wp_j^l \in \Sigma$ will consider them like stimuli z with respect to the system Σ. Also, the relations coming from node n_i of chain $\wp_i^k \in \Sigma$, affecting node m_j pertaining to alysidal element $\wp_j^l \in B_{al} \subset$ **H''**, will consider it like responses y. Subject S ignores or it does not consider the existence of $A_{al} \subset$ **H'** and $B_{al} \subset$ **H''**. They are the respective clouds where leave and enter inputs and outputs in the graph models of Forrester's Dynamics of Systems.

In our diachronic approach to DIS we consider two theories: enlarged and reduced.

1) In *enlarged theory*, both environments has a systemic structure, formed by alysidal sets and the stimuli are sheaves coming from a alysidal element pertaining to a determined a alysidal set comprising stimuli environment **H'**. Responses are sheaves leaving an alysidal element pertaining to DIS and affecting an alysidal element pertaining to an alysidal set included in the response environment **H''**. States are formed by alysidal elements pertaining to the DIS.

2) In *reduced theory*, stimuli are sheaves coming from a stimulus environment **H'** that Subject S believes without structure and affecting an alysidal element pertaining to DIS. Responses leave a alysidal element pertaining to DIS and affect not structured response environment **H''**. States are formed by alysidal elements pertaining to DIS. Then, stimuli and responses can be defined of the following way:

Definition 4.1: *We define Z or* stimuli set *as set of relations incoming in the system Σ from* $\wp_i^k \in A_{al} \subset \mathbf{H'}$ *and considered by S like stimuli.* $\forall z \in Z$ *will be a stimulus (input).*

Definition 4.2: *We define Y or* response set *as set of relations that leave Σ to* $\wp_j^l \in B_{al} \subset \mathbf{H''}$ *and considered by S like responses.* $\forall y \in Y$ *will be a response (output).*

4.2. THE DIS' CONCEPT

In enlarged theory, we assumed that the following alysidal product is a DIS: $\Sigma \subset A_{al} \overset{nxm}{\underset{al}{X}} B_{al}, \forall A_{al} \subset \mathbf{H'}$ and $\forall B_{al} \subset \mathbf{H''}$. S assumes in principle that the following relationship is a DIS: $\Sigma \subset Z \, X \, Y$ (*reduced theory*).

A time set T is a linearly ordered set whose order is expressed by $\leq$. Let Θ and Φ be two alysidal sets and T a time set. Let Θ^T and Φ^T be the set of all the functions of T in Θ and Φ, respectively, such that $\Theta^T = \{\rho : T \to \Theta\}, \Phi^T = \{\xi : T \to \Phi\}$. Let A_{al} and B_{al} two subsets such that $A_{al} \subset \Theta^T, B_{al} \subset \Phi^T$. For Subject S will be $Z \subset \Theta^T, Y \subset \Phi^T$.

Definition 4.3: *A DIS Σ can be defined as a time system representing a relationship* $R_i ; i = [t_0, t]$ *between the alysidal sets* $A_{al} \subset \Theta^T, B_{al} \subset \Phi^T$ *or for Subject S between the sets Z and Y.*

Let $[t_0, t] \subset T ; t > t_0$ *be a time subset, then*:

$$
\begin{cases}
\Sigma[t_0,t] \subset A_{al}[t_0,t] \overset{nxm}{\underset{al}{X}} B_{al}[t_0,t] \quad enl\arg ed \quad theory \\
\\
or \\
\Sigma[t_0,t] \subset Z[t_0,t] XY[t_0,t] \quad reduced \quad theory
\end{cases}
$$

Note 4.1: *Relationship* $R_i ; i = [t_0, t]$ *will be sheaves for enlarged theory and binary relations for reduced theory.*

Note 4.2: *A DIS Σ may be considered like an alysidal set with a single alysidal element.*

Definition 4.4 (*enlarged theory*): An alysidal set $L_{al}[t_0,t]$ is interposed *between the alysidal sets* $A_{al}[t_0,t]$ *and* $B_{al}[t_0,t]$, *if there exists an alysidal set* $\Lambda_{al}^T = \{\lambda : T \to \Lambda_{al}\}$ *such that* $L_{al}[t_0,t] \subset \Lambda_{al}^T$ *and* $\exists R_1 \subset A_{al}[t_0,t] \overset{nxm}{\underset{al}{X}} L_{al}[t_0,t]$ *and*

$\exists R_2 \subset L_{al}[t_0,t] \overset{nxm}{\underset{al}{X}} B_{al}[t_0,t].$

Definition 4.5 (*reduced theory*): An set $L[t_0,t]$ is interposed (Usó-Doménech *et al.* 2002[a]) *between the sets* $Z[t_0,t]$ *and* $Y[t_0,t]$, *if there exists a set* $\Lambda^T = \{\lambda : T \to \Lambda\}$ *such that* $L[t_0,t] \subset \Lambda^T$ *and* $\exists R_1 \subset Z[t_0,t] X S[t_0,t]$ *and* $\exists R_2 \subset S[t_0,t] X Y[t_0,t].$

Causality expresses *determinism* (Mesarovic and Takahara, 1975), meaning that each event is the unique consequence of a set of causes that uniquely defines it. The causes may be known or unknown for S. Though causality need not be explicitly linked with time T, normally if they are known their effect over time are determined. Here we consider a close relationship between causality and time intervals $[t_0,t] \in T; t > t_0$, where t_0 represents the current or starting time of a cause and t the final time or its effect. We considered this time interval like objective or Newtonian time. For the Subject S, located like omphalos of Σ, it will exist a subjective time T', $T' \neq T$, in where also the causation principle is fulfilled. It will exist, therefore, a subjective time interval $[t_0,t]_{sub} \neq [t_0,t]$. We will consider this time interval like *subjetive time of the system*. The time of the system will be the subjective/objective time and we will represent it like $[t_0,t]_S^O$.

Consequence 4.1: *Interposed sets are causal connections in the propagation of the cause*

Dynamic behavior of Σ happens in response to the behavior of the environment of Σ, which is received how stimulus. This is understood introducing a third set of object variable s (Zadeh and Desoer, 1963; Patten *et al.*, 1976). But it is evident such a system definition is incomplete since oneself stimulus can drive to two different responses,

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what one of the desirable basic requirements would break: the principle of causation. It is this way necessary to introduce the state concept that will make us possible to no longer represent to a system like a simple relationship, but rather like a function. The state allows the determination of a future response in the base of a future stimulus and of the state in that is the system. In another words, the state is the bridge that permits the connection with the past from the present and the future.

Let h_i^k be the sheaf starting off of node n_i of an alysidal element $\wp_i^K \in A_{al} \subset \mathbf{H'}$ affecting node m_j of alysidal element $\wp_j^l \in \Sigma$ and let h'_j^l the sheaf starting off of node n_i of the alysidal element $\wp_\alpha^h \in \Sigma$ and that affects node m_j of alysidal element $\wp_\beta^h \in B_{al} \subset \mathbf{H''}$. Let $H_S = \left\{ h_i^k \right\}_{i=1,\ldots,\omega}$ be the set of stimulus sheaves and $H_R = \left\{ h'_j^l \right\}_{i=1,\ldots,\omega'}$ the set of responses sheaves, then:

Definition 4.6 (*enlarged theory*): *We define the alysidal set* $S_{al}[t_0,t]_S^O$ *of states of the DIS Σ as the alysidal interposed set between alysidal sets* $A_{al}[t_0,t]_S^O \subset \mathbf{H'}[t_0,t]_S^O$ *and* $B_{al}[t_0,t]_S^O \subset \mathbf{H''}[t_0,t]_S^O$ *verifying*

$$(\forall h_i^k[t_0,t]_S^O \in H_S) \wedge (\forall h'_j^l[t_0,t]_S^O \in H_R), \exists s_1[t_0,t]_S^O \in S_{al}[t_0,t]_S^O$$

such that

$$\left(\left(h_i^k[t_0,t]_S^O, s_1[t_0,t]_S^O \right) \in H_S \right) \wedge \left(\left(s_1[t_0,t]_S^O, h'_j^l[t_0,t]_S^O \right) \in H_R \right)$$

Definition 4.7 (*reduced theory*): *We define the set* $S[t_0,t]_S^O$ *of states (Usó-Doménech et al. 2002[a]) of the DIS Σ as the alysidal interposed set between sets* $Z[t_0,t]_S^O$ *and* $Y[t_0,t]_S^O$ *verifying*

$$\forall \left(z[t_0,t]_S^O, y[t_0,t]_S^O \right) \in R_i, \exists s_1[t_0,t]_S^O \in S[t_0,t]_S^O \quad such \quad that \quad \left(z[t_0,t]_S^O, s_1[t_0,t]_S^O \right) \in R_1$$

$$\wedge \left(s_1[t_0,t]_S^O, y[t_0,t]_S^O \right) \in R_2$$

for Subject S.

Stimuli $z[t_0,t]_S^O \in Z[t_0,t]_S^O$ serve to apply time $[t_0,t]_S^O \in T_S^O$ in states $s[t_0,t]_S^O \in S[t_0,t]_S^O$, and the states take stimuli $z[t_0,t]_S^O \in Z[t_0,t]_S^O$ turning them responses $y[t_0,t]_S^O \in Y[t_0,t]_S^O$. The states will be interposed between the stimuli and the responses. The sets, considered *how set of behavior* $Z[t_0,t]_S^O, S[t_0,t]_S^O, Y[t_0,t]_S^O$ represent families of all the possible trajectories and will consider how *setof behavior,* whereas $z[t_0,t]_S^O, s[t_0,t]_S^O, y[t_0,t]_S^O$ are *specific trajectories*

Definition 4.8 (*enlarged theory*): *The* state space S^s of a DIS Σ *(Zadeh and Desoer, 1963; Mesarovic and Takahara, 1975, 1989) o model of diachronic DIS is the alysidal product of all the states S*

$$S^s[t_0,t]_S^O = \mathop{X}_{\substack{al \\ i=1}}^{\substack{m \\ nxn}} S_i[t_0,t]_S^O$$

Definition 4.9 (*reduced theory*): *The* state space S^s (Usó-Doménech *et al.* 2002[a]) *of a DIS Σ is the cartesian product of all the states S*

$$S^s[t_0,t]_S^O = \mathop{X}_{i=1}^{m} S_i[t_0,t]_S^O$$

for Subject S.

1) The state pace consists of state trajectories onl, and is defined by the categories of p-impure objects (relative beings) and relations (sheaves and freeways) by subject S conceives Σ.

2) The state space can consist of a single state. It will depend on the Subject S and the dissagregation whereupon it conceives to system H

4.3. GNORPSIC SPECIAL FUNCTIONS

We will consider only reduced theory.

Let $\Sigma[t_0,t]_S^O \subset Z[t_0,t]_S^O \, XY[t_0,t]_S^O$ be a DIS. Let $S_0[t_0,t]_S^O \in S^s[t_0,t]_S^O$ be an initial state.

The defined functions will be gnorpsic functions $\mathop{{}^{\omega}f}_{n_i}^{m_j} \wp_i^k \to \wp_j^l$ but arbitrarily ignoring

of which node comes and to that node arrives, we will generically denote like $^{\omega}\rho$, being ω its polinodal index.

Definition 4.10: *There exists a gnorpsic function $^{\omega}\rho_0$ denominated initial gnorpsic response function such that*

$$^{\omega}\rho_0 : Z[t_0,t]_S^O \; XS_0[t_0,t]_S^O \to Y[t_0,t]_S^O$$

which satisfies

$$\forall z[t_o,t]_S^o \in Z[t_o,t]_S^o, \forall y[t_o,t]_S^o \in Y[t_o,t]_S^o, \exists s[t_o,t]_S^o \in S[t_o,t]_S^o$$

such that

$$y[t_o,t]_S^o = {}^{\omega}\rho_0\left(s[t_o,t]_S^O, y[t_o,t]_S^O\right)$$

Definition 4.11: *An initial gnorpsic response function* $^{\omega}\rho_0 : Z[t_0,t]_S^O \; XS_0[t_0,t]_S^O \to Y[t_0,t]_S^O$ is causal *iff:*

$$\forall z[t_0,t]_S^o \in Z[t_0,t]_S^o \wedge \forall s[t_0,t]_S^o \in S_0[t_0,t]_S^o, z'[t_0,t]_S^o \in Z[t_0,t]_S^o,$$
$$with \quad [t_0,t]_S^o = z'[t_0,t]_S^o \to {}^{\omega}\rho_0\left(z[t_0,t]_S^o, s[t_0,t]_S^o\right) = {}^{\omega}\rho_0\left(z'[t_0,t]_S^o, s[t_0,t]_S^o\right)$$

Definition 4.12: *A DIS Σ is* causal *if it has an initial gnorpsic response function.*

Orientation (directionality) is implicit in causality (Usó-Doménech *et al.* 2002[a]).

Definition 4.13: *A causal DIS Σ is oriented* when its boundary attributes are partitioned in causes Z and effects Y; Σ will be expressed as a stimulus-response set of time (objective&subjective) time segments.

$$\left(z[t_0,t]_S^o, y[t_0,t]_S^o\right) \in \Sigma(\aleph)[t_0,t]_S^o, z[t_0,t]_S^o \in Z[t_0,t]_S^o, y \in Y[t_0,t]_S^o$$

Therefore, an oriented DS associates temporal response sequences with temporal stimulus sequences.

Definition 4.14: *An oriented causal DIS Σ is functional when stimulus-responses relations are expressed as gnorpsic functions relating time sets of stimuli to time sets of responses.*

$$^{\omega}\Sigma : Z[t_0,t]_S^O \to Y[t_0,t]_S^O$$

Domain and rang of functional DIS is expressed how:

$$Dom^{\omega}\Sigma = C = \left\{ z[t_0,t]_S^O, \exists y[t_0,t]_S^O \in Y[t_0,t]_S^O \, / \left(z[t_0,t]_S^O, y[t_0,t]_S^O \right) \in {}^{\omega}\Sigma[t_0,t]_S^O \right\}$$

$$rang\, ^{\omega}\Sigma = G = \left\{ y[t_0,t]_S^O, \exists z[t_0,t]_S^O \in Z[t_0,t]_S^O \, / \left(z[t_0,t]_S^O, y[t_0,t]_S^O \right) \in {}^{\omega}\Sigma[t_0,t]_S^O \right\}$$

Definition 4.15: *A functional, oriented, causal DIS Σ is uniquely determined iff when each stimulus sequence $z[t_0,t]_S^O \in Z[t_0,t]_S^O$ there corresponds one and only one response sequence $y[t_0,t]_S^O \in Y[t_0,t]_S^O$.*

Note 4.3: *The role of external subject S in defining DISs is of singular significance.*

4.4. RESPONSE AND ALETICAL COMPONENTS

By comfort, we will assume like obvious the time of system $[t_0,t]_S^S$, implicit in all the following formulation. Let $\Sigma \subset Z\, XY$ be a DIS, Z be the set of stimuli, Y be the set of responses, S be the set of states, $^{\omega}\rho_0 : S\, X\, Z \to Y$ be an initial gnorpsic response function of Σ such as:

$$(z, y) \in \Sigma \leftrightarrow (\exists\, s/y = {}^{\omega}\rho_0\, (z, s))$$

That is, that the stimulus *z* will be in correspondence with the response and, iff a state exists for which the response correspondent is the initial response of the system for that state and that stimulus.

Definition 4.16: A gnorpsic response function *of the system Σ is the gnorpsic function $^{\omega}\rho : S\, XZ \to Y$ if it is verified that:*

$$(z, y) \in \Sigma \to (\exists\, s/y = {}^{\omega}\rho\, (z, s))$$

We denoted like ALW the operator "*always*", CAN the operator "can be", □ the operator of necessity and ◊ the operator of possibility.

Definition 4.17: *A response y is said that it is always necessary (or only necessary) iff:*

$$\text{ALW}(\square(y = {}^{\omega}\rho(z, s)))$$

for some s $\in S$, $z \in Z_{\Sigma}$

Definition 4.18: *A response y is said that it is always no necessary (or only no necessary) iff:*

$$\text{ALW}(\neg \square (y = {}^{\omega}\rho(z, s)))$$

for some s $\in S$, $z \in Z_{\Sigma}$

Definition 4.19: *A response y is said that it is possible iff:*

$$\Diamond(y = {}^{\omega}\rho(z, s))$$

for some s $\in S$, $z \in Z_{\Sigma}$

Definition 4.20: *A response y is said that it is impossible iff:*

$$\neg \Diamond(y = {}^{\omega}\rho(z, s))$$

for some s $\in S$, $z \in Z_{\Sigma}$

4.5. STIMULI, RESPONSES AND DEONTICAL COMPONENTS

We denoted like O the operator of obligation, P the operator of permission and Ph the operator of prohibition. We will establish the following condition:

CONDITION OF PERMISSION: *We will say that the set Z_{Σ} is allowed by the system Σ iff all its elements carry out:*

1) ${}^{\omega}\rho: Z \times S \to Y$ *satisfying the following relationship* $\forall z \in Z \wedge \forall y \in Y \Rightarrow \exists s \in S$ *such that* $y = {}^{\omega}\rho(z, s)$.

2) ${}^{\omega}\phi: Z \times S \to S$ *satisfying the following relationship* $\forall z \in Z \wedge \forall s_1 \in S \Rightarrow \exists s_2 \in S$ *such that* $s_2 = {}^{\omega}\phi(z, s_1)$.

Note 4.4: *This condition is very strong since it establishes fixed stimuli.*

4.5.1. Definitions

A good number of responses will be vague or uncertain, they will sometimes be feasible (*allowed*) and other not. It will be among the responses of systems that somehow are desirable and those that are not, that is, those responses that the system would not take place, the set of responses that it would be considered forbidden or nonallowed for the system. It seems in principle, difficult to assign them a really value (*allowed or forbidden*). A form of obviating this resulting difficulty is to introduce the following notions: *possibly forced and always forced, possibly allowed and always allowed, possibly forbidden and always forbidden*.

Let Σ be a DIS, Z_Σ be the set of stimuli, Y_Σ be the set of responses, S be the set of states,

Definition 4.21: *A response y is said that it is always forced (or only forced) iff* $O\big(y={}^{\omega}\rho(z,s)\big)$ *for some* $s \in S, z \in Z_\Sigma$.

Definition 4.22: *A response y is said that it is possibly forced iff* $\Diamond O\big(y = \big({}^{\omega}\rho(z,s)\big)\big)$ *for some* $s \in S, z \in Z_\Sigma$.

Definition 4.23: *A response y is said that it is always allowed (or only allowed) iff* $P\big(y={}^{\omega}\rho(z,s)\big)$ *for some* $s \in S, z \in Z_\Sigma$.

Definition 4.24: *A response y is said that it is always forbidden, (or only forbidden) iff* $Ph\big(y={}^{\omega}\rho(z,s)\big)$ *for some* $s \in S, z \in Z_\Sigma$.

Definition 4.25: *A response y is said that it is possibly allowed iff* $\Diamond P\big(y = \big({}^{\omega}\rho(z,s)\big)\big)$ *for some* $s \in S, z \in Z_\Sigma$.

Definition 4.26: *A response y is said that it possibly forbidden iff* $\Diamond Ph\big(y = \big({}^{\omega}\rho(z,s)\big)\big)$ *for some* $s \in S, z \in Z_\Sigma$.

Then:

1) $P\left(y={}^{\omega}\rho(z,s)\right)=\neg Ph\left(y={}^{\omega}\rho(z,s)\right)=\neg O\neg\left(y={}^{\omega}\rho(z,s)\right)$ *for some* $s \in S, z \in Z_{\Sigma}$.

2) $Ph\left(y={}^{\omega}\rho(z,s)\right)=\neg P\left(y={}^{\omega}\rho(z,s)\right)=O\neg\left(y={}^{\omega}\rho(z,s)\right)$ *for some* $s \in S, z \in Z_{\Sigma}$.

3) $\Diamond P\left(y={}^{\omega}\rho(z,s)\right)=\Diamond\neg Ph\left(y={}^{\omega}\rho(z,s)\right)=\Diamond\neg O\neg\left(y={}^{\omega}\rho(z,s)\right)$ *for some* $s \in S, z \in Z_{\Sigma}$.

4) $\Diamond Ph\left(y={}^{\omega}\rho(z,s)\right)=\Diamond\neg P\left(y={}^{\omega}\rho(z,s)\right)=\Diamond O\neg\left(y={}^{\omega}\rho(z,s)\right)$ *for some* $s \in S, z \in Z_{\Sigma}$.

4.5.2. Deontical set of responses

In the set Y_{Σ} of responses, we define the next deontical subsets:

[1] Subset of forced and allowed responses SA

$SA = \{y \,/y \in Y_{\Sigma} \; and \; (O(y = {}^{\omega}\rho(z, s)) \cup P(y = {}^{\omega}\rho(z, s))) \; for \; some \; s \in S, z \in Z_{\Sigma}\}$

[2] Subset of forbidden responses SF

$SF = \{y \,/y \in Y \; and \; Ph(y = {}^{\omega}\rho(z, s)) \; for \; some \; s \in S, z \in Z_{\Sigma}\}$

[3] Subset of possibly forced and allowed responses SPA

$SPA = \{y \,/y \in Y \; and \; (\Diamond O(y = {}^{\omega}\rho(z, s)) \cup \Diamond P(y = {}^{\omega}\rho(z, s))) \; for \; some \; s \in S, z \in Z_{\Sigma}\}$

[4] Subset of possibly forbidden responses SPF

$SPF = \{y \,/\, y \in Y \; and \; \Diamond Ph(y = {}^{\omega}\rho(z, s)) \; for \; some \; s \in S, z \in Z_{\Sigma}\}$

Being:

C1) $SA \subset SPA \subset Y$.

C2) $SF \subset SPF \subset Y$.

C3) $SPA \cap SPF = \phi$.

C4) $SA \cap SF = \phi$.

C5) $SA \cap SPF = \phi$.

C6) $SPA \cup SPF = Y$.

We designate SA^C, SF^C, SPA^C, SPF^C as its negations or complementary such as:

[1] $SA^C = \neg (O(y = {}^{\omega}\rho (z, s)) \cup P(y = {}^{\omega}\rho (z, s)))$

[2] $SF^C = \neg Ph(y = {}^{\omega}\rho (z, s))$

[3] $SPA^C = \neg(\Diamond O(y = {}^{\omega}\rho (z, s)) \cup \Diamond P(y = {}^{\omega}\rho (z, s)))$

[4] $SPF^C = \neg \Diamond Ph (y = {}^{\omega}\rho (z, s))$

4.5.3. Hypothesis

We will establish the following hypotheses:

Hypothesis 4.1: *If a response y is forced in all possible states, then the response is forced in the current state. If $y \, \varepsilon \, Y_{\Sigma}$, for some $s \in S$, $s_a \in S_a$, $z \in Z_{\Sigma}$ is $\forall S \in \Sigma$ then:*

$$O(y = {}^{\omega}\rho (z, s)) \rightarrow O(y = {}^{\omega}\rho(z, s_a))$$

Hypothesis 4.2: *If a response y is allowed in all possible states, then the response is allowed in the current state. If $y \, \varepsilon \, Y$, for some $s \in S$, $s_a \in S_a$, $z \in Z_{\Sigma}$ is $\forall S \in \Sigma$ then:*

$$P(y = {}^{\omega}\rho (z, s)) \rightarrow P(y = {}^{\omega}\rho(z, s_a))$$

Hypothesis 4.3: *If a response y is forbidden in all possible states, then the response will be forbidden in the current state. If y εY_Σ, for some s $\in$ S ,$s_a \in S_a$, z $\in Z_\Sigma$ is $\forall S \in \Sigma$ then:*

$$\mathbf{Ph(y = {}^\omega\rho\ (z,\ s)) \rightarrow Ph(y = {}^\omega\rho(z,\ s_a))}$$

Hypothesis 4.4: *If a response y is possibly in all possible states, then the response will be possibly forced in the current state. If y εY_Σ, for some s $\in$ S ,$s_a \in S_a$, z $\in Z_\Sigma$ is $\forall S \in \Sigma$ then:*

$$\lozenge\mathbf{O(y = {}^\omega\rho\ (z,\ s)) \rightarrow \lozenge O(y = {}^\omega\rho(z,\ s_a))}$$

Hypothesis 4.5: *If a response y is possibly in all possible states, then the response will be possibly allowed in the current state. If y εY_Σ, for some s $\in$ S ,$s_a \in S_a$, z $\in Z_\Sigma$ is $\forall S \in \Sigma$ then:*

$$\lozenge\mathbf{P(y = {}^\omega\rho\ (z,\ s)) \rightarrow \lozenge P(y = {}^\omega\rho(z,\ s_a))}$$

Hypothesis 4.6: *If a response y is possibly forbidden in all possible states, then the response will be possibly forbidden in the current state. If y εY_Σ, for some s $\in$ S ,$s_a \in S_a$, z $\in Z_\Sigma$ is $\forall S \in \Sigma$ then:*

$$\lozenge\mathbf{Ph\ (y = {}^\omega\rho\ (z,\ s)) \rightarrow \lozenge Ph(y = {}^\omega\rho(z,\ s_a))}$$

Hypothesis 4.7: *If a response y may be forced in some possible state, then the response will be necessarily forced in some possible state. If y εY_Σ, for some z $\in Z_\Sigma$ is:* $(\exists S_i \in \Sigma, s_i \in S_i) \wedge (\exists S_j \in \Sigma, s_j \in S_j)$ *such as CAN* $\mathbf{O(y = {}^\omega\rho(z,\ s_i)) \rightarrow \square O(y = {}^\omega\rho(z,\ s_j))}$

Hypothesis 4.8: *If a response y may be allowed in some possible state, then the response will be necessarily allowed in some possible state. If y εY_Σ, for some z $\in Z_\Sigma$ is:* $(\exists S_i \in \Sigma, s_i \in S_i) \wedge (\exists S_j \in \Sigma, s_j \in S_j)$ *such as CAN* $\mathbf{P(y = {}^\omega\rho(z,\ s_i)) \rightarrow \square P(y = {}^\omega\rho(z,\ s_j))}$

Hypothesis 4.9: *If a response y may be forbidden in some possible state, then the response will be necessarily forbidden in some possible state. If y ε Y_Σ, for some z $\in$ Z_Σ is:*

$(\exists S_i \in \Sigma, s_i \in S_i) \wedge (\exists S_j \in \Sigma, s_j \in S_j)$ *such as CAN* **Ph(y = $^\omega\rho$(z, s$_i$)) $\rightarrow$ $\square$Ph(y = $^\omega\rho$(z, s$_j$))**

Hypothesis 4.10: *If a response y may be possibly forced in some possible state, then the response will be necessarily possibly forced in some possible state. If y ε Y_Σ, for some z $\in$ Z_Σ is:*

$(\exists S_i \in \Sigma, s_i \in S_i) \wedge (\exists S_j \in \Sigma, s_j \in S_j)$ *such as CAN* **$\lozenge$O(y = $^\omega\rho$(z, s$_i$)) $\rightarrow$ $\square\lozenge$O(y = $^\omega\rho$(z, s$_j$))**

Hypothesis 4.11: *If a response y may be possibly allowed in some possible state, then the response will be necessarily possibly allowed in some possible state. If y ε Y_Σ, for some z $\in$ Z_Σ is:*

$(\exists S_i \in \Sigma, s_i \in S_i) \wedge (\exists S_j \in \Sigma, s_j \in S_j)$ *such as CAN* **$\lozenge$P(y = $^\omega\rho$(z, s$_i$)) $\rightarrow$ $\square\lozenge$P(y = $^\omega\rho$(z, s$_j$))**

Hypothesis 4.12: *If a response y may be possibly forbidden in some possible state, then the response will be necessarily possibly forbidden in some possible state. If y ε Y_Σ, , for some z $\in$ Z_Σ is:*

$(\exists S_i \in \Sigma, s_i \in S_i) \wedge (\exists S_j \in \Sigma, s_j \in S_j)$ *such as CAN* **$\lozenge$Ph(y = $^\omega\rho$(z, s$_i$)) $\rightarrow$ $\square\lozenge$Ph(y = $^\omega\rho$(z, s$_j$))**

Hypothesis 4.13: *If a response y is forced, then the response will be possibly allowed. If y ε Y_Σ, for some z $\in$ Z_Σ is:*

$$\mathbf{O(y = {}^\omega\rho\ (z, s)) \rightarrow \lozenge O(y = {}^\omega\rho\ (z, s))}$$

Hypothesis 4.14: *If a response y is allowed, then the response will be possibly allowed. If y ε Y_Σ, for some z $\in$ Z_Σ is:*

$$\mathbf{P(y = {}^\omega\rho\ (z, s)) \rightarrow \lozenge P(y = {}^\omega\rho\ (z, s))}$$

Hypothesis 4.15: *I a response y is forbidden, then the response will be possibly forbidden. If y εY_Σ,, for some z $\in Z_\Sigma$ is:*

$$Ph(y = {}^\omega\rho\ (z, s)) \to \lozenge Ph(y = {}^\omega\rho\ (z, s))$$

Hypothesis 4.16: *A response y is no possibly forced iff the response is forbidden. SPA^C = SF and such as*

$$\neg\lozenge O(y = {}^\omega\rho\ (z, s)) = Ph(y = {}^\omega\rho\ (z, s))$$

Hypothesis 4.17: *A response y is no possibly allowed iff the response is forbidden. SPA^C = SF and such as*

$$\neg\lozenge P(y = {}^\omega\rho\ (z, s)) = Ph(y = {}^\omega\rho\ (z, s))$$

Hypothesis 4.18: *A response y is no possibly forbidden, iff the response is allowed or forced SPF^C = SA and such as*

$$\neg\lozenge Ph(y = {}^\omega\rho\ (z, s)) = P(y = {}^\omega\rho\ (z, s)) \vee O(y = {}^\omega\rho\ (z, s))$$

Hypothesis 4.19: *A response y is no allowed (or no forced) iff the response is possibly forbidden. SA^C = SPF and such as*

$$\neg\ (P(y = {}^\omega\rho\ (z, s)) \vee O(y = {}^\omega\rho\ (z, s))) = \lozenge Ph(y = {}^\omega\rho\ (z, s))$$

Hypothesis 4.20: *A response y is no forbidden iff the response is possibly allowed or forced. SF^C = SPA and such as*

$$\neg Ph((y = {}^\omega\rho\ (z, s))) = \lozenge(\vee)\ \vee\ (y = {}^\omega\rho\ (z, s)))$$

Hypothesis 4.21: *If y_1, y_2 εY_Σ, is:*

$$Oy_1 \to (y_2 \to Oy_1)$$

Hypothesis 4.22: *If y_1, y_2 εY_Σ, is:*

$$O\neg y_1 \to O(y_1 \to y_2)$$

Hypothesis 4.23: *If y_1, y_2 εY_Σ, is:*

$$Oy_1 \to O(y_2 \to y_1)$$

Hypothesis 4.24: *If y_1, y_2 εY_Σ, is:*

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$$Oy_1 \rightarrow \neg y_2 \vee Or_1$$

Hypothesis 4.25: *If y_1, y_2 $\varepsilon\, Y_\Sigma$, is:*

$$O\neg y_1 \rightarrow O(\neg y_1 \vee y_2)$$

Hypothesis 4.26: *If y_1, y_2 $\varepsilon\, Y_\Sigma$, is:*

$$Oy_1 \rightarrow O(\neg y_2 \vee y_1)$$

Hypothesis 4.27: *If y_1, y_2 $\varepsilon\, Y_\Sigma$, is:*

$$O(y_1 \wedge y_2) \rightarrow Oy_1 \wedge Oy_2$$

Hypothesis 4.28: *If y_1, y_2 $\varepsilon\, Y_\Sigma$, is*

$$P(y_1 \vee y_2) \rightarrow Py_1 \vee Py_2$$

Hypothesis 4.29: *We establish the following Principle of Permission. If y, $\varepsilon\, Y_\Sigma$, is*

$$Py_1 \vee P\neg y$$

Hypothesis 4.30: *If y_1, y_2, y_3 $\varepsilon\, Y_\Sigma$, is*

$$If \quad Oy_1 \rightarrow Oy_2 \quad and \quad Oy_1 \wedge Py_3 \quad then \quad Oy_3$$

We will establish the following consequences:

Consequence 4.2: *Always that a response be forbidden, will be impossible be possibly allowed or forced. Sets SF and SPA are disjoints and such as*

$$ALW(y \in SF) \cong \neg\lozenge(\neg\,(y \in SF)) = \neg\lozenge(y \in SPA)$$

Consequence 4.3: *Always that a response be allowed or forced, is impossible be possibly forbidden. Sets SA y SPF are disjoints and such as*

$$ALW(y \in SA) \cong \neg\lozenge(\neg\,(y \in SA)) = \neg\lozenge\,(y \in SPF)$$

4.6. MAIN THEOREMS

Definition 4.27: *Let Σ be a DIS so that $\Sigma \subset ZXY \subset Z_\Sigma XY_\Sigma$ those initial gnorpsic response function is ${}^\omega\rho_0$ and such as $(z,y) \in \Sigma \leftrightarrow (\exists s/\ y = {}^\omega\rho_0\ (z,s))$. We tell that Σ is consistent if always gives allowed responses.*

.

Σ is consistent if: $\forall y \in Y_\Sigma \rightarrow y \in SA$. It is clear that $Y_\Sigma \subset SA$.

Definition 4.28: *Let Σ be a DIS so that $\Sigma \subset ZXY \subset Z_\Sigma XY_\Sigma$, those initial gnorpsic response function is ${}^\omega\rho_0$ and such as $(z,y) \in \Sigma \leftrightarrow (\exists s/\ y = {}^\omega\rho_0\ (z,s))$. We tell that Σ is complete if gives the all possibly allowed responses.*

Σ is complete iff $\forall\ (y \in SPA) \leftrightarrow (y \in Y_\Sigma)$. It is clear that $SPA \equiv Y_\Sigma$.

We propose the next theorems:

Theorem 4.1: *If a system $\Sigma \subset ZXY \subset Z_\Sigma XY_\Sigma$, is consistent, then $(SPA \cap Y_\Sigma) \cap SPF = \phi$.*

Proof:

We go to demonstrate that:

1) $(\forall(y \in Y_\Sigma) \rightarrow (y \in SA)) \rightarrow ((SPA \cap Y_\Sigma) \cap SPF = \phi)$.

2) $((SPA \cap Y_\Sigma) \cap SPF = \phi) \rightarrow (\forall(y \in Y_\Sigma) \rightarrow (y \in SA))$.

1) If Σ is consistent then: $\forall(y \in Y_\Sigma) \rightarrow (y \in SA)$ and $Y_\Sigma \subset SA \subset SPA$, then $(SPA \cap Y) = Y_\Sigma$. Then will be: $(SPA \cap Y_\Sigma) \cap SPF = Y_\Sigma \cap SPF = \phi$ and like $Y_\Sigma \subset SA$ and for C5, SA is disjoint with SPF. We had demonstrated that $(\forall(y \in Y_\Sigma) \rightarrow (y \in SA)) \rightarrow ((SPA \cap Y_\Sigma) \cap SPF = \phi)$.

2) If $(SPA \cap Y_\Sigma) \cap SPF = \phi$ then: $(y \in Y_\Sigma) \rightarrow (y \notin (SPA \cap SPF) \rightarrow (y \notin SPA \vee y \notin SPF) \rightarrow (y \in SPA^C \vee y \in SPF^C)$ and for C3 and C4 $(y \in SF \vee y \in SA) \rightarrow y \in SA$ and this demonstrates that $((SPA \cap Y_\Sigma) \cap SPF = \phi) \rightarrow (\forall(y \in Y_\Sigma) \rightarrow (y \in SA))$, and system Σ is consistent.

Theorem 4.2: *If a system $\Sigma \subset ZXY \subset Z_\Sigma XY_\Sigma$, is complete iff $(SPA \cap Y_\Sigma) \cup SPF = Y$*

Proof:

We go to demonstrate that:

1) $(\forall(y \in SPA) \leftrightarrow (y \in Y_\Sigma)) \rightarrow ((SPA \cap Y_\Sigma) \cup SPF = Y)$.

2) $((SPA \cap Y_\Sigma) \cup SPF = Y) \rightarrow (\forall(y \in SPA) \leftrightarrow (y \in Y_\Sigma))$

   1) If $\Sigma(\aleph)$ is complete then is $(\forall(y \in SPA) \leftrightarrow (y \in Y_H))$. Like $Y_\Sigma = SPA$, and will be: $(SPA \cap Y_\Sigma) \cup SPF = SPA \cup SPF = Y$.

   2) If $(SPA \cap Y_\Sigma) \cup SPF = Y$, then $(SPA \cup SPF) \cap (Y_\Sigma \cup SPF) = Y$, but is $(SPA \cup SPF) = Y$, and: $(SPA \cup SPF) \cap (Y_\Sigma \cup SPF) = Y \cap (Y_\Sigma \cup SPF) = Y$. Then $(Y_\Sigma \cup SPF) = Y$, and is $Y_\Sigma = SA \vee Y_\Sigma = SPA$, and it implicate $Y_\Sigma = SPA$ or is the same $(\forall(y \in SPA) \leftrightarrow (y \in Y_\Sigma))$.

A system Σ can be consistent but no complete, if $(SPA \cap Y_\Sigma) \cap SPF = \phi$ but it exists a response $y \in Y$ such as $y \notin (SPA \cap Y_\Sigma) \cup SPF$, or it can be complete but inconsistent. For example if it exists $y \in Y$ such as $y \in (SPA \cap Y_\Sigma) \cap SPF$ and is $(SPA \cap Y_\Sigma) \cup SPF = Y$.

For each state, $s \in S$ will correspond a set of stimuli s and ρ will produce desirable responses:

$$Z_C = \{z/^\omega \rho(z, s) \in SPA\}$$

Definition 4.29: *Let Z' be an arbitrary subset of stimuli, $Z' \subset Z$. Set Z' is allowed for $^{\omega}\rho$ iff exists $s \in S$ such as $Z' = Z_C$.*

Definition 4.30: *According to Mesarovic and Takahara (1989),* a generalized Gödel's gnorpsic function *is a one to one map, $g_n : S \rightarrow Z$.*

A relevant way to interpret $^{\omega}g_n$ is to consider it as a denotation function, i.e., for every s $\in$ S, $^{\omega}g_n(s)$ is the "name" of s in Z.

Definition 4.31: *According to Mesarovic and Takahara (1989),* a diagonalization *of $s \in$ S is the value of the Gödel's gnorpsic function given for* $Y_c = {}^{\omega}\rho(s, g_n(s))$

Definition 4.32: *According to Mesarovic and Takahara (1989), for any $SPF \subset Y$, $S_{SPF}{}^d \subset S$ is the set of all states whose diagonalization is in all Possible Wordls W (Lewis, 1973), i.e.,* $s \in S_{SPF}{}^d \leftrightarrow y_c = {}^{\omega}\rho(s, g_n(s)) \in SPF$

Theorem 4.3 (Nonwished Effects Theorem NWET): *Let $Z_{SPF}{}^d$ be the Gödel image of $S_{SPF}{}^d$, i.e. $Z_{SPF}{}^d = {}^{\omega}g_n(S_{SPF}{}^d)$, $\Sigma(\aleph)$ be a DIS such as $\Sigma \subset ZXY \subset Z_{\Sigma}XY_{\Sigma}$, $^{\omega}\rho_0$ be a gnorpsic function such as $^{\omega}\rho_0 : S \, x \, Z_{\Sigma} \rightarrow Y_{\Sigma}$ and SPA and SPF be the subsets of Y. Σ is inconsistent or incomplete whenever Z_{SPF} is an allowed set if :*

$$(\exists s) \, [z \in Z_{SPF} \leftrightarrow {}^{\omega}\rho(z, s) \in SPA] \rightarrow [(SPA \cap Y_{\Sigma}) \cap SPF \neq \phi] \text{ or } [(SPA \cap Y_{\Sigma}) \cup SPF \neq Y]$$

Proof:

Let z $\in Z_{SPF}{}^d$ be since $Z_{SPF}{}^d$ is an allowed set , it exist s such that

$$z \in Z_{SPF}{}^d \leftrightarrow {}^{\omega}\rho(z, s) \in SPA \leftrightarrow {}^{\omega}\rho(z, s) \in (SPA \cap Y_{\Sigma})$$

and substituting $z = g_n(s)$, it results :

$$g_n(s) \in Z_{SPF}{}^d \leftrightarrow {}^{\omega}\rho(s, g_n(s)) \in (SPA \cap Y_{\Sigma})$$

For definition of $Z_{SPF}{}^d$, for each $s \in S$ is:

$$g_n(s) \in Z_{SPF}{}^d \leftrightarrow {}^\omega\rho(s, g_n(s)) \in SPF$$

Then

$$g_n(s) \in Z_{SPF}{}^d \leftrightarrow \rho(s, g_n(s)) \in (SPA \cap Y_H) \leftrightarrow \rho(s, g_n(s)) \in SPF$$

$$y \in (SPA \cap Y_\Sigma) \leftrightarrow y \in SPF$$

And since for logical theorems

$$F \leftrightarrow G = (F \wedge G) \vee ((\neg F) \wedge (\neg G)) \text{ , and } (\neg F) \wedge (\neg G) = \neg (F \vee G) \text{ ,}$$

we have:

$$y \in (SPA \cap Y_\Sigma) \cap SPF$$

$$(y \notin (SPA \cap Y_\Sigma) \wedge y \notin SPF) \rightarrow y \notin ((SPA \cap Y_\Sigma) \cup SPF)$$

Note 4.5: *We can get the same result using Theorem 4.1 and Theorem 4.2. From Theorem 1, it is:*

From Theorem 4.1, it is:

$$(\forall(y \varepsilon Y_\Sigma) \rightarrow (y \varepsilon SA)) \Leftrightarrow ((SPA \cap Y_\Sigma) \cap SPF = \phi)$$

$$(Y_s \subset SA) \Leftrightarrow ((SPA \cap Y_\Sigma) \cap SPF = \phi)$$

From Theorem 4.2 it is :

$$(\forall(y \varepsilon SPA) \leftrightarrow (y \varepsilon Y_\Sigma)) \Leftrightarrow ((SPA \cap Y_\Sigma) \cup SPF = Y)$$

$$(SPA \equiv Y_\Sigma) \Leftrightarrow ((SPA \cap Y_\Sigma) \cup SPF = Y)$$

And it is clear that $(Y_\Sigma \subset SA)$ and $(SPA \equiv Y_\Sigma)$, can not be true at the same time.

4.7. NONWISHED EFFECTS

We had show that the goal of reducing Reality to systemic conception (models) cannot be totally reached. For each constructed systemic conception, can happen to it one of the two following things:

1) Either some allowed responses are not produced or

2) Else some forbidden responses are produced.

What would it mean to say that Reality is reduced to a given systemic conception? It would mean that system produces as response each allowed response of the Reality, but also forbidden responses for the system. That is to say: any allowed response is produced from the system but that forbidden response is so produced.

Definition 4.33: *To the forbidden responses produced by the system we will denominate like* nonwished effects.

The study of nonwished effects (social, political, economic, legal, etc.), of their abundance and its complexity, are in favor outside the intentions of this work. A study not too exhaustive of history is sufficient, even the recent one, to realize it.

5. THE DOXICAL FILTER: GENERALIZATION

5.1. LANGUAGE AND REALITY

In previous chapters, we have defined Deontical Impure Systems (DIS) Σ, and the mathematical properties of their structure. They are Impure because their elements are material and/or energetic beings. Deontical because in their relations deontical modalities exist: obligation, permission, prohibition and faculty. These main characteristics are those that constitute the human ecosystem or society.

In the mind of the Subject, belonging to one Σ forms a *conceptual space of representation* (CSR) of the Reality that takes in principle, three subspaces:

a) *Conceptual Subspace of the immediate reality.*

b) *Conceptual Subspace of representation of the mediate reality*

c) *Conceptual subspace of representation of the distant reality.*

In CSR is represented so much the "natural" reality, is to say, the material and energetic transactions, as the physical base of Σ and its structural base. A different thing is that the CSR is directly perceivable to the conscience, or, more directly, can be representable for the own language. But the fundamental thing is that the effectiveness of a language depends mainly, of the existence of a displaced plane, in which as much the language as the represented thing, exerts a mutual tension, being reflected in a tense and reticular geometry. We see then that the objective to reach understanding of the reality by mediation of mental or linguistic models, never could totally be reached. It means that the linguistic model produces like response each acceptable response of the reality, but not inadmissible responses. That is to say, any acceptable response takes place from the model, but they have not taken place any inadmissible response.

Language is relative as well. How can we speak about absolute being, then? We can and we cannot. But that we cannot completely speak about it, it is not a reason to stop speaking about it (Wittgenstein, 1972), because we can incompletely represent its completeness. We would not be able to speak about anything, because languages are

incomplete. Language is used inside a context. Depending of this context language will be different.

A *symbolic system* is all system governed by the distinction between significant and significance (Sastre-Vazquez, P.. Usó-Doménech, J.L., Y. Villacampa, J. Mateu and P. Salvador. 1999; Usó-Domènech, J.L., G. Stübing, J. López-Vila, and P. Sastre Vázquez, 2002; Usó-Domènech, J.L., J. Mateu. 2004; Villacampa, Y. and Usó-Domènech, J.L. 1999; Villacampa-Esteve, Y., Usó-Domènech, J.L., Castro-Lopez-M, A. and P. Sastre-Vazquez, 1999; Usó-Domènech, J.L. and Villacampa, Y., 2001), distinction that, although reaches all its specificity in the linguistic field, implies in addition:

a) The sense is never born in the level of an isolated term, but of a structured chain where the situation of the diverse composing elements is more important that the particular nature of these elements.

b) All modification in some of these elements repels on all the chain, and the significance always finds a multiplicity of expressions that, latent or present, define the framework within which is developed any progress in the evolution of all the significances.

Definition 5.1: *We denominates* sign *all semiotic unit whose significant has not been extracted from a symbolic system, but of a nonorganized land with the following significant purpose: to mediate arbitrarily between absolute being and its significance.*

All effort to make correspond, term upon term, significant and significance is devoid of sense: it implies that the significant is totally preexisting to the represented object, because the language is a set of correlations between certain words and diverse conceptual contents, between these contents and the same number of objects totally determined. However, differentiated units to which the concepts are applied and the significance of these concepts is not the reflection of the word that is the carrier do not form the reality. This contingency of the relation between the two faces of the sign springs from the same nature of the human communication, more exactly of the structure of all semiotic system. This is simultaneously a unitary structure of two heterogenous levels of the reality where are the objects, and the differential definition of these objects that are only carrying of information.

The interference between nature and culture come from a humanization of the natural reality. Nature becomes culture, not in regard to an equivalence ratio, but integration of a certain number of natural elements to a type of order that characterizes the culture. This characteristic is own of all symbolic system and all discourse, when the message means an additional codification in addition to the own codification of the language. It means the use of information taken from a sphere different from the sphere in where the system works, information that can be physical (colors, sounds, sensations, gestures, etc.) or cultural (provided by already existing the semiotic systems); application that is ordered in itself, by virtue of an organization principle. The abuse of the sign, resultant of the association of two different spheres from the reality, is reinforced by the integration of each significant unit in a differentiated system, that is the unique, allowing the appearance of the semantic sense like effect. The significance is never directly attainable but it is through an instrumental material that is been stingy of another sphere of the reality. The significance backs down through the significant one; of a particular and isolated way, nothing else it can reach it secondarily. In the language, this refraction process is double:

1) At first, it corresponds to the constitution of this same information, that is to say, the laws that all images must obey for being significant. This process designates the type of culturization of the nature.

2) In one-second phase, it corresponds to the relation that each one of these significant units maintains with other units, and this relation is the unique one defining its significances accurately. This process is the elaboration of the reality operating through the interrelation of these significant units.

Philosophical systems, religion, myths, ideologies, popular beliefs, etc., need the language existence and a certain organization of the reality by mediation of this language; they are diverse discourses doing use of signs that previously have been provided.

Each discourse takes care of a determined region of the reality. What the elaboration of the discourse characterizes the long term is the possibility of putting under objects, in the beginning heterogenous, to similar operations. The content is identified, with the division of this content in the language, that is to say, in the case of not organized discourses, with the use of signs provided by the language. In each one of these

discourses is necessary raising, in the first place, as it is the function of this language, the function that fulfills, the reason by which has been constructed. It is essential to know that receiver and emitter they are virtually confused, due that all actor Subject is simultaneously both and are virtually confused. In addition, it is necessary to take in consideration not solely the emitter and the real receiver, but those that are invoked by the discourse. Sebag (1964) mentions the following example: a "*divine message*" only can occur like such message for the believing Subject. The emitter is extrahuman; if the subject only knows this, can understand what the message contains.

Each society structuring a different Σ orders its relation with its own instruments of thought self distributing the use on the space and temporary extension of its existence. And it is necessary to ask the relationship between the emitter and the used signs, and that can be created in all knowledge of cause (*case of axiomatic systems*), learned (*language*) or undergone without dominating the operation (*dream*). It is revealed that all reference to the intention of the Subject that conceives, is insufficient to exhaust the being of everything what is produced, because this being has its existence in articulating other elements of a system, within as all creation operates and, except in the formal logical or mathematical systems, it never has equivalent a total subjectiviy. Each semiotic system is nourished in a particular land - that comprises or natural or cultural world- and the election of this material is constrictive, because it partially determines the type of syntax that will be applied. Thus, each Σ, more or less complex, will be let observe by the Subject from a plurality of angles.

5.2. THE STRUCTURAL BASE, DOXICAL AND MYTHICAL SUPERSTRUCTURES

Distinction between material structure (*Structural Base SB*) and ideal or cultural Superstructure is common. This dichotomy translates to social sphere the old religious and philosophical dualism between the body and the soul. Materialistic and idealistic thinkers share this dualism. The difference is that the materialists maintain that the structure generates and dominates the superstructure, whereas the idealistic invests the dependency relationship. The authentic materialism does not affirm that the material determines to the ideal, but it denies the existence of the ideal as thing and it affirms like activity or function of the people. What usually is called as *ideal* is an abstraction: one is an activity of concrete human beings who use material tools such as stone axes or

computers. All economic activity has cultural components: the domestic economy even requires the learning, transmission and application of prescriptions. All cultural activity has economic components. All political activity is included between the economic and the cultural spheres (Bunge, 1981). In fact, such separation between body and soul, between material structure and ideal and cultural superstructure does not exist. It is a cybernetic process with images and projections so and as we have briefed previously. Distinction between *structure* and *superstructure*, between reality א and language ל is referred to an ontic division: but also, they have an operative value. That it is a thing and that is another one, certainly it is given by the same reality; but in any case it is not conducted until the end; scientific rationality takes, then, until extreme consequences what it is outlined by the same object. However, the reality is let always define of two ways:

1) The located and dated behaviors, own from the individual subjects, or real groups, directly observables.
2) On the other hand, everything level of a social and considered reality like unit and to those who one ties other levels of different nature.

In our DIS approach, the Superstructure has been divided en two:

1) *Doxical Superstructure (DS)* is formed by values in fact, political and religious ideologies and culture of a human society in a certain historical time.
2) *Mythical Superstructure (MS)* also has been divides in two parts:

   a) MS_1 containing the mythical components or primigenial bases of the ideologies and cultures with the ideal values.
   b) MS_2 containing ideal values and utopias that are ideal wished and unattainable goals of belief systems of the Doxical Superstructure (DS).

Definition 5.2: *We define as* structural base (SB) *the order defining the combination and permutation rules that tie diverse terms forming a determined system, and are the types of possible combinations defining the semantic value of the terms, that is to say, their significance.*

Note 5.1: *The structural base (SB) is equivalent to the social, and economic forces and the normative structure enforcing it.*

Structural Base (SB) constitutes the frame or skeleton of a DIS Σ (human society). In this structure, several related substructures are interlaced strongly: normative structure (legislative body), political structure, economic structure, technological structure, pedagogical structure, etc. Each one of them can be treated like a DIS' subsystem.

Like all complex system, the human society (DIS Σ in our approach) is compound of interacting components and what we called *culture of a society* is in narrow interaction with the other subsystems: normative, political, economic, pedagogical, etc. The subsystem formed by the technological structure deserves attention, by its strong implications with respect to the rest of substructures forming SB. In according Bunge (1981), a body of knowledge is *a technology* iff is compatible with the contemporary science of a DIS, controllable by the scientific method and it is used to control, transform or create things and natural or social process.

5.3. THE DOXICAL SUPERSTRUCTURE

We have defined previously the conceptual space of representation of the Reality (CSR). Deontical Impure Systems Σ, with its general structure and normative substructure (*legal structure*), that is to say, its SD, like mental construction, operate within this space, with all denotative systemic significances. We emitted the hypothesis of the existence of another conceptual space of superior level, in where are the significances of abstract concepts such as: necessity, possibility, completeness, etc., and others like life, science, relation, ethics, knowledge, beliefs, etc. To this space, we will denominate *Doxical Space* and forming the superstructure of normative structure, as much legal as costumary.

Definition 5.3: *We define* superstructure *as the set of socio-psychological or semantic configurations that maintain a coherent and meaningful sytemic structure in a given Σ, or part thereof. That structure is rationalized and reproduced in human experience.*

The superstructure is the entire remainder of society, culture, technology, institutions, etc. It is the "invisible force" behind or within the structure, or perhaps, it is the

anthropocentric "reason" for the structure. It can include the culture, institutions, power structures, roles, and rituals of the society. It is that which, through conditioned interpersonal and situational behaviors, enforces a set of constraints and guidelines on human activity in a stable and effective fashion, such that it engenders a society's characteristic organization, and it is that characteristic organization itself. In according Marx the base determines the superstructure (Figure 5.1), although this easily simplified relationship requires some qualification:

SUPERSTRUCTURE

Superstructure maintains and legitimate the base

Education
Religion
Family
Politics

Means of Production

Relations of Production

Base shapes the Superstructure
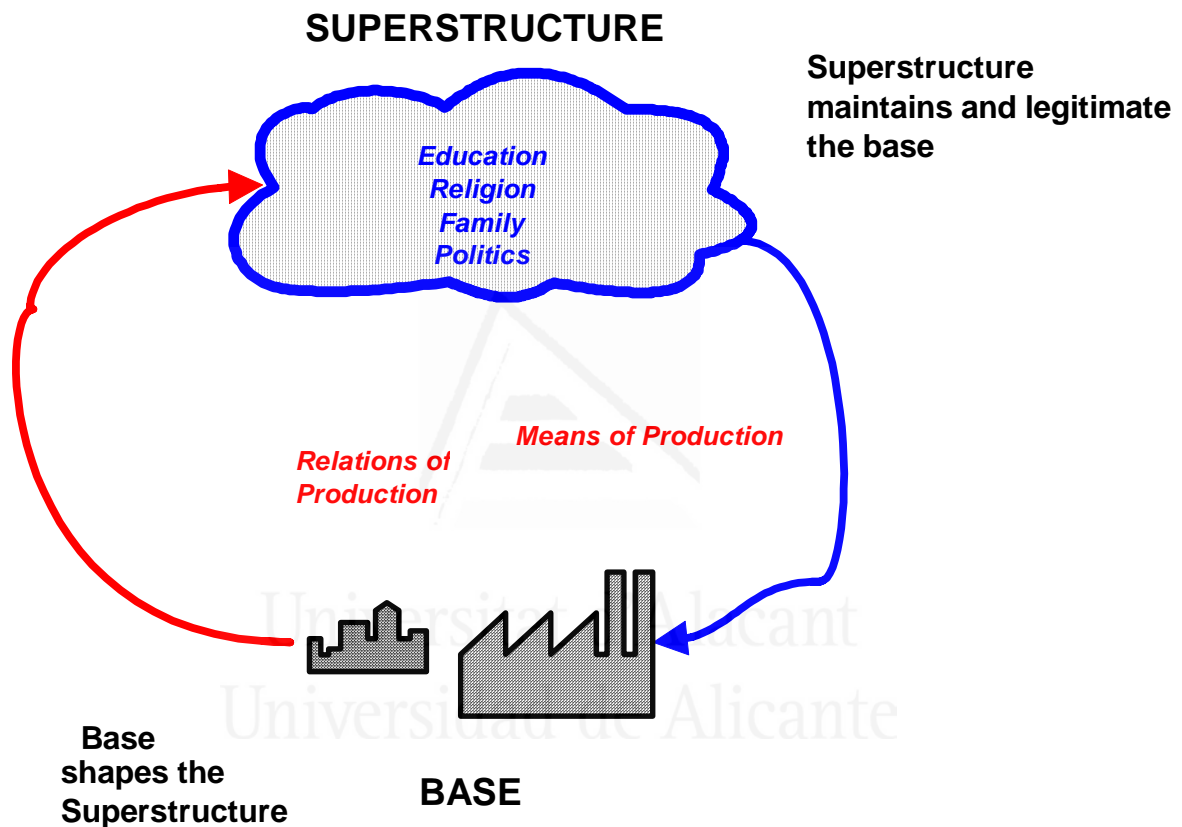
BASE

Figure 5.1.

1) Base refers to the entirety of productive relationships, not just to a particular economic position.

2) The superstructure varies throughout history and is frequently unevenly developed across different areas of societal activity.

3) There is an element of reciprocity between base and superstructure. In Gramsci's conception or theory superstructural elements, related to (and not predetermined by) economic elements through a process of articulation.

4) For Althusser (1971) is easy to see that this representation of the structure of every society as an edifice containing a base (*infrastructure*) on which are erected the two "*floors*" of the superstructure, is a metaphor, to be quite precise, a spatial metaphor: the metaphor of a topography (*topique*). Like every metaphor, this metaphor suggests something, makes something visible. The upper floors could not 'stay up' (in the air) alone, if they did not rest precisely on their base. Thus the object of the metaphor of the edifice is to represent above all the "*determination in the last instance*" by the economic base. The effect of this spatial metaphor is to endow the base with an index of effectivity known by the famous terms: *the determination in the last instance of what happens in the upper "floors" (of the superstructure) by what happens in the economic base*. The very purpose of this metaphor is to attribute the power of determination to the 'base' and to afford the 'superstructure' a secondary status. It reveals that questions of determination are crucial; that it reveals that it is the base which in the last instance determines the whole edifice; and that, as a consequence, it obliges us to pose the theoretical problem of the types of "*derivatory*" effectivity peculiar to the superstructure, i.e. it obliges us to think what the Marxist tradition calls conjointly the relative autonomy of the superstructure and the reciprocal action of the superstructure on the base.

5) Jameson (1997) settles down one narrow relates between economy and cultural superstructure. A causal connection between the art and the circumstances in which one takes place the creation and reception. In the historical scene of Capitalism a mutation of the cultural and mediatics forms of expression, as well as of its technological bases is observed, as a adaptable artifices to the own changes of the Capitalism in the progressive process of globalization. The aesthetic forms defining postmodernity correspond with the phase of worldalization of the market and are, in itself, putting in fashion by the market (Figure 5.2).

Definition 5.4: *We designate as* values *to mental constructions in the mind of the actor Subject generated by specific forms of conduct due to the actions conducted by a certain group of actor subjects, tribe, nation or culture.*
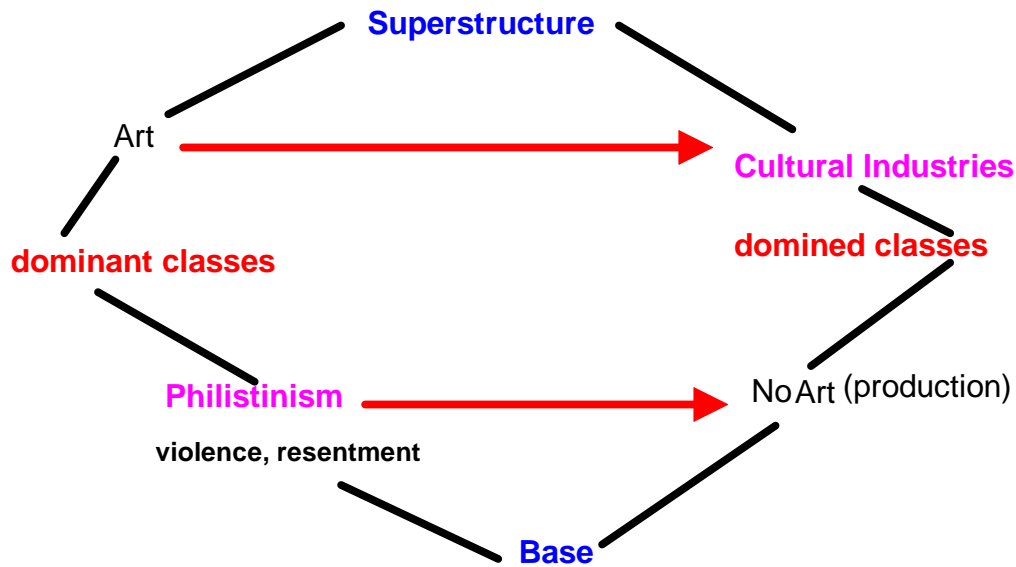
Figure 5.2.

Main Ideal condition: *The group of actor subjects will have to be homogenous.*

In DIS approach two superstructures exist (Usó-Domènech et al. 2009[a,b]):

1) A concrete specific Superstructure formed by diverse belief systems: ideologies, values in fact, philosophy, sciences, etc. We will denominate to this Superstructure as *Doxical Superstructure* (DS).

2) An abstract ideal Superstructure formed by ideal values, myths, utopia, etc., serving as primogenital explanation and last goal to the own structural base. We will denominate to this Superstructure as *Mythical Superstructure* (MS).

We summarized these ideas in the following diagram (Figure 5.3):
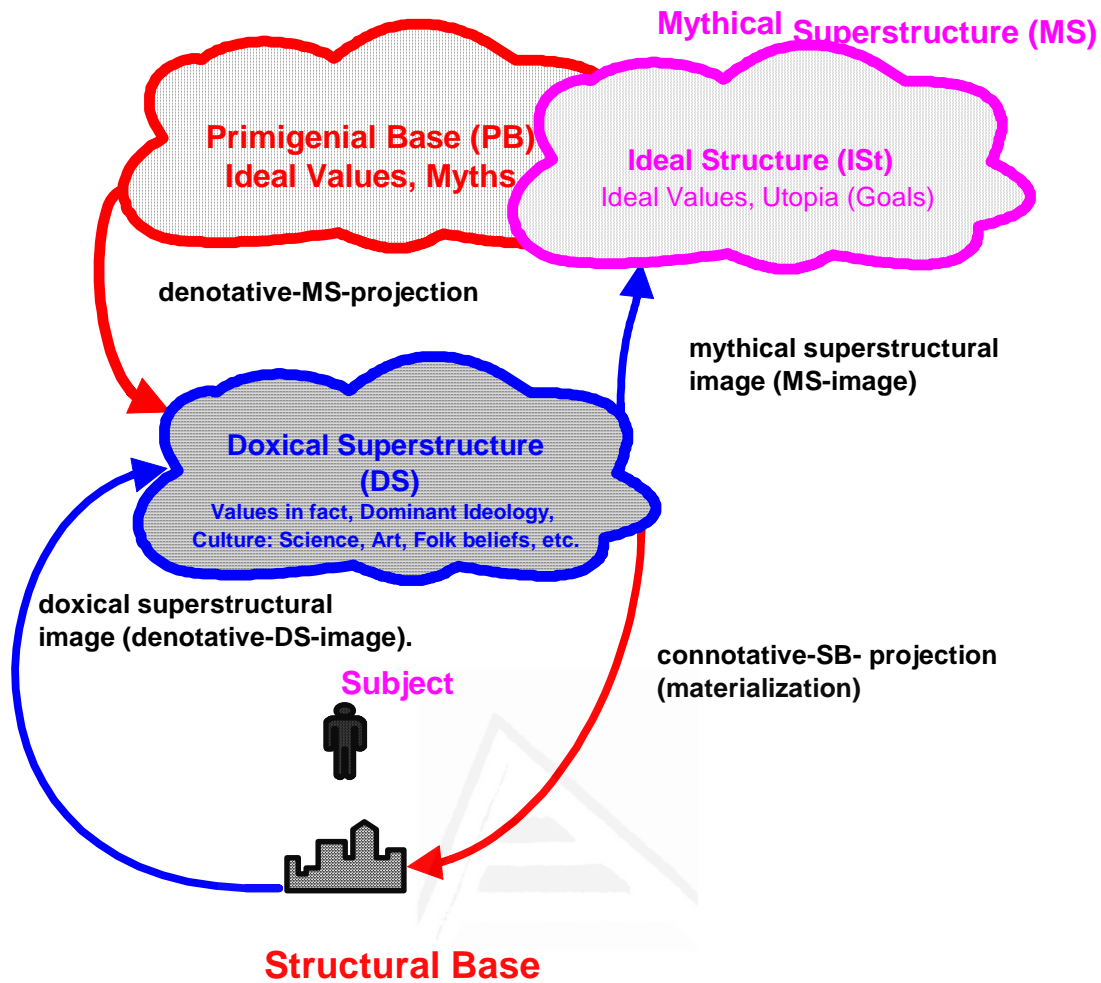
Figure 5.3.

For example, the imperative norm "*Thou shalt not kill*" for a value of the life. expresses a value for life, "*Thou shalt not steal*" one for property, etc. LeShan and Margenau (1982) call to these values like *values in fact*, because they are automatically born of the considerations, as image or reflection of the structural base (SB) in the Doxical superstructure (DS), and have not innate nor outside obligatory validity except for the conformity with the imperative norms (SB) that are arbitrary to a great extent. Considering the values in themselves, it is not possible to be said if their structural antecedents, the imperative norms are valid. Values much frequently describe the majority conduct of the group of actor subjects, the practice is taken like a norm. It is thought that determined actions or conducts are correct if the majority takes them to effect. This deceit is common and pernicious and affects until the own normative structure belonging to SB of Σ. Values in fact lack normative forces (projection of DS on SB). Being merely *in fact* needs "would have it". That the "to be" reaches "must be"

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is through the ethical validity. Nevertheless, the profit of the validity supposes the establishment of correspondences with another series of values called *ideal values* (In MS). All normative structure belonging to BS contains, in addition to norms and its reflection in the Doxical Superstructure in form of values in fact, a series of goals that are the *ideal values*, reflection of Doxical Superstructure on the Mythical Superstructure. These ideal values are practically accepted in almost all the cultures: they contain principles on the personal and collective human happiness, the freedom of action and beliefs, the right to the life, health, tranquillity, freedom or peace, privacy, certain conjugal fidelity, education, etc. These ideal values include what current it is denominated "*Human rights*". In spite of the variety of their names, all are compatible. The correspondence between values in fact and ideal values, the profit of the happiness, freedom, etc., by mediation of a life in agreement with these orders, are taken to give to validity to the Doxical Superstructure, transforming values in fact into norms (SB), by mediation of a projection of the Doxical Superestructure to the Structural Base SB.

5.4. THE MYTHICAL SUPERSTRUCTURE (MS)

It exists a double distortion in the ideological phenomenon and concerning the opposition while it is significance of the real object (*relative beings*) and the same reality of this object (*absolute beings*). Then, the relation between SB and Superstructures (DS and MS) can consider from each one of the facts that have been isolated like components of the being in one or another symbolic system. It is a series of correspondences and each one can grasp a social reality. At first sight, an important difference between the symbolic language and other systems exists. In the language the relation between significant and significance must like characteristic not be able to establish no loop of union between object (*absolute being*) and the concept that it evokes (*relative being*). This it is not the case of other symbolic systems - myths, religions, political ideologies, etc. - where the symbol seems bound by an internal relation with what it symbolizes. The eagle is symbol of royalty, empire, greatness and seems cannot be replaced by another symbol. The linguistic sign is arbitrary in the measure that the language structures a nonsignificant land to be used with significant purposes. The myth uses linguistic signs like significant having its own sense. Elements provided by the language cannot be put under any treatment and its significance becomes the origin, from as the myth conducts its own operations. The arbitrarily of the

linguistic sign is consequence of a contingent juxtaposition of elements removed from the physical world and particular psychic contents and from the systematic organization of these elements. All the postlinguistic systems implying the previous existence of a language and making use of linguistic signs put in relation contents extracted of differentiated cultural fields. Each parts of the myth are not self significant, but by their arrangement with respect to other parts of the myth. The semantic value of each unit depends on the system of operations that define the totality of the mythical discourse.

Definition 5.5: The myth *is a language of second order, of ambiguous character and that displays a logical mental model creating the problems and the fundamental dilemmas of a society.*

Note 5.2: *In a myth belonging to the Mythical Superstructure (MS) a univocal correspondence between absolute being significant and the mythical significance cannot settle down.*

Myth provides the ideal values of the culture. Many of western moral values, for example, come from the Jewish-Christian myths. The story of David and Goliath is one reason why we revere courage. Murder and theft are regarded as wrong, evil, as the myth of Moses teaches us. The myth of Noah and the Ark tells us of the consequences of evil and righteousness. To summarize then, myth provides a guide for the individual throughout his life; one that aids him to live in health, strength, and harmony in the particular society in which he was born. For Sylvie Brunel (2008) a critic of the basis of the sustainable development, with its binary vision of the world, can be compared to the Christian mythical vision of Good and Evil, a idealized nature where the human being is an animal like the others or even an alien. Nature – as Rousseau thought – is better than the human being. It is a parasite, harmful for the nature. But the human is the one who protects the biodiversity, where normally only the strong survive

The myth uses the language with certain purposes; but it continues leaning in the same reality of the language. It is integrated in a multiplicity of semantic classes being able to fit in others, to diverge, to interfere reciprocally. These semantic classes are more or less general and the mythical message tends to be located in its same level, using monem or a significant group of monems as its class (significant of the significance) and the qualifying majority depends on what it tries to mean. Considering the myth like a

semiologic system (Leví-Strauss, 1968) where their elements are defined by oppositions and relations, it has a narrative structure being able to be sintagmatic and paradigmatically studied, disturbing the myth in minimum sequences, whose combination reveals an explicit sense and a sense at a deeper level.

5.4.1. The Weinreb's mythical dimension

For Weinreb (1986) it exists an additional dimension, beyond material existence, which he calls the *mythical dimension* that contains images which are not material. In fact, Weinreb maintains that everything which exists in the concrete world as an image or a shape with a physical body, exists concurrently as a mental picture in the mythical dimension. Weinreb claims that the mythical world is formed in structures created from other material, in which are preserved not only general principles but also the particulars. Nothing exists in the sensory world without being related to its reality in another dimension (Figure 5.4).
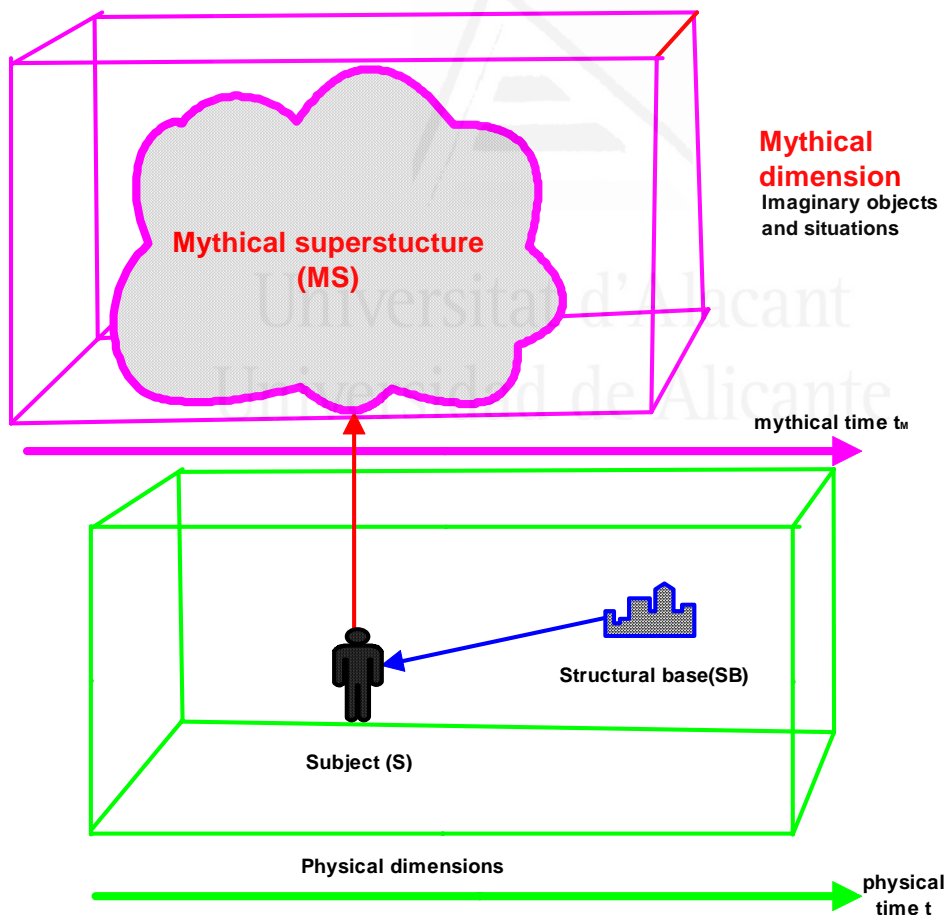
Figure 5.4.

The mythical dimension has the following characteristics:

1) The unique nature of the mythical dimension is also expressed in that space and time have a different meaning from the familiar one in the world of material phenomena:

   a) From the perspective of *space*, the mythical dimension contains no material substance, therefore the images there are not differentiated by such clear, distinct borderlines.

   b) From the perspective of *time*, there is no differentiation between past, present and future; therefore, everything which exists in the present or, alternatively, which appeared in the past, or will appear in the future, exists 'there' in a 'spiritual accumulated state'. In the mythical dimension, death does not mean nothingness but a transformation, where the future, the past and the present exist at one and the same time. In the mythical dimension time exists in its totality, embracing past, present and future. It is the *mythical time*.

2) Another important characteristic of the mythical dimension is that not only do things appear differently, but their metaphysical-value is immediately present. The entire natural-material world in which we exist is a symbol, since all its creatures exist in another dimension of metaphysical significance. These creatures have meaningful and mutual relationships which are usually hidden from our awareness. What is hidden from us in our world is the additional meaning of phenomena. This world is not devoid of spiritual meaning, but one must learn to recognise it. The full context of the forms of time exists in the mythical dimension, as does the full context of forms in space, but they are harder to discern.

3) We may term the mythical dimension as the Whole, and concrete reality as the *Half*. However, this half is only a half in human consciousness, since people who learn to communicate with the mythical dimension begin to see the material world in its full context. Although people confront multiplicity, the encompassing and unifying nature of the mythical dimension is manifested in the eventual perception of all personal elements in their unity. This is the path that leads from polytheistic myths to monotheistic myths: polytheistic myths

constitute a stage in the progression towards a unifying perception of reality, a single Divine Being which is founded on multiplicity.

4) The mythical dimension is very intimately connected with man's interior-spiritual life. Human memory already denotes that people prevail over the continuum of time and over forms in space. Through memory man can experience different times and sights without being dependent on a specific time or space. However, as with the Jungian idea of the subconscious, and in accordance with Weinreb's perception of the mythical dimension, the subconscious includes historical content, not only individual memory; the collective and universal form part of the human subconscious.

5) Dreams are an important means through which man receives messages from the mythical dimension. We have seen that everything exists mythically and with metaphysical meaning. In our dreams we receive concrete images which have additional meaning and therefore these images have inner value. Contemporary excessive cerebrality must be balanced by a return to the subconscious or the dream-world. Dreams are cardinal mythical facts, since in dreams we receive a concrete image with a significance that transcends the concrete. Our dreams are not simply random, and the images we see have a certain value-significance. The cerebral aspect refuses to grasp the metaphysical significance of natural objects.

6) Weinreb (1986) claims that the myths derive, in principle, from one source of inspiration and therefore can be approached using the same commentary methods: he applied this principle to the Bible, the Oral Tradition as well as to the New Testament. Weinreb's commentary on the New Testament has typological, mythical and archetypal features in accordance with the aforementioned priniples: it gives the New Testament a universal dimension which transcends Christianity.

The religious behavior is so practical as the technical behavior; it assures a man integration to a world that exceeds him and with that het treats physics or metaphysical. To each stage of this integration had to correspond a phase of the religious behavior. While the old phases of the beliefs have extended until the present man, in each historical stage a new phase was added that dominated the others.

5.5. THE IDEOLOGY

Our species-specific, evolved means of survival in the world is our faculty of conceptual thought: the human lives by identifying the facts of reality; and by using the resulting principles to preserve and enhance his life on Earth. If we are human, we were born to think. An idea, according to The Concise Oxford English Dictionary, *can be a thought or suggestion as to a possible course of action; a mental impression; a belief.* Whilst dictionary definitions aren't always the best place to start in Media Studies, this one is actually quite helpful. Ideology, as we use it in Media Studies as a tool of analysis, a tool to determine how texts make meaning, is all of these things.

An **ideology** is a set of beliefs, aims and ideas. Ideologies are not a collection of accidental facts considered separately and referred an underlying history. Therefore, it is:

1) *Thoughts about our own behaviours, lives and courses of action.*

2) *A mental impression – something that is abstract in our heads – rather than a concrete thing.*

3) *A system of belief. Just beliefs –non-unchangeable ultimate truths about the way the world should be.*

Ideology has different meanings:

1) The process of production of meanings, signs and values in social life.

2) A body of ideas characteristic of a particular social group or class.

3) Ideas that help to legitimate a dominant political power.

4) Socially necessary illusion; the conjecture of discourse and power.

5) The medium in which conscious social actors make sense of their reality.

6) Action oriented set of beliefs.

7) The confusion of linguistic and phenomenal reality.

8) Semiotic closure.

9) The indispensable medium in which individuals live out their relations to a social structure.

10) The confusion of the process whereby social life is converted to a natural.

Ideas, and therefore ideologies, have been around since the beginning of time, but the study of ideology has become increasingly important, whilst getting increasingly

complex, in modern life. Whilst once your choices would have been made for you, based on your social roles as girl/boy, man/woman, husband/wife, mother/father, and on moral guidance from your religion and the monarchy, these choices are no longer fixed in modern life. We increasingly make our own choices: whether to work, whether to learn, whether to marry, whether to have children, and how to raise those children. But in a modern world where the Church, Monarchy, Community, or even the Family unit no longer have the same significance in giving guidance on these big decisions, only one institution is gathering pace and influence. Mi Park (2002) writes, "*Ideology is the main medium with which conscious human beings frame and re-frame their lived experience. Accumulated memories and experiences of struggle, success and failure in the past influence one's choice of ideological frame*".

They are thought systems where it is necessary to discover a organization principle, because a valid correspondence between differentiated planes, only can settle down once clarified the structure of each one of these planes. Ideologies are systems of abstract thought applied to public matters and thus make this concept central to politics. *Ideology* is not the same thing as Philosophy. *Philosophy* is a way of living life, while ideology is an almost ideal way of life for society. Some attribute to ideology positive characteristics like vigor and fervor, or negative features like excessive certitude and fundamentalist rigor. Though the word ideology is most often found in political discourse, there are many different kinds of ideology: political, social, epistemic, ethical, and son on.

Karl Marx (1976) proposes an economic base superstructure model of society (See figure 5.1). The *base* refers to the means of production of society. The *superstructure* is formed on top of the base, and comprises that society's ideology, as well as its legal system, political system, and religions. For Marx, the base determines the superstructure. Because the ruling class controls the society's means of production, the superstructure of society, including its ideology, will be determined according to what is in the ruling class's best interests. Therefore the ideology of a society is of enormous importance since it confuses the alienated groups and can create false consciousness. Althusser (1971) proposed a materialistic conception of ideology. A number of propositions, which are never untrue, suggest a number of other propositions, which are, in this way, the essence of the lacunar discourse is what is *not* told (but is suggested). For example, the statement *All are equal before the law*, which is a theoretical

groundwork of current legal systems, suggests that all people may be of equal worth or have equal opportunities. This is not true, for the concept of private property over the means of production results in some people being able to own more than others, and their property brings power and influence. Marxism itself is frequently described as ideology, in the sense in which a negative connotation is attached to the word; that is, that Marxism is a *closed system* of ideas which maintains itself in the face of contrary experience. Any social view must contain an element of ideology, since an entirely objective and supra-historical view of the world is unattainable. Further, by its very scope and strength, Marxism lends itself to transformation into a closed and self-justifying system of assertions.

Minar (1961) describes six different ways in which the word "ideology" has been used:

1. As a collection of certain ideas with certain kinds of *content*, usually normative;
2. As the *form or internal logical structure* that ideas have within a set;
3. By the role in which ideas play in *human-social interaction*;
4. By the role that ideas play in the *structure of an organization*;
5. As meaning, whose purpose is *persuasion*; and
6. As the *locus* of social interaction, possibly.

For Mullins (1972), an ideology is composed of four basic characteristics:

1. It must have power over cognitions;
2. It must be capable of guiding one's evaluations;
3. It must provide guidance towards action;
4. And, as stated above, must be logically coherent.

Mullins emphasizes that an ideology should be contrasted with the related (but different) issues of *utopia* and *historical myth*. For Zvi Lamm (1984) an ideology is a system of assumptions with which people identify. These assumptions organize, direct and sustain people's volitional and purposive behaviour. The assumptions on which an ideology is based are not collected at random but constitute an organized and systematic structure.

In according to Cranston (2003) an ideology is a form of social or political philosophy in which practical elements are as prominent as theoretical ones. A system of ideas aspires both to explain the world and to change it. Therefore, the main purpose behind

an ideology is to offer change in society through a normative thought process. For Duncker (2006) the term ideology is defined in terms of a system of presentations that explicitly or implicitly claim to absolute truth.

Ideas may be good, true, or beautiful in some context of meaning but their goodness, truth, or beauty is not sufficient explanation for its existence, sharedness, or perpetuation through time. *Ideology* is the ground and texture of cultural consensus. In its narrowest sense, this may be a consensus of a marginal or maverick group. In the broad sense in which we use the term ideology is the system of interlinked ideas, symbols, and beliefs by which any culture seeks to justify and perpetuate itself; the web of rhetoric, ritual, and assumption through which society coerces, persuades, and coheres. Therefore:

Definition 5.6 (First definition): *An* Ideology *is a system of related ideas (learned and shared) related to each other, which has some permanence, and to which individuals and/or human groups exhibit some commitment.*

Definition 5.7 (Second definition): Ideology *is a system of concepts and views, which serves to make sense of the world while obscuring the social interest that are expressed therein, and by completeness and relative internal consistency tends to form a closed belief system and maintain itself in the face of contradictory or inconsistent experience.*

Note 5.3 (Althusser, 1971): *All ideology has the function of constituting concrete individuals as subjects.*

Consequence 5.1: *Conventional conception of author (authority, originator) and individual agent are replaced by an ideologically constituted actor subject. Stereotypes, that actor subject rely on to understand and respond to events.*

As much if the Philosophy, Political or Religion are doxical reflected of economic relations as if they express in a specific language certain mental model of human relations, or an update of a certain field of a common structure to society, only be closed the debate after a theoretical treatment.

Nevertheless, theoretical treatment of all ideology firstly has to be located to synchronism level. Relation between synchronous and diachronic order is complicated

when we are located in a unique level: the structure of Σ and transformations are homogenous among them. In the case of synchrony are constructed static or dynamic models. In the diachronic case we will have to consider History, content multiform movement making take part heterogenous elements. Ideology emerges spontaneously at every level of society, and simply expresses the existing structure of that Σ. Members of every class constructs their own understanding of the Σ, based on their personal experiences. Since those experiences are primarily of capitalist social relations, their ideology tends to reflect the norms of capitalist society.The individual subject is faced, not with the problem of differentiating the *ideological* from the *real*, but with the problem of choosing between competing ideological versions of the *real*. Drawing on Jaques Lacan's theory in which human subjectivity is formed through a process of misrecognition of the ideology in the *mirror* of language.

This is far from the only theory of economics to be raised to ideology status - some notable economically-based ideologies include *mercantilism, mixed economy, social Darwinism, communism, laissez-faire economics, free trade, ecologism, islamic fundamentalisme*, etc. *Science* is an ideology in itself. Therefore, while the scientific method is itself an ideology, as it is a collection of ideas, there is nothing particularly wrong or bad about it. In everything what affects the study of the ideologies the problem has a double sense:

1) *Homogeneity:* each discourse informs a content previously given and that puts under its own syntaxes.
2) *Heterogeneity:* passage of the reality to languages introduces a complete displacement of all the notions, fact that excludes the cause that they are conceived like simple duplicates.

5.6. TYPOLOGY OF IDEOLOGIES

To establish a *typology of ideologies* is very difficult. We will expose here the classifications that more interesting have seemed to us:

1) Depending on the *Ideological Degree*, since we will describe in next paragraphes

2) So considered, ideology is basically conservative but it is not therefore static or simply repressive.

In Walsby's theory (1947), ideologies have a taxonomical structure, and every ideology belongs to one of the seven major ideologies. These are ranged in historical sequence according to their order of appearance, revealing the progressive development of human needs. The individual who identifies with the most recent of the principle ideologies thereby identifies with man's most advanced needs, but in doing so does not reject all the preceding ideologies listed in the taxonomical order of their appearance. He remains with them and they remain with him. Walford (1979, 1983[a,b]) divides the major ideologies into three groups:

1) **Ediostatic group:** The ideologies in this group are:

   a) *The Protostatic Ideology*: The principal features of the protostatic ideology are: *a)* Positive group identification. b) Negative cosmic identification. c) Economic individualism. d) Political collectivism. e) Negative intellectuality. f) Undifferentiated reality. Every volitional action of an individual, in any sphere, is influenced by the ideology he accepts. The protostatic ideology is at the same time a universal ideology in much the same sense as consumption is a universal necessity. It is *conservatism* and, under certain circumstances, *fascism or its equivalents*. This group tends to identify exclusively with its own social unit (state, nation or country) and to regard all outside that unit, the physical, social and human aspects of the environment with either complete indifference or, if it seems to be presenting a threat, then with undiluted hostility.

   b) *The Epistatic Ideology:* This ideology justifies accepted practice. It does not aspire towards reforms, but comes to terms with changes and innovations provided they strengthen the existing situation. People adhering to this ideology accept one of the religions, but at the same time recognize the right of other religions to exist; they are nationalists, but recognize the right of other nations to exist. In the political sphere, this is a *transition from the extreme Right to conservatism*. In times of peace, he may uphold justice even though this obliges him to criticize

his society or state. Like the protostatic, he rejects intellectualism, but he is not as hostile to it.

c) *The Parastatic Ideology:* The sciences, and particularly the physical sciences, now come to the fore in the struggle for survival and as a means of removing restrictions on freedom. This does not yet constitute the victory of intellectualism, however. The anti-intellectual approach continues to exist, though in a steadily weakening form. The sciences born under the auspices of the parastatic ideology respect facts more than intellect, which is called upon to serve in the struggle for survival. The political embodiment of parastatism is *liberalism*. In it the assumption of multiplicity becomes the principle of faith, leading to the demand for universal suffrage.

2) **Eidodynamic group:** This awareness gave rise to the eidodynamic ideologies, which regard poverty, disease, cruelty and other social features as restricting man's freedom. According to this new approach, society is the target against which or at least within which it is necessary to act in order to improve man's lot. The attitude toward the environment is positive, and it is felt that the environment should be preserved and defended. The person adhering to the dynamic ideology, on the other hand, will be prepared to mobilize others to defend nature and maintain peace with the neighbors, whoever they are, but at the same time will wish to fight in order to correct society and even to change it fundamentally. Here they are collectivists in economics and individualists in politics. Intellectualism should not be identified with intelligence. On the ideological Left not all the intellectuals are necessarily always intelligent. Each of the three ideologies in this group interprets the assumptions listed above in its own special way. The ideologies in this group are:

a) *The protodynamic ideology*: Society is regarded as a complex whole that consists of classes connected to one another through interaction and not necessarily opposition. Nonetheless, this is the first ideology, which is not based on positive identification with society, and maintains that society needs to be structurally amended, not superficially improved. Political manifestation is *social democracy*.

b) *The epidynamic ideology:* The epidynamic ideology, whose political manifestation is *communism*, takes negative identification with society still further. Society is depicted as the arena of conflict between hostile classes between which there are unbridgeable contradictions regarding matters of principle. Revolution is an act of liberation. The same applies to all other aspects of reality; they all consists of contradictions and exist to develop in their own right.

c) *The Paradynamic ideology:* It is the ideology of *anarchism*. This takes the negative identification with society to its conclusion, since society's control of the individual is the principle limitation to his freedom. This control derives from the principle of authority, which the state uses as a mechanism of coercion. Consequently, it is necessary first to destroy the state. The principle underlying the new organization of society, which is necessary to ensure man's freedom, is the removal of all coercive institutions and the replacement of rule by administration.

3) **Metadynamic group:** It does this by recognizing the fact that all the assumptions of all the previous ideologies are problems, which have to be dealt with, ad hoc, and are not articles of faith. All the assumptions of all the ideologies need to be studied and examined, approached with a different attitude, namely that adopted by people towards assumptions with which they identify. The people who belong to this group try to understand the phenomenon known as ideology, and thus defeat ideologies as factors limiting their freedoms.

Other classification not contradicting the previous one can be the following:

a) *Affirmative Ideology*: An ideology that is dominated by affirmative root themes and is directed towards developing sound rational thinking is an affirmative ideology.

b) *Negative or Divergent Ideology*: An ideology dominated by invert themes that tend to weaken commitment to sound rational thinking is a negative divergent ideology. There are many ways of being negative.

c) *Polar Ideology*: Polar ideology is a negative oriented ideology that stresses oppositional antagonism as a primary vital force dominating both physical and intellectual forces in the universe.

d) *Marginal Ideology*: Those theories on the edge are marginal. Marginal ideologies border between affirmative and negative. For example: As for violent radical Islam, Feldman (2003) considers it a marginal ideology— which in many ways it is. He goes on to envision what a Middle East beyond these violent jihadis could be. Quoting a saying of the Prophet Muhammad concerning the need for the greater jihad.

e) *Split Ideology*: Those theories that say one thing while implying, suggesting or encouraging the opposite are split ideologies.

Using Gramsci's (1971) notion of *hegemony* to identify three cultural forces:

1) *Dominant ideology* or now in force.
2) *Residual ideology* or what was dominant.
3) *Emergent ideology* or what is evolving in resistance to dominance.

As Raymond Williams (1965, 1977) points out, ideology evolves through conflict, and even when a certain ideology achieves dominance it still finds itself contending to one degree or another with the ideologies of residual and emergent cultures within he society contending, that is, with alternative and oppositional forms that reflect the course of historical development. In this process, ideology functions best through voluntary acquiescence, when the network of ideas through which the culture justifies itself is internalized rather than imposed, and embraced by society at large as a system of belief. Williams (1977) using Gramsci's notion of hegemony identifies three cultural forces:

1) The *dominant ideology* or ideology now in force.
2) The *residual ideology* what was dominant.
3) The *emergent ideology* what is evolving in resistance to dominance.

All of which are co-present at any one moment of cultural history.

The concept of *dominant ideology* was defined firstly by K. Marx and F. Engels in the book *The German Ideology* (1976 [c. 1845]). Dominant ideologies appear as neutral, holding to assumptions that are largely unchallenged. Meanwhile, all other ideologies that differ from the dominant ideology are seen as radical, no matter what the content of their actual vision may be. Marx proposed that a society's dominant ideology was a part of its superstructure.

Definition 5.8: *We define* dominant ideology (DI) *as the abstract symbolic system of common values and beliefs shared by most people in a given society of actor subjects forming a Deontical Impure System and valid during a determined historical period, framing how the majority think about a range of topics.*

Definition 5.9: *To the part of the IDS containing dominant ideologies we will denominate* Dominant Ideological Doxical Subspace (DIDS).

There are three possible positions for the individual subject in relation to the dominant ideology of his society.

1) The first is *identification*: the actor subject accepts his place in society and the social order as it stands.

2) The second is *counter-identification*: the actor subject who simply denies and opposes the dominant ideology, and in so doing inadvertently confirms the power of the dominant ideology by accepting the *evidentness of meaning* upon which it rests.

3) The third position is termed *disidentification*: an effect which constitutes a working (transformation-displacement) of the actor subject form and not just its abolition. Disidentification requires a transformation or displacement in the way the subject is interpellated by ideology. It is not just a matter of people changing, but also of changes in power relations, in the ways discourses and institutions produce, define and confine social actor subjects. Disintification's concept is useful in analysing the relationship of discourse and ideology to class struggle and in accounting for subjectivities which are situated contradictorily across class, race, gender, and other sociopolitical divisions. Disidentification is possible (according to Pecheux's theory) because meaning is determined by the ideological positions brought into play in the socio-historical process in which

words, expressions, propositions, etc. are produced (i. e. reproduced). It is the subject's position within a particular discursive formation that determines meaning, rather than the subject's intent. The ideological and discursive formations supply the assumptions about intent which appear to determine meaning, or, even, necessarily, the conventional meanings valorized by the dominant ideology. Change, and some degree of discursive agency, can be identified precisely because no ideological discourse can monolithically interpellate a subject, and because different discourses within a particular social formation will intersect at various points to produce a range of sometimes conflicting subjectivities. When most people in a society belonging to a particular DIS think alike about certain matters, or even forget that there are alternatives to the status quo, we arrive at the concept of *hegemony* about which philosophers and writers of XX century have argued that social ideological homogeneity can be achieved by restricting the conceptual metaphors transmitted by mass communication.

For Williams (1977) *emergent ideology* is referring to those values and practices, which are developing in society outside of, and sometimes actively challenging, the dominant. All of which are co-present at any one moment of cultural history. Williams viewed culture as a *productive process*, part of the means of production, and cultural materialism often identifies what he called *residual*, *emergent* and *oppositional* cultural elements. *Residual ideologies* they are the ghost of those ideology that was dominant in a last time. They are the nonlegal tradition of people, its customs, norms, behaviors, etc. Williams (1977) describes residual ideology referring to beliefs and practices that are derived from an earlier stage of society. *Myth* is still a vital component in the life of any community, still a motivating factor in our actions--a matrix of any residual ideology of our civilization. Maybe the family belongs to a sort of residual ideology in which it was quite useful in the past for youngsters to have babies because they could contribute to the family income at a very early age. We are talking of the preindustrial situation, and maybe we still have that residual ideology in modern society. In fact, this classification complements the previous ones; an ideology can be *dominant or derived* (in its social context), *epydinamical and marginal*.

Historian George Rudé (1980) has identified two kinds of ideologies:

a) *Inherent* which are the commonsense beliefs of most people.

b) *Derived*, which are a systematic, coherent critique of the status quo along with a strategy for change.

Rudé finds that traditional ideologies form the basis of defensive struggles which do not significantly threaten the status quo such as worker resistance to plant-closings or recent efforts to support affirmative action. The potential for political and social transformation is present only when the traditional ideology is supplemented by a derived ideology that brings with it more radical goals. George Rude's theory that popular ideology is developed out of the interplay between peoples daily-experiences and struggles, and the derived ideology that seems to represent that reality best (Rude, 1980). Popular ideologies are never rigid or fixed in space and time. Ideas meet reality in a sort of dance where the subordinate class adopts or rejects a certain derived ideology depending on their experience. Rude describes the "*locally-assembled*" nature of any one particular popular ideology as the fusion of inherent ideas based on direct experiences with a more structured system of derived ideas transmitted and adapted from outside. Examples of these "*structured*" ideas could be the Rights of Man, Nationalism or Marxism-Leninism.

Typically, each ideology contains certain political ideas on what it considers to be the best form of government (e.g. democracy, tyranny, theocracy, etc), and the best economic system (e.g. capitalism, socialism, etc). Sometimes the same word is used to identify both an ideology and one of its main ideas. Ideologies also identify themselves by their position on the political spectrum. Finally, ideologies can be distinguished from political strategies and from single issues that a party may be built around.

Definition 5.10: A Political Ideology *is a certain ethical set of ideals, principles, doctrines, myths or symbols of a social movement, institution, class, or large group that explains how society should work, and offers some political and cultural blueprint for a certain social order.*

Political ideologies are concerned with many different aspects of a society, some of which are: the econimy, education, health care, labor law, criminal law, the justice system, etc. A political ideology largely concerns itself with how to allocate power and to what ends it should be used. Some parties follow a certain ideology very closely,

while others may take broad inspiration from a group of related ideologies without specifically embracing any one of them.

Political ideologies have two dimensions:

1) *Goalages:* How society should work (or be arranged).

2) *Methods:* The most appropriate ways to achieve the ideal arrangement.

5.7. THE IDEOLOGICAL COMPONENTS

The conditions of permanence, commitment, and connectedness are variable characteristics through which we expect ideologies to be related to social organization (SB). Therefore, an ideology has the appropiate propierties, and through them social significance.

Definition 5.11: *We will call* believer *to the Actor Subject plaintif belonging to a certain Σ that believes (it has faith) in a concrete ideology.*

Some characteristics of ideologies are:

1) *Personal commitment* is one of most observable and interesting features of an ideology. If it were not for the fact of personal commitment, ideologies could not have strong social consequences, and it have not interesing the study of social systems.

2) Ideologies have an *existence* that is independent of the believers who experienced the commitment. The believers does not contain the ideology; in fact, he is unlikely to be aware of more than a small part of it and, knowingly or unknowingly, he must take the rest of the ideology on faith.

3) *Psychological mechanisms such as cognitive congruence* may help explain individual commitment,but they do not necessarily explain the connectedness of an ideology in human society.

4) The *life span* of an ideology is potentially longer than the life span of believers.

5) Ideologies *vary* almost infinitely in substantive content.

6) The *boundaries* of an ideology are generally, although not always, undefined. Collections of beliefs do not generally have neat boundaries unless boundaries

are constructed with some social purpose in mind, determining who is "*in*" and who is "*out*". Ideologies often appear to have clear boundaries when the saparation is really between social groups.

5.8. ELEMENTS OF AN IDEOLOGY

The following elements (Borhek and Curtis, 1983) are listed in the order that would be logically required for the understanding a first aprroach of an ideology. This does not imply priority in value or in causal or historical sense.

1) *Values*. Implicitly or explicitly, ideologies define what is good or valuable. We refer to ideal values belonging to Mythical Superstructure (MS). They are goals in the sense that they are the values in terms of which values in fact belonging to Doxical Superstructure (DS) are justified. Ideal values tend to be abstract summaries of the behavioral attributes which social system rewards, formulated after the fact. Social groups think of themselves, however, as setting out to various things in order to implent their values. Values are perceived as a priori, when they are in fact a posteriori to action. Having abstracted a ideal value from social experience in SB, a social group may then reverse the process by deriving a new course of action from the principle. At the collective level of social structure (SB), this is analogous to the capacity for abstract thought in individual subjects and allows great (or not) flexibility in adapting to events. Concrete ideologies often substitute obsevable social events for the unmeasurable abstract ideal values to give the values in fact inmediate social utility.

2) *Substantive beliefs (Sb)*. They are the more important and basic beliefs of an ideology. Statements such as *All the power for the people, God exists, Black is Beautiful*, and so on, comprise the actual content of the ideologies and may take almost any form. For the believers, substantive beliefs are the focus of interest.

3) *Orientation*. The believer may assume the existence of a framework of assumptions around his thought, it may not actually exist. The orientation he shares with other believers may be illusory. For example, consider almost any politic and sociologic ideology. Such system evolves highly detailed and highly systematic doctrines long after they come into existence and that they came into

existence of rather specific substantive beliefs. The believers interact, share specif consensuses, and give themselves a specific name: marxisme, socialisme, nazisme, etc. Then, professionals of this ideology work out an orientation, logic, sets of criteria of validity, and so forth.

4) *Language.* It is the logic of an ideology.

Definition 5.12: *We define as* language **L** *of an ideology the logical rules which relates one subtantive belief to another within the ideology.*

The language must be inferred from regularities in the way of a set of subtantives beliefs in the way a set of beliefs is used. The language will be implicit, and it may not be consistently applied.

Let Sb be a substantive belief. We propose the following rules of generation of ideologies:

$$R1 \rightarrow \Pr ed \rightarrow subs\tan tive \quad beliefs \rightarrow \bigcup_{k=1}^{n} Sb_k = Sb_j$$

$$R2 \rightarrow Arg \rightarrow hypothesis + goal \rightarrow why \quad and \quad what \quad for?$$

$$R3 \rightarrow T \rightarrow \Pr ed \wedge Arg$$

$$R4 \rightarrow T \rightarrow T[(\&)]^n, n \geq \varnothing$$

$$R5 \rightarrow \& = \begin{cases} \wedge \\ \vee \\ \equiv \end{cases}$$

Note 5.4: *Argument is formed by the sum of two characteristics: hypothesis, that is to say, so that this physical and social reality? and goal: as we want is this society to reach its "perfection" (utopia).*

5) *Perspective.*

Definition 5.13: *We define* perspective of an ideology *or their cognitive map, to the set of conceptual tools.*

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Central in most perspectives is some statement of where the ideology and/or social group that carries it stads in relation to other things, specially nature, social events or other social groups. *Are we equals? Enemies? Rulers? Friends?*

Note 5.5: *Perspective as description of the social environment is a description of the social group itself, and the place of each individual in it.*

The perspective may be stated as a myth in the Mythical Superstructure (MS). It explains not only who subjects are and how subjects came to be in cognitive terms, but also why subject exist in terms of ideal values. Meaning (d-significances $\overrightarrow{s_{\Sigma}^{D}}$) and identification are provided along with cognitive orientation.

6) *Prescriptions and proscriptions.* This includes action alternatives or policy recommendations as well as deontical norms for behavior. They are the connotative-SB-projection from DS to SB. Historical examples of prescriptions are the Marx's *Communist Manifesto,* the Lenin's *What is To Be Done* or the Hitler's *Mein Kampf.* Deontical norms (*Deontical Structure in SB*) represent the cleanest connection through of MS-image and SB-projections between the abstract idea (*Ideal Structure belonging to Mythical Superstructure*) and the concrete applied belief (SB) because they refer to behavior that is observable. They are the most responsive conditions in being directly carried by the social group through the mechanisms of social reward and punishment.

7) *Ideological Technology.* In according Borhek and Curtis (1983) every ideology contains associated beliefs concerning means to attain ideal values. Some such associated beliefs concern the subjective legitimity or appopriateness of d-significances, while others concern only th efectiveness of various d-significances. For example, political activists and organizational strategy and tactics are properly called technology of the ideology.

Definition 5.14: *We define as* Ideological Technology *the associated beliefs and material tools providing means for the inmediate (in SB) or far (In Ideal Structure as Utopia)goals of an ideology.*

Note 5.6: *Ideological Technology is not used to justify or validated other elements of an ideology, although the existence of ideological technologies may limit alternative among substantive beliefs.*

Ideological Technology commands less commitment from believers than do the other elements. A change in Ideological Technology (*strategy*) may be responsible for chages in logical prior elements of an ideology. Ideological Technology, like belonging to Structural Base and having a series of prescriptions concerning *doing* can influence the life conditions of believers, thus forcing an adaptation in the ideology itself. Eurocomunism in Western Europe gives to a good historical example. Ideological Technology may become symbolic through DS-image and an inverse MS-image (PB-image) on Primigenial Base belonging to Mythical Superstructure, and it can cause of more fundamental differences between ideologies and, therefore, a source of conflict. Conflicts between Anarchists and Communists in the Spanish Civil War (1936-1939) or the ideas of Trosky and those of Stalin in the USSR are examples of it. Much blood has been shed between Muslims and Hindus over the fact that their religions have different dietary restrictions (*deontical prohibitions*).

Note 5.7: *Conflicts are not over Ideological Technology but over what technological difference symbolizes in the Primigenial Base of the Mythical Superstructure.*

Note 5.8: *Substantive beliefs are understood only in terms of ideal values, criteria of validity, language and perspective.*

Note 5.9: *The believer is usually better able to verbalize substantive beliefs than he is values, criteria.logical principles or orientation, which are apt to be the unquestioned bases from which he proceeds.*

Note 5.10: *Ideal values, criteria of validity, language and perspective may have been built up around a substantive belief to give it it significance and justification.*

Definition 5.15 (Third definition): *We define systemically as* ideology *and we represent as* $Id = \langle Sb, IR \rangle$ *to the system formed by an object set Sb whose elements are*

substantive beliefs $Sb = \{Sb_i\}, i = 1,..., n$ *and whose relational ser IR is formed by the set of binary logical abstract relations between substantive beliefs.*

Note 5.11: *Ideologies, like units of energy (information), should be thought of as things which have variable, abstract characteristics, not as members of platonic categories based on similarity.*

Definition 5.16: *Interrelatedness of their substantive beliefs define the* degree of an ideology (DId) *and it si defined like the number m of their logical abstract relations.*

Logically, some belief systems an ideologies are more tightly interrelationed than others. We suppose the ideologies and belief systems forming a continuum: $[Id_l,..., Id_r]$.

> a) At the right end of the continuum are ideologies that consist of a few highly linked general statements from which a fairly large number of specific propositions can be derived. Confronted by a new situation, the believer may refer to the general rule to determine the stance he should take. Science considered as ideology is an example.
>
> b) At the left end of the continuum are ideologies that consists of sets of rather specif prescriptions and proscriptions (deontical norms) between which there are only weak functional links, althoough they may be loosely based on one or more assumptions. Confronted by a new situation, the believer receives little guidance from the belief system because there are no general rules to apply, only specific behavioral deontical norms that may not be relevant to the problem at hand. Agrarian religions are typically of this type. They are not true ideologies but proto-ideologies.

If DId is defined by m or number of logical abstract relations between substantive beliefs, then m = 0 defines the non exitence of belief system and $m = \infty$ an ideal ideology that it contemplated understanding of the totality, that is to say, of the own Reality.

Consequences:

1) A high DId may inhibit diffusion. It may make an otherwise useful trait inacessible or too cotsly by virtue of baggage that must accompany it. Scientific theories are understood by a small number of experts.

2) To DId is high, social control may be affected on the basis of sanctions and may be taught and learned. Idelogies wih a relative high DId seem to rely on rather general internalized deontical norms to maintain social control.

Definition 5.17: *We define as* empirical relevance (ER) *as te degree to which individual substantive belief Sb$_i$ confront the empirical world (Reality).*

The proposition that the velocity is the space crossed by a movil divided by the time that takes in crossing that space has high empirical relevance. The proposition God's existence has low empirical relevance. $ER \subset [0,1]$ being 0 null empirical relevance (*Homo neaderthalensis* lives at the moment) and 1 total empirical relevance (a + b = c). When beliefs lacking empiical relevance arise in response to pressing strain in the economic or political structures (SB), collective action to solve economic or political problems becomes unlikely. Lack of ER protects the ideology and the social vehicle from controversies arising between the highly differentiated population of believers.

Definition 5.18: *We define as* ideological function *its actual utility for a group of believing subjects.*

Note 5.12: *Ideological function conditions the persistence of the ideology, or time that is useful or influences social structure.*

Definition 5.19: *We define as* degree of the willingness of an ideology *(WD)* *the degree to which an ideology accpt or rejects innnovations.* $WD \subset [0,1]$ *being WD = 0 null acceptance and WD = 1 total acceptance.*

To major consequence of WD to take innovations is the ease with which ideologies adapt changes in their social environment. Beliefs with $WD \approx 1$, accpting innovations of

all ideological degrees survive extrem changes in social structure: Shinto in Japan or Roman Catholicism are examples.

Definition 5.20: *We define as* degree of tolerance of an ideology *(TD) the degree with an ideoloy accept or reject competing ideologies or beliefs systems.* $TD \subset [0,1]$ *being* $TD = 0$ *total rejection and* $TD = 1$ *total acceptance.*

Some accepts all others as equally valid but simply diferent expalnations of reality $TD \approx 1$. Others reject all other ideology as evil $TD \approx 0$, and maintain a position sucha as one found in revolutionary or fundamentalist moviments.

1) High TD seems to be independent of ideological system and the degree of the willingness (WD).
2) Low TD is fairly strong related with WD.
3) Low TD is fairly strong related with a high ER. Relevance of highly empirical beliefs to each other is so clear.

Therefore $TD = f\left(\dfrac{1}{WD}, ER \right)$.

TD has consequences for the ideology:

1) It affects the case with the organizational vehicle (social structure) may take alignments with other social structures.
2) It affects the social relationships of the believers.

Definition 5.21: *We define as* degree of commitment demanded by an ideology *(DCD) the intensity of commitment demanded to the believer by the part of the ideology or the type of social vehicle by which the ideology is carried.* $DCD \subset [0,1]$ *being* $DCD = 0$ *null commitment demanded and* $DCD = 1$ *total adhesion.*

1) DCD is not dependent of ideological system ID, empirical relevance (ER), acceptance or innovation (WD) and tolerance (TD).

2) The degree of commitment demanded (DCD) has consequences for the persistence of the ideology. If an ideology has $DCD \approx 1$ and cannot motivate the believers to make this commitment, it is not likely to persist for very long. Intentional communities having like immediate objective utopias have typically failed in larg part for this reason. Revolutionary and fundamentalist ideologies typically demand DCD = 1 of the their believers and typically institute procedures, such as party names to both ensure and symbolize that commitment (Crossman, 1949).

3) DCD depends of invalidation. Ideological systems with low DCD fail or are invalidated slowly as beliefs drops from the believers' repertoire one by one or are relegated to some inactive status. Invalidation of idelogical systems with high DCD produce apostates. High DCD ideological systems seem to become invalidated in a painful explosion for their believers, and such ideologies are replaced by an equally high DCD to an ideology oppsing the original one.

5.9. COMMITMENT AS FOCUS OF IDEOLOGIES

Ideologies "are" in the Superstructure, but far from our intention to think about neoplatonic ídeas that beliefs exist *per se*, without material support. Without believers there exists no belief system; but the belief system itself is not coextensive with any given individual Subject or set of Subjects. Ideologies as belief system have longer lives than Subjects and are capable of such complexity that they would exceed the capacity of a given Subject to detail. Ideologies have the quality of being real and having strong consequences but having no specific location, because Superstructure has not a physical place. In according to Rokeach (1968), people make their inner feelings become real for others by expressing them in such coses as votes, statements, etc. they built or tear dow, which in turn form the basis of cooperative (or uncooperative) activity for humans, the result of which is "Reality". Ideology is one kind of Reality although not all of it.

Definition 5.22 (Durkheim, 1965): *We define* external quality *(EQ) of an ideology the property by which ideologies seem to believers, to transcend the social groups that carry them, to have an independent existence of their own.*

But reality is not constructed. Reality is encountered and then modified. Human Subjects do, in fact, encounter each other in pairs or groups in situations that require them to interact and to develop beliefs and ideologies in the process. They do so, however, as socialized beins with language, including all its values in fact, logic, prescriptions and proscriptions; in the context of the previous work of others; and constrained by endless social restrictions on alternative courses of action.

Commitment is focus of ideologies, because is focus Ideas may be good, true, or beautiful in some context of meaning but their goodness, truth, or beauty is not sufficient explanation for its existence, sharedness, or perpetuation through time. *Ideology* is the ground and texture of cultural consensus. In its narrowest sense, this may be a consensus of a marginal or maverick group. In the broad sense in which we use the term ideology is the system of interlinked ideas, symbols, and beliefs by which any culture seeks to justify and perpetuate itself; the web of rhetoric, ritual, and assumption through which society coerces, persuades, and coheres on those aspects of social structure which maintain or create commitment: limitation of alternatives, social isolation, and social insulation through strategies that dictate heavy involvement of the individual Subject in group-centered activities. Individual commitment is view as stemming either from learning and reiforcements for what is learned, or from the fact that ideological functions (actual utility) to maintain peronality either by compensating for some feeling of inadequacy, by providing an object for dependence, or by producing order out of disorder (Fromm, 1941; Wallace, 1966). Commitments are validated (or made legitimate) by mechanisms that make them subjectively meaningful to Subjects (Berger and Luckmann, 1966).

Consequence 5.1: *Ideological system Id during the time of its actual utility* $[t_0, t_w]$ *or* historical time *will be a nonlinear function of its main characteristics, such as Id = f(DId, ER, WD, TD, DCD) = f(DId, ER, WD, f'(1/WD, ER), DCD) = F(DId, ER,WD, DCD).*

5.10. VARIABLE CHARACTERISTICS OF AN IDEOLOGY

The apparent elusiviness of an ideology derives from four characteristics, all of which result from the fact that while beliefs are created and used by humans, thy also have

propierties that are independent of their human use. In according with Borhek and Curtis (1983)

1) Ideologies apperar to their believers to have a stability, inmutability, coherence and independence. Ideologies to appear to social group members as a suprasocial set of eternal verities, uncheangeable thorough mere human action and agreed upon by all right-thinking people not because the verities belong to a believers but because they are true (Durkheim, 1965). In reality, beliefs are changeable.

2) Similarities among substantive beleifs are not necessary pararel structural similarities among ideologies.

3) The historic source of beliefs (*the myth*) may, by virtue of their original use, endow them with features that remain through millenia of change and particulary fit them to use in novel context.

4) The most important commonality among a set of subtantive beliefs is the social structure.

Principle 5.1: *An ideology vary in the ideological degree (IdD) and its empirical relevance (ER) or the extent to which this ideology pertain directly o empirical reality.*

6. THE SOCIAL STRUCTURE

6.1. THE SOCIAL STRUCTURE

A human society is a system of interrelated individuals and, whereas some of their properties are mere resultants of properties of their members, others derive from the reports between these.

Definition 6.1: *The ordered short list* $\langle \wp(\Sigma), H(\Sigma), \varepsilon(\Sigma) \rangle$ *represents an* impure *system IS iff:*

1) $\wp(\Sigma)$ *or composition of* Σ *, is the set of the parts of* Σ *.*

2) $H(\Sigma)$ *or enironment of* Σ *is the set of the things, different from the components of* Σ *, that act on these, or they are acted by these.*

3) $\varepsilon(\Sigma)$ *or structure of* Σ *is the set of relations and bonds between members of bonds between members of* Σ *, or members of* Σ *and members of* $H(\Sigma)$ *.*

Definition 6.2: *We define as* deontical relation r_i^k *to a systemic object characterized by, at least one, of deontical modalities: obligation, permission, prohibition and faculty.*

Deontical relations can be of two classes: *normative and nonnormative*. These last ones include rules of social behavior, protocol, education, customs, etc., and in them, obligation and prohibition have not coercive imperative character but rather its fulfillment tolerates acceptance (and in its case) social rejection.

Definition 6.3: *An impure system will be* deontical *iff some of its relations has at last one of the deontical modalities: obligation, prohibition, permission and faculty.*

The notion of social structure *as relationships between different entities or groups* or as *enduring and relatively stable patterns of relationship* emphasises the idea that society

is grouped into structurally related groups or sets of roles, with different functions, meanings or purposes. Social structure has been identified as

1) The relationship of definite entities or groups.
2) The enduring patterns of behavior by participants in a social system in relation to each other.
3) The institutionalised norms or cognitive frameworks structuring the actions of actors in the social system.

Sociologists also distinguish between:

1) *Normative structure* (Deontical Structure in the Structural Base)
2) *Ideal structure*: pattern of relations between beliefs and world visions of varying social positions (Doxical Superstructure)
3) *Interest structure*: pattern of relations between goals and desires of people of varying social positions (Doxical and Mythical Superstructure)
4) *Interaction structure*: forms of communications of people of varying social positions (Structural Base).

In according to Bunge (1974, 1981):

Definition 6.4: *The short list* $\langle S, R \cup T, E \rangle$ *will be a* human society *iff*

1) *The composition S of Σ is a set of human beings (actor Subjects).*
2) *R is the set of social relations between members of S, and includes a nonempty subset $M \subset R$ so that all element of M is a relation on S^m, where $m \geq 2$, that represents the action of some members of S on others.*
3) *E is a set of material things able to be transformed by some member of S.*
4) *R is the set of the relations of transformation of Σ and includes a nonempty subset $W \subset T$ so that all element of W is a relation of a set of $S^p XE^q, (p, q \geq 2)$ on a subset $A \subset E$, that it represents the transformation, by some members of S, certain things of E, in certain things of A.*
5) *Σ is a self-sufficient system.*

Some of social relations included in R are a *social equivalence relation*, having the reflective, symmetrical and transitive properties. Anyone of these social equivalence relations induces a partition of the set S in homogenous and mutually disjoint subsets.

Definition 6.5: *We define as* social group *to each one of these homogenous and disjoint subsets, resulting of the division of S and having a social equivalence relation.*

Definition 6.6: *A* social class *is a* is *a particular type of social group whose social equivalence relation consists of having equal economic status.*

There will be so many divisions as social equivalence ratios. The totality of these partitions can be called the *social structure of Σ*. We will call ~ to the set of the n social relations of equivalence

Definition 6.7: *To the partition of S induced by $\sim_i \in \sim$ and denoted like $P_i(S) = S / \sim_i$, constitutes the* i-social structure of Σ .

Let n be the number of social relations of equivalence.

Definition 6.8: *We define as* social strucure *of Σ to the totality defined as*
$$P(S) = \{P_i(S) \mid P_i(S)/ \sim_i \ \wedge \sim_i \ \in \sim \wedge 1 \leq i \leq n.$$

1) This definition indicates a systemic property of Σ, like is it all element of. Σ
2) No are properties of the individual members of Σ, but global properties of Σ emergening of certain reciprocal actions between members of S.

Other systemic properties are the *gestalt properties*: social stratification, cohesion, mobility and stability.

6.2. THE STRUCTURAL BASE (BS)

Let $\aleph$ be the Reality (absolute beings), being $\beth$ a part thereof, such that $\beth \subset \aleph$. Let S be a Observer Subject during a time interval $\left[t_0, t_f\right]$, Σ the system's concept, $\Sigma(\beth)$ the conception that $\beth$ is a system (relative beings). Let r_i^k be a doxical relation belonging

to a k sheaf of relations ρ_i^k. $\Sigma_D(\daleth)$ is conceived like a Deontical Impure System formed by a set of relations being $\{r_i^k\}$ a subset of doxical relations and that we will represent by $\Sigma_D = (\{r_i^k\}, \wedge)$, being $\wedge$ functor "and". We are going to call s to the systemic significance that it will be a denotative significance. We will call ζ to the set of significant (signs) of Reality and ζ_Σ to the set of systemic significants forming a particular CSR, that is to say, the part of signs having been limited by the Subject when establishing the borders of the determinate DIS, and so that $\zeta_\Sigma \subset \zeta$. Let $I_\Sigma = \{i_\Sigma\}$ be the set of possible systemic individuals, that is to say, the totality of objects impure objects and relations including within the border of the structural base of system Σ. We are going to define some of the deontical properties of the relations of a system.

Definition 6.9: *We say that two deontical relations (belonging or not to the same sheaf) r_i^k and r_j^k are* composibles *if for some ξ_Σ, r_i^k exists in ξ_Σ and also, r_j^k exists in ξ_Σ.*

Definition 6.10: *A deontical relation r_i^k is simultaneously complete and possible and it fulfills the following conditions:*

1) r_i^k is a deontical relation iff for some ξ_Σ, r_i^k exists in ξ_Σ.

2) If r_i^k is a deontical relation, it exists exactly in one ξ_Σ.

3) If r_i^k and r_j^k are deontical relations, r_i^k is composible with r_j^k iff $\xi_\Sigma^{\wp_i^K} = \xi_\Sigma^{\wp_j^K}$.

4) The composibility is a relation of equivalence in the set of deontical relations of the DIS.

Definition 6.11: *s_Σ is a* denotative DIS significance (d-significance) *iff it is a function defined in ξ so that if $\xi_\Sigma \subset \xi$ then $s_\Sigma(\xi_\Sigma) \subseteq \xi_\Sigma$*

We will denominate $L_\Sigma = \{r_i^k\}$ to set of all the deontical relations of DIS $\Sigma(\aleph)$. Then:

Definition 6.12: *We denominate $\neg s_\Sigma$ to the negation of s_Σ and so that it is the function that maps ξ_Σ to I_Σ.*

Property 6.1: *Set* $L_\Sigma = \{r_i^k\}$ *is a nonempty set of d- significances of deontical relations belonging to SB of a determinate DIS.*

Note 6.1: *Deontical relations* r_i^k *have not single d- significance, since each related object has a set of significances. In addition, each multirelational sheaf is a set of denotative systemic significances.*

For comfort reasons, we will denote like $s_\Sigma = \{s_\Sigma\}_{i=1,2,...,n}$ to the set of d- significances of deontical relation.

Theorem 6.1: *A deontical relation* r_i^k *has one d- significance of relation in the SB of a determinate DIS* Σ*, or in the set of systemic significants* ξ_Σ*, in case this significance is one of their members, it is to say* r_i^k *has* s_Σ *in* ξ_Σ *if* $s_\Sigma \in r_i^k$*.*

Proof:

Although deontical relations are not systemic individual themselves, certain of them merge individual sayings in the following sense: If $i_\Sigma \in I_\Sigma$, then we can define the correlation of individual i$_\Sigma$ in the set of systemic significants, like s_Σ^C and so that $i_\Sigma^C = \{s_\Sigma; i_\Sigma = s_\Sigma(\xi_\Sigma)\}$. Correlation of i$_\Sigma$ in ξ_Σ is indeed set of d-significances that has i$_\Sigma$ in ξ_Σ. It indicates to us that it is a deontical relation by definition 6.5.

Let CAN be the logical operator "*can*". Modalities take the following modal (aletic and deontical) characteristics in form from d- significances:

a) *Aletical modalities***:**

1) A deontical relation r_i^k *exists* in ξ_Σ for some i$_\Sigma$ if $r_i^k \equiv i_\Sigma^C$. This is equivalent to say that one deontical relation r_i^k exists in ξ_Σ for some i$_\Sigma$ if i_Σ^C is equal to the set of systemic individuals which deontical relation r_i^k represents.

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2) A deontical relation r_i^k _is complete_ if is certain for each d- significance, that is to say, r_i^k is complete for each s$_\Sigma$ if $\left(s_\Sigma \in r_i^k\right) \vee \left(\neg s_\Sigma \in r_i^k\right)$

3) A deontical relation r_i^k _is possible_ if have not incompatible d-significances, that is to say, r_i^k is possible for some i$_\Sigma$ and ξ_Σ if $r_i^k \subseteq I_\Sigma$.

4) A deontical relation r_i^k _is necessary_ iff r_i^k did not exist in ξ_Σ for some i$_\Sigma$, $r_i^k \neq i_\Sigma^C$ then ξ_Σ would not exist.

b) **_Deontical modalities_:**

1) A deontical relation r_i^k _is allowed_ if it is possible and it exists, that is to say, r_i^k is allowed for some i$_\Sigma$, if $\left(r_i^k \subseteq I_\Sigma\right) \wedge \left(r_i^k = i_\Sigma^C\right)$

2) A deontical relation r_i^k _is facultative_ if it can exist and it can not exist,, that is to say for some i$_\Sigma$, if $CAN\left(r_i^k = i_\Sigma^C\right) \wedge CN\left(r_i^k \neq i_\Sigma^C\right)$

3) A deontical relation r_i^k _is obligatory_ if is facultative and it exists, that is to say, for some i$_\Sigma$, $CAN\left[\left(r_i^k = i_\Sigma^C\right) \wedge CAN\left(r_i^k \neq i_\Sigma^C\right)\right] \wedge \left(r_i^k = i_\Sigma^C\right)$

Theorem 6.2: *An incomplete deontical relation has not one d-significance.*

Proof:

Let us suppose that an incomplete deontical relation $\{\theta\}$, had one d-significance $s_\Sigma *$. Now we suppose a complete deontical relation r_i^k with d-significance s$_\Sigma$. We can form the union of both deontical relations so forming a new deontical relation $\Lambda = r_i^k \cup \{\theta\}$. This deontical relation will be simultaneously complete, with one d-significance s$_\Sigma$ and incomplete, because it contains $\{\theta\}$, with one d-significance $s_\Sigma *$, which leads us to the absurd.

6.3. THE DOXICAL SUPERSTRUCTURE (IDS)

Due to the complexity of the treated subject, we will limit Doxical Superstructure to a subspace that contains the belief systems denominated ideologies. This subspace we will denominate *Ideological Doxical Superstructure* (IDS).

Example 6.1: Let us put a historical example: The *Summa Theologica* of Saint Tomas Aquinas may be understood like reflection (*projection in Subject's SB*) of the structure of the feudal society of Medieval Europe. The created relation between God and beings, and the relation between diverse creatures, by the fact to be outlined following a vertical axis, deeply reproduces the hierarchized aspects of the feudal world; and this hierarchical structuring springs (*image in IDS*) from the organization of the social relations (SB), are the true matter seeing their content transposed later diverse levels. Diversity of the expressions is referred a unique message, where one of these expressions (those constituting the same social relations) is main in relation to the others. The *Summa Theologica* transposes to a scientific language (*L*) a particular social content (*structure of feudal-Σ*); but this transposition is neither voluntary nor conscious; in the *Summa Theologica*, to part of some absolutely formal analogies, anything it allows to happen directly of a level (SB) to another one (IDS). One would treat rather, of the unconscious structuring of a primitive reality (SB), ignored by the Subject that carries out it. The fact to put in contact these two heterogenous levels is not possible but in the structural level. Possible and desirable operations in a level let be it when a perspective change is carried out: to validate the conscious expressions implies the fact to be located in the level of the partial sequences, that are chained with others and determined reciprocally until the infinite.

<div align="center">***</div>

We are inspired by the Meingonians objects (Meinong, 1960) to develop a theory of images and projections. Let L_Σ be the set of possible doxical superstructure individuals, that is to say, the totality of abstract objects and relations belonging to Doxical Superstructure (IDS).

Definition 6.13: *We define as* doxical superstructural significance (IDS-significance) *and we denote as* s_Σ^D *to a function that maps set* ξ_Σ *to a subset of* L_Σ.

IDS-significances are the meaning in the mind of the Subject of the elements belonging to the Superstructure. In our approach, these elements will be ideological.

Definition 6.14: *We say that a IDS-significance* s_Σ^D *has in* ξ_Σ *an* attribution *respect the deontical relation* r_i^k *if* $r_i^k \in s_\Sigma^D(\xi_\Sigma)$.

We define the following modal attributions of IDS-significances:

a) Aletical modalities:

1) *Existence:* We define existence as the function that maps ξ_Σ to $\{r_i^k\}$ for some $i_\Sigma \in I_\Sigma, r_i^k = i_\Sigma^C$.

2) *Completeness:* We define completeness as the function that maps ξ_Σ to $\{r_i^k\}$ for each $s_{\Sigma,}, (s_\Sigma \in r_i^k) \vee (\neg s_\Sigma \in r_i^k)$.

3) *Possibility:* We define possibility as the function that maps ξ_Σ to $\{r_i^k\}$ for some other $\xi_{\Sigma*}$ and some $i_{\Sigma*} \in I_{\Sigma*}, r_i^k = i_{\Sigma*}^C$.

4) *Necessity:* We define necessity as the function that maps ξ_Σ to $\{r_i^k\}$ so that if r_i^k did not exist in ξ_Σ for some $i_\Sigma \in I_\Sigma, r_i^k \neq i_\Sigma^C$, then ξ_Σ would not exist.

b) *Doxical modalities:*

1) *Permission:* We define permission as the function that maps ξ_Σ to $\{r_i^k\}$ so that if for some $i_\Sigma \in I_\Sigma$ if $(r_i^k \subseteq I_\Sigma) \wedge (r_i^k = i_\Sigma^C)$.

2) *Faculty:* We define faculty as the function that maps ξ_Σ to $\{r_i^k\}$ so that if for some $i_\Sigma \in I_\Sigma$ if $r_i^k = i_\Sigma^C \wedge r_i^k \neq i_\Sigma^C$.

3) *Obligation:* We define obligation as the function that maps ξ_Σ to $\{r_i^k\}$ so that if for some $i_\Sigma \in I_\Sigma, [CAN(r_i^k = i_\Sigma^C) \wedge CAN(r_i^k \neq i_\Sigma^C)] \wedge (r_i^k = i_\Sigma^C)$.

For actor Subject S is not easy distinguishing between d-significances and IDS-significances. Only the Observer Subject S conceiving Σ will have to choose between the one or other.

Definition 6.15: *For each d-significance s_Σ exists an only one IDS-significance ε_Σ that we will denominate so like* doxical superstructural image (IDS-image) *of s_Σ in IDS and that $\varepsilon_\Sigma(\xi_\Sigma) = \left\{ r_i^k ; s_\Sigma \in r_i^k \right\}$.*

Note 6.2: *The totality of IDS-images reflected in the Ideological Doxical Superstructure (IDS) forms the system of beliefs between which is the dominant ideology.*

Note 6.3: *Doxical superstructural image formed in the IDS "explains" for the Subject the structural base observed in a certain Σ during a determined historical time.*

The d-significance and its IDS-image are equivalent, that is to say, that for ξ_Σ and for each relation r_i^k, r_i^k has s_Σ in ξ_Σ, iff r_i^k has ε_Σ in ξ_Σ. This assertion leads us to $s_\Sigma \in r_i^k$ iff $r_i^k \in \varepsilon_\Sigma(\xi_\Sigma)$.

Subject S has or constructs a certain language **L** containing denotative-SB-predicates (d-predicates) and doxical structural predicates (IDS-predicates), according to the following definitions:

Definition 6.16: *We define as* denotative-SB-predicate (d-predicate) P^d *that predicate belonging to **L** that express (names) one d-significance s_Σ.*

Definition 6.17: *We define as* doxical structural predicate (IDS-predicate) P^D *one predicate belonging to **L** that express (names) one IDS-significance ε_Σ.*

Let us suppose that observer subject S names (in **L**) like π any deontical relation r_i^k

Consequence 6.1: *$P^d \pi$ is true in ξ_Σ if the deontical relation r_i^k that ρ express in **L**, has s_Σ in ξ_Σ.*

Consequence 6.2: *$P^D \pi$ is true in ξ_Σ if the deontical relation r_i^k that π express in **L**, has ε_Σ in ξ_Σ.*

Relation between one d-significance and its IDS-image induces to equivalence between the predicates of language **L** of the following way:

Property 6.2: *If P^d express s_Σ and if P^D express ε_Σ in **L**, then if π names one deontical relation r_i^k, $P^d \pi$ is true iff $P^D \pi$ is true.*

Definition 6.18: *Corresponding to each IDS-significance s_Σ^D in IDS, will exist an only c-significance $\overrightarrow{s_\Sigma^D}$ or connotative significance to which we will call* connotative-SB-projection (c-projection) *of the IDS-significance s_Σ^D in the structural base (SB) and that $\overrightarrow{s_\Sigma^D}$ for each ξ_Σ and for each $i_\Sigma \in I_\Sigma, i_\Sigma \in \overrightarrow{s_\Sigma^D}(\xi_\Sigma), iff\ i_\Sigma^C \in s_\Sigma^D(\xi_\Sigma).*

Note 6.4: *The c-projection of the IDS on the structural base (SB) "justifies" for the Subject actions and materializations within the structure, their extensions, substitutions or disappearance of determined normative relations, work creation (philosophical, literary, scientific, artistic, architectonic, etc.), and in extreme case, substitution of the structure by another different one.*

We may say it of the following way

Definition 6.19: *For each ξ_Σ and for each deontical relation r_i^k if r_i^k exists in ξ_Σ then*

$$r_i^k \in s_\Sigma^D(\xi_\Sigma).iff\ r_i^k \in \overrightarrow{s_\Sigma^D}(\xi_\Sigma).$$

Logically, the exposed idea is that $s_\Sigma^{\overrightarrow{D}}$ is the only d-significance that agrees with IDS-significance s_Σ^D in relation to all the possible existing deontical relations. Then we may say that:

Property 6.3: *In the language L if P^D express (it names) s_Σ^D and if P^d express (it names) $s_\Sigma^{\overrightarrow{D}}$, then if π express (it names) an existing deontical relation, then $P^D \pi$ is true iff $P^d \pi$.*

Theorem 6.3: *For any d-significance s_Σ, s_Σ will be equal to the SB-projection of the IDS-image of s_Σ, that is to say $s_\Sigma = s_\Sigma^{\overrightarrow{D}}$.*

Proof:

Let *L* be a language with P^d and P^D its d-predicates and IDS-predicates respectively. By property 6.2, P^d express (it names) $s_\Sigma^{\overrightarrow{D}}$, and by property 1, P^d, express (it names) s_Σ. Then $s_\Sigma^{\overrightarrow{D}}$ express (it names) s_Σ.

By property 6.1, P^D express (it names) ε_Σ and by property 6.2, P^D express (it names) s_Σ^D, therefore ε_Σ express (it names) s_Σ^D and then $s_\Sigma^{\overrightarrow{D}}$ will express (it will name) $\overrightarrow{\varepsilon_\Sigma}$, therefore $\overrightarrow{\varepsilon_\Sigma}$ will express (it will name) P^d that it will express s_Σ by property 1 as well, then $\overrightarrow{\varepsilon_\Sigma}$ will express s_Σ, then if $\overrightarrow{\varepsilon_\Sigma}$ express s_Σ and $s_\Sigma^{\overrightarrow{D}}$ express $\overrightarrow{\varepsilon_\Sigma}$, then $s_\Sigma^{\overrightarrow{D}}$ express s_Σ and, of course, $s_\Sigma = s_\Sigma^{\overrightarrow{D}}$.

Theorem 6.4: *For each d-significance s_Σ any IDS-projection $\varepsilon_{\overrightarrow{s_\Sigma}}$ does not exist, that is to say, $s_\Sigma \neq \varepsilon_{\overrightarrow{s_\Sigma}}$.*

Proof:

Just like in Theorem 6.3.

Definition 6.20: *We define as* essentially-IDS-significance *of one IDS-significance* s_Σ^D *to that it is not the IDS-image of the IDS-projection of* s_Σ^D.

If a IDS-significance is not essentially-IDS-significance, it will not be equivalent to its IDS-projection. In such case, we can say that its IDS-projection is solely a nonassumeible version. A nonassumeible version of the IDS-projection of the IDS-significances exists, so that, for a relation:

$$\left(\overrightarrow{existence}, \overrightarrow{possibility}, \overrightarrow{completness},... \right) = s_\Sigma$$

$$\left(\overrightarrow{noexistence}, \overrightarrow{impossibility}, \overrightarrow{in\, completness},... \right) = s*_\Sigma$$

Definición 6.21: *Semantically, we may define a IDS-significance like a function that maps the set of significant* ξ_Σ *of SB of a determinate DIS, to a pair of set of deontical relations, so that* $s_\Sigma^D(\xi_\Sigma) = \{r_i^k\} \cup \{r_j^k\}$, *being* $\{r_i^k\} \cap \{r_j^k\} = \varnothing$ *and so that* $v(\{r_i^k\}) = 1 \wedge v(\{r_j^k\}) = 0.$

Definition 6.22: *We define as a* completely-IDS-significance *of a d-significance* s_Σ *to the function that maps* ξ_Σ *to* $\{r_i^k; s_\Sigma \in r_i^k\} \cup \{r_i^k; s_\Sigma \notin r_i^k \wedge \neg s_\Sigma \in r_i^k\}.$

6.4. THE MYTHICAL SUPERSTRUCTURE (MS)

We will call ζ_D to the set of doxical superstructural significants. That is to say, the part of signs having been limited by the observer Subject, when establishing the borders of the determinate Ideological Doxical Superstructure "covering" to a determinate DIS. Let L_M be the set of possible mythical superstructure individuals, that is to say, the

totality of abstract mythical objects and relations belonging to Mythical Superstructure (MS). Let $I_{DS} = \{i_{DS}\}$ be the set of possible deontical superstructure individuals, that is to say, the totality of abstract objects and relations including within the doxical superstructure IDS of system Σ.

Definition 6.23: *We define as* mythical superstructural significance (MS-significance) *and we denote as* s_Σ^M *to a function that maps set* ξ_D *to a subset of L_M.*

MS-significances are the meaning in the mind of the Subject of the elements belonging to the Mythical Superstructure.

Definition 6.24: *We say that a MS-significance* s_Σ^M *has in* ξ_D *an attribution* respect the *abstract relation* R_i^k *belonging to DS if* $R_i^k \in s_\Sigma^M(\xi_D)$.

Normally actor Subject confuses IDS-significances and MS-significances.

Definition 6.25: *Corresponding to some certain MS-significance* s_Σ^M *in MS, will exist an only one IDS-significance* $\overrightarrow{s_\Sigma^M}$ *to which we will call* denotative-IDS-projection (IDS-projection) *of the MS-significance* s_Σ^M *in the doxical superstructure (DS) and that* $\overrightarrow{s_\Sigma^M}$ *for each* ξ_Σ *and for each* $i_{DS} \in I_{DS}$, $i_{DS} \in \overrightarrow{s_\Sigma^M}(\xi_D)$, *iff* $i_{DS}^C \in s_\Sigma^M(\xi_D)$.

Note 6.5: *The totality of IDS-projections on Doxical Superestructura (DS) forms a subsystem of the systems of beliefs (among them the dominant ideology) that conform the Doxical Superstructure.*

Note 6.6: *The IDS-projection of the MS on the doxical superstructure (IDS) is for the Subjects the primitive and subconscious explanation of the ideal amb abstract doxical superstructure. Dominant ideology has like " foundation " a myth or residual ideology, that projects on the Doxical Superstructure.*

Note 6.7: *The part of the Mythical Superstructure containing myths constitutes the Primigenial Base (PB) of the Doxical Superstructure (DS).*

Definition 6.26: *For each IDS-significance s_D exists an only one MS-significance ε_M that we will denominate so like* mythical superstructural image (MS-image) *of $s_\Sigma M$ in MS and that $\varepsilon_M\left(\xi_D\right) = \left\{ R_i^k ; s_D \in R_i^k \right\}$.*

Note 6.8: *Mythical superstructural image formed in the MS constitutes for the actor Subject (considered here like believer) the last goal of his belief, that is to say, the Utopia.*

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Note 6.9: *The totality of the MS-images reflected in the utopic part of the Mythical Superstructure (MS) forms an Ideal Structure (Utopic Structure ISt) that constitutes the final and unattainable goal of all ideology.*

The IDS-significance and its MS-image are equivalent, that is to say, that for ξ_D and for each abstract relation R_i^k, R_i^k has s_D in ξ_D, iff R_i^k has ε_M in ξ_D. This assertion leads us to $s_D \in R_i^k$ iff $R_i^k \in \varepsilon_M\left(\xi_D\right)$.

Subject S has or constructs a certain language L_M containing denotative-IDS-predicates (IDS-predicates) and mythical structural predicates (MS-predicates), according to the following definitions:

Definition 6.27: *We define as* denotative-IDS-predicate (IDS-predicate) P^{DS} *that predicate belonging to L_M that express (names) one IDS-significance s_D.*

Definition 6.28: *We define as* mythical structural predicate (MS-predicate) P^M *that predicate belonging to L_M that expressing (names) one MS-significance ε_M.*

Let us suppose that observer subject S names (in L_M) like $\upsilon*$ any abstract relation R_i^k., then:

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Consequence 6.3: $P^{DS}\upsilon*$ *is true in* ξ_D *if the abstract relation* R_i^k *that* $\upsilon*$ *express in* **L_M**, *has* s_D *in* ξ_D.

Consequence 6.4: $P^M\upsilon*$ *is true in* ξ_D *if the abstract relation* R_i^k *that* $\upsilon*$ *express in* **L_M**, *has* ε_D *in* ξ_D.

Relation between one IDS-significance and its MS-image induces to equivalence between the predicates of language **L_M** of the following way:

Property 6.4: *If* P^{DS} *express* s_D *and if* P^M *express* ε_M *in* **L_M**, *then if* **$\upsilon*$** *names one abstract relation* R_i^k , $P^{DS}\upsilon*$ *is true iff* $P^M\upsilon*$ *is true.*

We may say it of the following way

Definition 6.29: *For each* ξ_D *and for each abstract relation* R_i^k *if* R_i^k *exists in* ξ_D *then*

$$R_i^k \in s_\Sigma^M\left(\xi_D\right). \text{iff } R_i^k \in \overrightarrow{s_\Sigma^M}\left(\xi_D\right).$$

Logically, the exposed idea is that $\overrightarrow{s_\Sigma^M}$ is the only IDS-significance that agrees with MS-significance s_Σ^M in relation to all the possible existing abstract relations. Then we may say that:

Property 6.5: *In the language* **L_M** *if* P^M *express (it names)* s_Σ^M *and if* P^{DS} *express (it names)* $\overrightarrow{s_\Sigma^M}$, *then if* $\upsilon*$ *express (it names) an existing abstract relation, then* $P^M\rho*$ *is true iff* $P^{DS}\upsilon*$.

Theorem 6.5: *For any IDS-significance* s_D, s_D *will be equal to the IDS-projection of the MS-image of* s_D, *that is to say* $s_D = \overrightarrow{s_\Sigma^M}$.

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Proof:

The same of Theorem 6.3.

Theorem 6.6: *For each IDS-significance s_D any MS-projection $\varepsilon^M \vec{s_\Sigma}$ does not exist,*

that is to say, $s_\Sigma \neq \varepsilon^M \vec{s_\Sigma}$.

Proof:

Just like in theorem 6.4.

6.5. SECOND APPROACH

In figure 6.1 we represented the hypothesis of the relationship between structural base-

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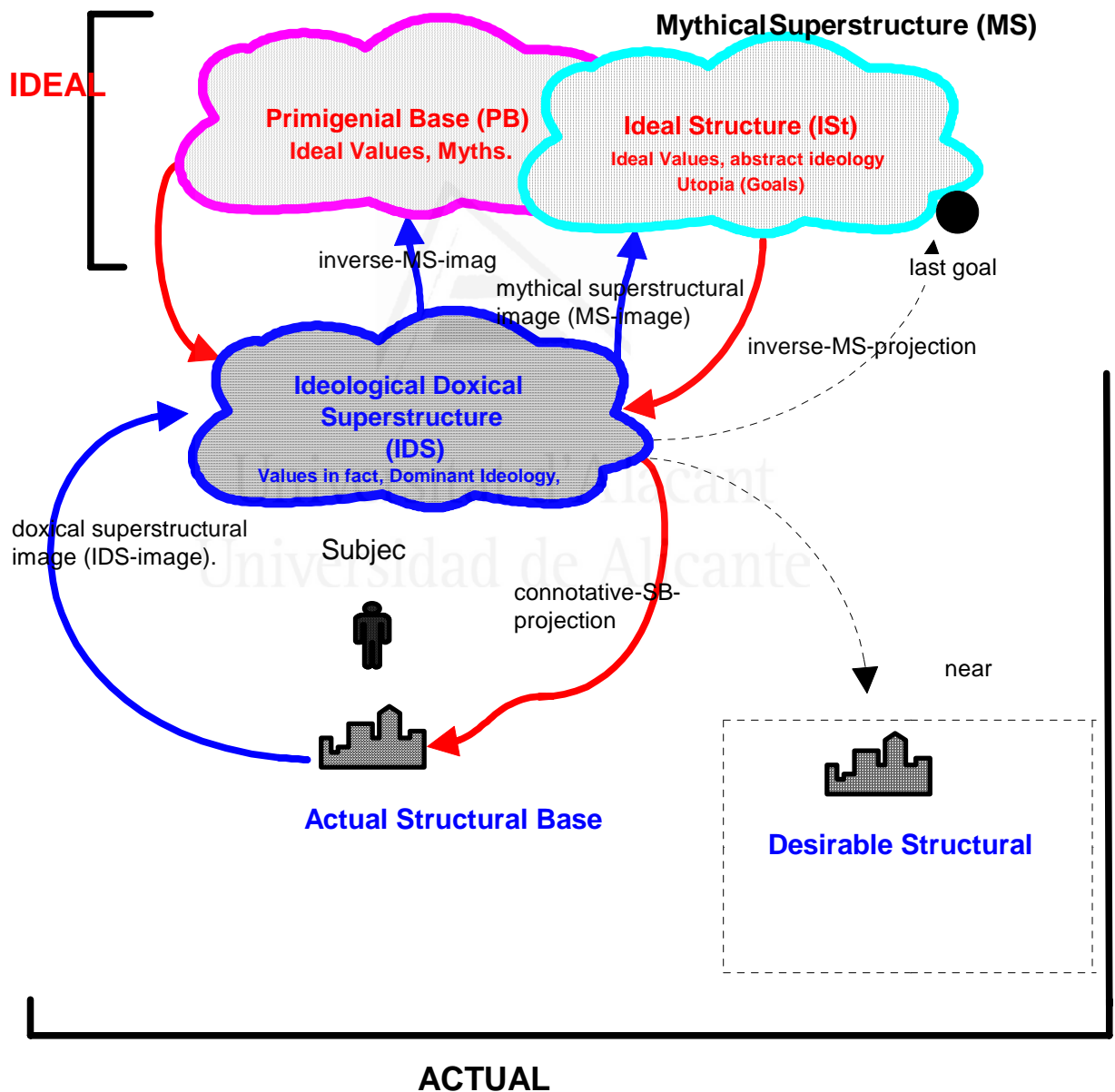
Figure 6.1.

doxical and mythical superstructures on one second approach. The Ideal will be formed by the Mythical Superstructure $(PB \cup ISt)$ and the present thing formed by the Ideological Doxical Superstructure (IDS) and the Structural Base (SB).

We will call ζ_D to the set of doxical superstructural significants, that is to say, the part of signs having been limited by the observer Subject when establishing the borders of the determinate Ideological Doxical Superstructure "covering" to a determinate DIS' Structural Base (SB). Let L_{PB} be the set of possible primigenial base (belonging to Mythical Superstructure) individuals, that is to say, the totality of abstract mythical objects and relations belonging to Primigenial Base Mythical Superstructure (PB). Let L_{ISt} be the set of possible ideal structure (belonging to Mythical Superstructure) individuals, that is to say, the totality of abstract mythical objects and relations belonging to Ideal Structure Mythical Superstructure (ISt). Let $I_{DS} = \{i_{DS}\}$ be the set of possible deontical superstructure individuals, that is to say, the totality of abstract objects and relations including within the Ideological Doxical Superstructure IDS of system Σ.

Definition 6.30: *We define as* primigenial base mythical superstructural significance (PBMS-significance) *and we denote as* s_Σ^{PBM} *to a function that maps set* ξ_D *to a subset of L_{PB}.*

PBMS-significances are the meaning in the mind of the Subject of the elements belonging to the Primigenial Base Mythical Superstructure.

Definition 6.31: *We define* ideal structure mythical superstructural significance (IStMS-significance) *and we denote as* s_Σ^{IStM} *to a function that maps set* ξ_D *to a subset of L_{Ist}.*

IStMS-significances are the meaning in the mind of the Subject of the elements belonging to the Ideal Structure Mythical Superstructure.

Definition 6.32: *We say that a PBMS-significance* s_Σ^{PBM} *has in* ξ_D *an* attribution *respect the abstract relation R_i^k belonging to IDS if $R_i^k \in s_\Sigma^{PBM}(\xi_D)$.*

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Definition 6.33: *We say that a IStMS-significance s_Σ^{IStM} has in ξ_D an attribution respect the abstract relation R_i^k belonging to IDS if $R_i^k \in s_\Sigma^{IStM}(\xi_D)$.*

Definition 6.34: *For some IDS-significance s_D exists an only one PBMS-significance s_Σ^{PBM} that we will denominate so like* inverse-MS-image (PB-image) *of s_Σ in PB and that $\varepsilon_\Sigma^{PBM}(\xi_D) = \{R_i^k ; s_D \in R_i^k\}$.*

Note 6.10: *The inverse-MS-image (PB-image) can suppose an exchange, readjustment or different interpretation from myths and ideal values, primigenial foundation of all ideology and belief system.*

Definition 6.35: *Corresponding to each IStM-significance s_Σ^{IStM} in ISt, will exist an only one IDS-significance $\overrightarrow{s_\Sigma^{IStM}}$ to which we will call* inverse-MS-projection (IDS-projection) *of the ISt-significance s_Σ^{IStM} in the doxical superstructure (IDS) and that $\overrightarrow{s_\Sigma^{IStM}}$ for each ξ_Σ and for each $i_{DS} \in I_{DS}, i_{DS} \in \overrightarrow{s_\Sigma^{IStM}}(\xi_D), iff\ i_{DS}^C \in s_\Sigma^{IStM}(\xi_D)$.*

Note 6.11: *Inverse-MS-projections (IDS-projections) constitute "adjustments" on ideologies and belief systems.*

Note 6.12: *Inverse-MS-projections (IDS-projections) constitutes a process of concretion or passage of the ideal abstract ideology to the concrete ideology that is perceived of immediate form and that is its opposite one.*

6.6. CONCRETE AND IDEAL ABSTRACT IDEOLOGY

The ability of human beings to abstract and to idealize is a precondition for the existence of the belief systems (including ideologies) and one of the sources of the influence of belief in human events. As actually used by humans, beliefs relate to actual (and historical) events and the particular social circumstances under which they occur as well as to the realm of the ideal and the general. Ideologies in particular and beliefs

systems in general do have their own inner logics and their own set of statements about things ideally are. If ideologies have social significance, they must come to terms with realities that are often removed far from the ideal. Humans are accustomed to this difficulty and behave simultaneously in terms of both the ideal and the concrete.

The change in the meaning of the ideology, which is thus accepted, could be described as a shift towards the particular conception of ideology in Mannheim's sense (Mannheim, 1936). Since the particular conception differs fundamentally from the total conception, involved in the first of the above given interpretations of the dual theory, this theory clearly contains incompatible views. The particular conception of ideology recognises that the opponent's thought does not always need to be ideological and that some of his assertions may be valid and true. This implies the recognition of what the total conception of ideology denies, i.e. the existence of common and universal criteria of validity, accepted and shared by individuals who are ideological adversaries. An ideological controversy becomes essentially a disagreement on the evaluative level. Although it may involve disagreements concerning matters of fact, these differences of opinion can be separated from the evaluative controversies and resolved by the accepted rules of scientific procedure. This leaves open the question what is the source, the mechanism and relative significance of diverse evaluative approaches.

The *abstract ideal ideological system* is not identical with the concrete actual description of ideology (IDS) and behavior (SB). Witness the uncomfortable interactions between the ideal of democratic politics and the operation of a national convention or the interaction between Christian theology and the operation of a church bureaucracy. On other hand, humans recognize the distance between the ideal and the actual. In so doing, humans apply two different sets of standards and two different conceptions of cause and effect.

Definition 6.36: *We define as* belief distance d_i *the abstract distance in the mind of the believer (or believers) existing between the ideal and the actual, that is to say, between which it is desired and what is.*

Beliefs distances are not equal. It does not exist the same belief distance between abstract ideal and concrete ideologies that the existing belief distance between ideal values and values fact and the long ago greater between immediate and last goals. If we represented a three-dimensional space both superstructures and we suppose that the

Doxical Superstructure forms a plane, the ISt-Mythical Superstructure would form a warped plane (Figure 6.2) based on the belief distances, plane that will change its form as much the distances are modified approaching or moving away the present thing to the ideal.
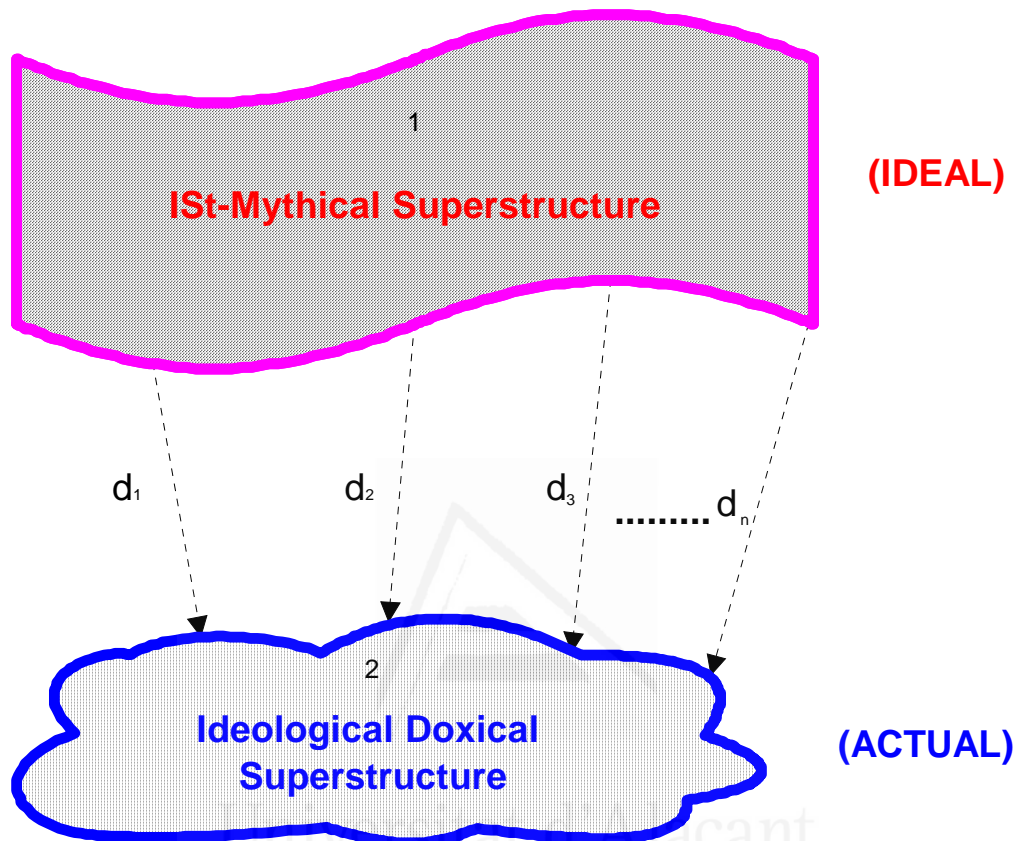
Figure 6.2.

At the ideal level, an ideology can be understood and discussed in terms of itself; it sets its own context, without which it is not comprehensible. In principle, it is illegitimate to criticize the abstract ideal ideology according to any criteria but its own. An hypothesis is true or false without reference to its origin, and a set of beliefs sets the standards by which they must be understood. This argument concerns the *genetic fallacy*, or *an informal logical fallacy*, where a Subject argues that a belief is incorrect, not in its own right, but because of where it originated, typically an attribute of the Subject who originated or presented the belief. There are several different forms of this fallacy, often with their own names, but they tend to follow one of these two general structures:

a) Subject A claims that P.

    b) Subject S is untrustworthy.

    c) Therefore, P is false.

Or

    A) Subject A claims that P.

    B) Subject A is particularly trustworthy.

    C) Therefore, P is true.

This is a fallacy because the truth or falsity of the claim is not necessarily related to its origin.

Mannheim (1936) suggested that the historical and social genesis of an idea is not as irrelevant to its ultimate validity as the genetic fallacy argument claims. In his view, social conditions, under which a perspective emerges, have some effects on the content and form peculiar to this perspective. Perspectives differ qualitatively in their conceptual frameworks, the meaning attached to concepts, ontological commitments, models of thought, levels of abstraction, patterns of argument, kinds of inferences made in controversies. Mannheim claimed that the social position infiltrates, as it were, into the investigator's method and results of inquiry and reveals otherwise unobservable aspects of social reality. Each perspective contains, therefore, new cognitive elements which must remain unnoticed to the researcher, who is himself determined by different social conditions. Mannheim's anticipatory assertion, unobjectionable as long as it is accepted as a programme of inquiry or a hypothesis to be tested, has been assimilated into the dual theory of ideology as a well-established fact. What is particularly important is that Mannheim accepts pretty completely the neo-Kantian position on the question of validity and rejects the genetic fallacy quite as sweepingly as, say, Karl Popper.

However, because of the problems in human communication and because ideologies contain powerful elements of metaphor, the connection between the inner logic of the ideology (*the ideal*) and the real (*Doxical Superstructure and Structural Base*) may be extremely difficult to fathom. Connection is made by apologists. Social diffusion that in old times was made in pulpits or square markets, actually is by mass media and Internet. A simple example should clarify much of the above:

Example 6.3: In 2007 a great deal of effort was invested by political spaniard apologists to demonstrate that the negotiations taken upon maturity by the socialist government of Spain with terrorist band ETA flowed directly from ideal democratic values (dialogue, tolerance, peace, etc.). The amount of energy invested was considerable because the task was difficult. Indeed, it appears to have been impossible.

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The abstract ideal ideology should be parallel, point for point, to one or more concrete expresions of the ideology. Thus the abstract ideal ideology is often used as a practical excuse for a parallel system of concrete beliefs (*concrete ideology*) that is quite different. The operation of ideologies in social behavior through the connotative-SB-projection, involve orientation to both abstract and concrete sets of goals and values at the same time.

We consider the Ist-Mythical Superstructure and The Doxical Superstructure (IDS) like two alysidal sets with unequal cardinal number of alysidal elements (Figure 6.3)

Figure 6.3.

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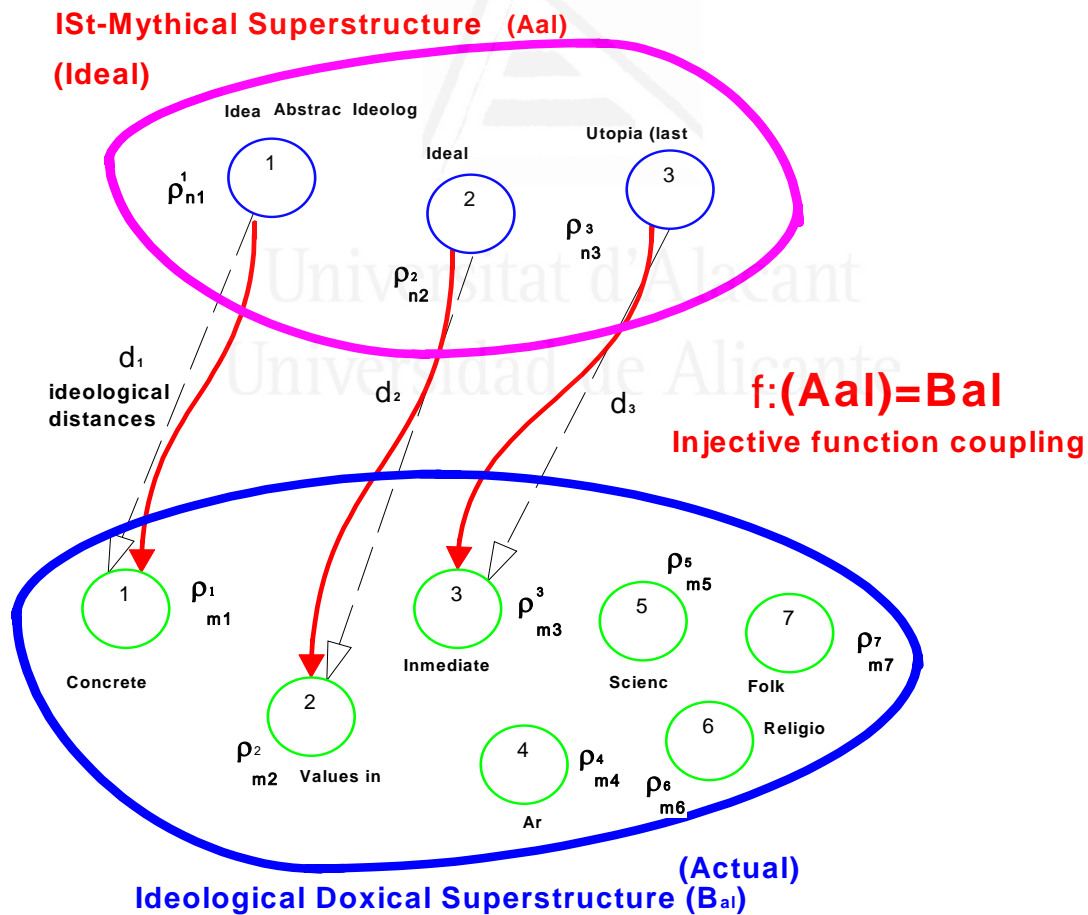
We call A_{al} and B_{al} to two alysidal sets (*ISt-Mythical Superstructure and Ideological Doxical Superstructure*). By simplification, we suppose that A_{al} has three alysidal elements $\left(\rho_{n1}^1, \rho_{n2}^2, \rho_{n3}^3\right)$ corresponding to *Ideal Abstract Ideology, Ideal Values and Utopia* respectively. B_{al} has alysidal w elements $\left(\rho_{n1}^1, \rho_{n2}^2, \rho_{n3}^3....\rho_{nw}^w\right)$ corresponding *Concrete Ideology*, *Values in fact, Inmediate goals, Art, Science, Folk beliefs, Religion* and so on. Subscripts $n_1, n_2, n_3, m_1, m_2, m_3,..., m_w$. correspond to substantive beliefs considered like nodes in a the theory of Alysidal sets. The coupling function $f : \left(A_{al}\right)^{3Xw} = B_{al}$ is an injective coupling function. In Alysidal Sets Theory (AST), each alysidal element is a chain formed by n interrelated elements (nodes). In this case, the nodes are substantive beliefs interrelated with abstract relations.

Example 6.4: We consider the Abstract Ideology belonging to ISt-Mythical Superstructure and the Dominant Ideology belonging to Doxical Superstructure like two alysidal sets with an only element (Figure 6.4)

Figure 6.4

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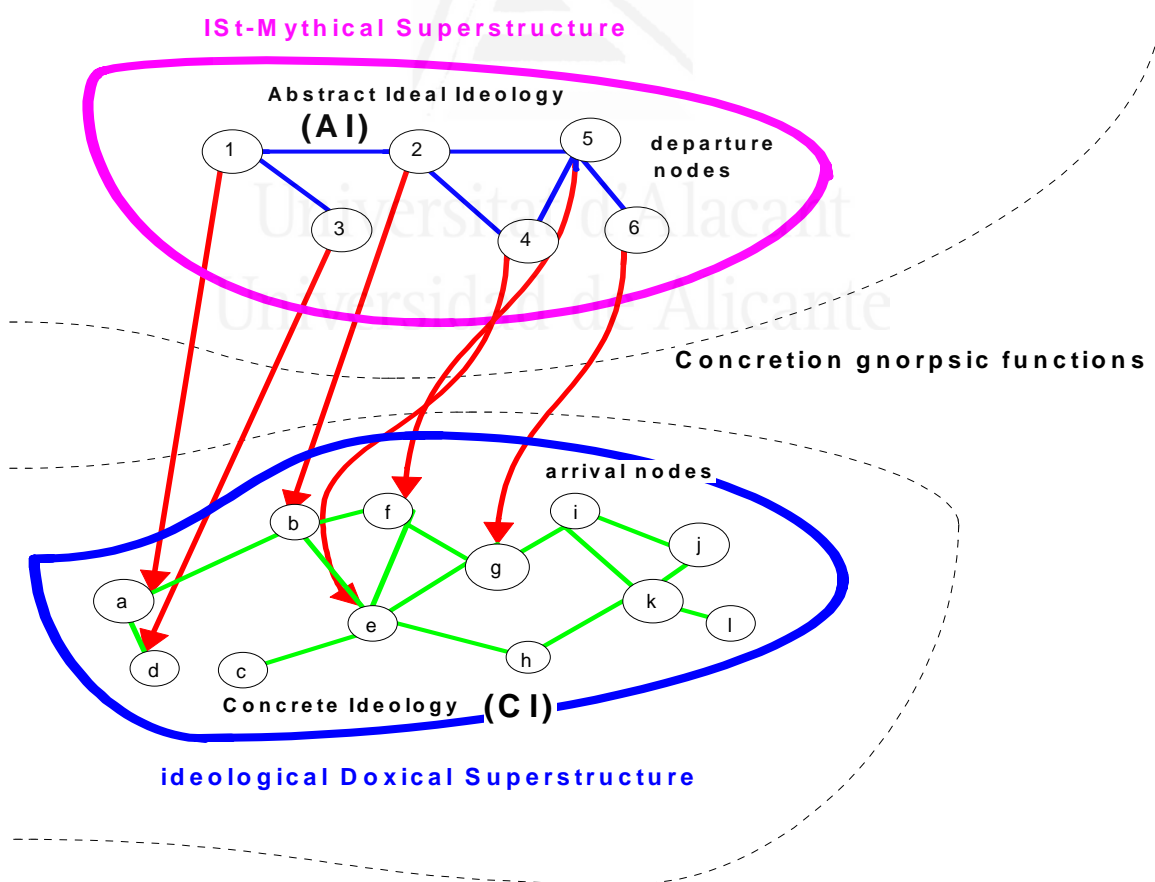
Nodes are substantive beliefs and binary relations are abstract relations between substantive beliefs. In figure 6.4 the following pairs have formed: (1, a), (2, b), (3, d), (4, e), (5, f), (6, g).

<center>***</center>

Abstract ideology will be the *domain* and concrete ideology will be the *codomain*.

In AST if one alysidal element $\wp_i^k$ of A_{al} has n nodes and the alysidal element $\wp_j^l$ of B_{al} has m nodes, the space of possibilities of coupling will be nxm. Nevertheless, in this space of possibilities, a single one "*is chosen*" so much by alysidal element $\wp_i^k$ as by the $\wp_j^l$. The other possibilities are rejected, how if alysidal element $\wp_j^l \in B_{al}$ "knew" in that certain node must make coupling. Therefore, we will have to define a function of knowledge or *gnorpsic function* (of the Greek γνωρψία: to know) associated to the connection between alysidal element $\wp_i^k \in A_{al}$ and the $\wp_j^l \in B_{al}$. The gnorpsic function

$$\prescript{m_j}{n_i}{\omega}f\,\wp_i^k \to \wp_j^l$$

is the function that determines that node n_i (*departure node*) of alysidal element $\wp_i^k \in A_{al}$ is connected with node m_j (*arrival node*) of the alysidal element $\wp_j^l \in B_{al}$. Subindex n_i indicates the departure node, supraindex m_j the arrival node and supraindex ω the order of coupling.

If connection of n_i (departure node) is only with an only arrival node m_j, the function will be mononorpsic and we denote as

$$\prescript{m_j}{n_i}{1}f\,\wp_i^k \to \wp_j^l$$

If connection of n_i (departure node) is with two arrival node m_j, m_k, the function will be bignorpsic and we denote as

$$\prescript{m_j,m_k}{n_i}{2}f\,\wp_i^k \to \wp_j^l$$

If connection of n_i (departure node) is only with three arrival node m_j, m_k, m_l the function will be trinorpsic and we denote as

$$\prescript{m_j,m_k,m_l}{n_i}{3}f\,\wp_i^k \to \wp_j^l$$

If connection of n_i (departure node) is with many arrival node m_j, m_k, m_l, …,m_ω the function will be polinorpsic and we denote as

$$\prescript{m,m_k,...,m_{\omega j}}{n_i}{\omega}f\,\wp_i^k \to \wp_j^l$$

In the case that occupies to us it is a

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mononorpsic function $\displaystyle \overset{m_j}{\underset{n_i}{^1f}} \wp_i^k \to \wp_j^l$, but with a special meaning: the concretion of the ideals with concrete substantive beliefs. Let AI and CI be the abstract ideal and concrete ideologies so that $AI \in A_{al} \wedge CI \in B_{al}$.

Definition 6.37: *We define as* concretion function *and we denote as* $\displaystyle \overset{m_j}{\underset{n_i}{f}} (AI)_{con} \to CI$

the monognorpsic function that determines that substantive ideal belief n_i (departure substantive ideal belief) of alysidal element $AI \in ISt - Mythical\ Superstructure\ is$ connected with the concrete substantive belief m_j (arrival concrete substantive belief) of the alysidal element $CI \in DS$.

Example 6.5: In the case of figure 6.4, the concretion functions are:

$$\overset{a}{\underset{1}{f}} (AI)_{con} \to CI$$

$$\overset{b}{\underset{2}{f}} (AI)_{con} \to CI$$

$$\overset{d}{\underset{3}{f}} (AI)_{con} \to CI$$

$$\overset{e}{\underset{4}{f}} (AI)_{con} \to CI$$

$$\overset{f}{\underset{5}{f}} (AI)_{con} \to CI$$

$$\overset{g}{\underset{6}{f}} (AI)_{con} \to CI$$

***

These concretion functions turn ideal substantive beliefs in concrete substantive beliefs. An ideal legal structure (ideal deontical normative) becomes one concrete legal structure (makes specific and concrete deontical normative) and it is projected on Structural Base determining the behavior of the society. Subjectivity, prevarication, parciality, etc of the legislative body comes certain in last instance by the double ideological content: ideal and concrete.

7. THE DOGMATIC SYSTEM

7.1. SOCIAL STRUCTURES THAT CARRIES IDEOLOGIES

Ideologies exist in two social contexts which make them intelligible, a context of organization and a context of meaning. Even the context of meaning is social in that it refers to the process f symbolic communication. The countless social structure that carry ideologies may be divided into two general types.: associations and unspecialized social structures (Borhek and Curtis, 1983). For our intention we will take into account the associations solely, due to the presence of a purpose that justifies its existence.

Definition 7.1: *We defined as* associations *the specialized social structures called into being more or less intentionally for some specific purpose or purposes.*

Their main characteristics are the following ones:

1) The purpose may or not may be the ideology itself. It is in the case of structured religions and political parties,.

2) Associations are the type of organizational vehicle wich provides full-time specialists for the task of developing and perpetuating ideologies.

3) At the time very least provide amateurs who devote vast quantities of time and energy to those ends.

4) Associations provide resources such as money, man-hours, buildings, and social power.

5) Associations provide jobs and, in so doing, motivate commitment in a powerful way and they devote resources andto ancillary activities: meeting internal needs and performing external services.

6) Services mobilize social power and make the ideology a much more potent voice in human affairs.

7) They are also necessarily involve the ideology in the mundane, often with profound cnsequences.

8) Associations are thought of as single-purpose organizations. But since coordinated action is the source of social power, an association that has been constructed for one purpose is potentially useful for many oher purposes. The ideology usually does not impose a unique purpose on general organizational activities such as recruitment, collection of founds, public relations, and so on.

9) Associations are probably never the only organizational vehicle for an ideology. At any one time may be several different associations, at different stages of institutionalization, carrying portions of an ideology in a given human society.

10) If the ideology has developed to the point of being carried by an asociation, it is sure to be carried by unspecialized structures in the society as well. It is dominant ideology.

11) The association generally attempts to acquire exclusive legitimacy in decision-making about o on the ideology but is seldom fully successful in the attempt.

12) When associations deal with other they must treat one another as rivals for the respective ideology. An example can be found in the quite typical development of movements of the Left. The leftist parties are characterized by such bitter competition for exclusive franchise about associations that for a long periods the general goals are subordinatted to a struggle for power between organizations.

13) Associations are composed of a *corporate body* which includes the leadership, all specialized roles, and employees, and a membership consisting of all formal members who do not currently occupy specialied roles. The corporative body may be internally very complex.

14) Both the membeship and the corporative body are part of a potentially much larger social category, the *community of believers,* which also includes participants in the ideology who do not affiliate themselves with the association, although they may act in concert with it in practice.

15) An association in which the corporative body is a large proportion of the membership, or in which the memebership is a large proportion of the community of believers, is said to be highly *mobilized* in that it is prepared to take immediate full-scale action close to the limit of its potential.

Borhek and Curtis (1983) distinguish the associations in two different but interrelated types: *cults* and *concerns*:

Definition 7.2: *A* cult *is an association which the raison d´être consists only of the development and perpetuation of the ideology as an inrinsic value.*

Cults are inclined to treat ideologies as sacred. The cult responds to the inner logic of the ideology without much reference to its practical consequences (projection on the structural base SB) and its likely to be extremely conservative in terms of adopting changes which have originated in its constituency. It is likely to be radical in some respects because its specific charter to follow its own drummer may lead it in directions not popular in the structural base. Examples of cult are churches or centers of ideological formation belonging to political, or graduated schools .

Definition 7.3: *A* concern *is an association for which the ideology is a means rather than a goal.*

The ideology carried by a concern is apt to be much more socially useful, but also much more intimately tied to a particular historical circunstance. The concern responds to pressures in the Structural Base and is likely to be willing to compromise principle to accomplish practical (inmediate) goals. The concern is likely to be conservative vis-à-vis the logical development of the ideology and to hold on tenaciously to the past while it is radical in its willingness to try new approaches on a purely technological level. Examples of concerns are political or trade organizations. Few associations are pure cult or pure concern. After the organization is broken up into different partswhich behave as if they had different purposes, associations may be internally differentiated and a concern may have as cult as a differentiated part, such as a committee on party goals established by a politiical party. Party members (believers) usually expect the committee to serve the goals of the party but the committee members are apt to see the party as implementing goals specified by the committee (Borhek and Curtis, 1983).

The contrasting stance, toward the concrete actuality of Structural Base versus the abstract ideal (*ultimate goal*) affects the role of the concern or the cult in revolutionary change of societies (violent substitution of a dominant ideology by another one) and social control. The cult and the concern are almost by definition in conflict with each other.

Consequence 7.1: *If the degree the organizational vehicle that carries an ideology is dominated by a cult, the ideology will remain pure but will face problems of retaining its relevance to some numerous community of believers.*

Consequence 7.2 : *If the extent an organizational vehicle is dominated by a concern, the ideology may relevant to a numerous community of believers but it is likely to change remain rapidly and to become highly compromised.*

Definition 7.4: *We define as* dominant cult *this having to guarantee the conservation and transmission of the purity of the beliefs of a dominant ideology during a determined historical period.*

Definition 7.5: *We define as* dominant concern *this having to conserve the structures created by the power based on the dominant ideology, on the basis of the justification of this ideology.*

Dominant ideology lead by dominant cult and dominant concern can be established through revolutionary social movements (*revolution from down*) or by the own structures of being able to conserve their predominance (*revolution by above*). All dominant ideology establishes institutional structures in Structural Base. All new cult (*emergent ideology*) is an organizational anomaly to officers in institutional structures because of its lack of mobilization. Initially, it is so weak as to be negligible, even though the community of believers may be very large. If it can mobilize the community it may become an enormous and effective organization (for example, Nazi Party in the German Republic of Weimar in the twenties in the last century). The importance of a transformational ideology in undergirding political and/or social change should not be underestimated.

There is a great distance between the ideal world and reality. Reality affects the interpretation of ideas so that ideas are always being transformed and adjusted (Habermas 1996). If text –mainly religious and/or philosphical text- is read literally while ignoring the reality of context, it will produce dogmatic thought or ideology. In this perception the text is reality. Without getting involved in a debate between structuralism and existentialism, we can say that text contributes to the formation of individual and groupal worldviews, and that this worldview will be socialized

sometimes as a form of indoctrination. Understood in the classical sense, *noesis* differentiates consciousness of the divine ground from other parts of comprehensive knowledge. Voegelin (1998) is not saying that noetic knowledge is the only form of knowledge, but that noesis isolates ratio while other experiences of the divine, e.g. pneumatic, the love of God, etc., also disclose truth. Ratio is quite important as it is an explicit control of what constitutes reality and knowledge. It is an instrument of critique which can critically assess non-noetic interpretations of reality, such as the pneumatic. Noesis also recognizes that tensions in the reality of knowledge remain. Voegelin mentions three. The first tension occurred shortly after classical noesis, or the Hellenic phase, where after true concept of God, man, and the world occurred through noetic differentiation from the prior non-noetic compact experience, it derailed into the philosophical dogmatism of the schools leading to Epicurean skepticism. The Jewish-Christian revelation, although a further differentiated advance through the pneumatic experience of the divine, experienced a loss of noetic exegesis when philosophy was made ancillary to theology. As a result, noetic exegesis was no longer participatory interpretation of the divine ground, but dogmatic theology, which led to dogmatic metaphysics and reactionary rebellions. A subsequent third tension followed naturally from dogmatic theology to dogmatic metaphysics to dogmatic ideology such as Comte's positivism or Marx' scientifical dialectic, which Voegelin calls a third-generation dogmatism. If one wonders why persuasion about divine reality and knowledge has lost ground, an answer can be found in dogmatism which has undermined the noetic clarity and articulation of the origin of order as an existential tension toward the ground. Dogmatism of whatever sort attempts to eliminate the tension, and Voegelin shows how this has continued throughout history. Therefore, ***all ideology has an associated dogma***.

Definition 7.6:   A Dogma *is the established belief or doctrine held by an ideology, thought to be authoritative and not to be disputed, doubted or diverged from.*

Generally dogmatism is opposed tolerance. Higher degree of tolerance of an ideology, lower is its dogmatism.

Definition 7.7: *To all system having a dogma we will denominate, not by perojative form, a* Dogmatic System H.

Evidence positive or negative (in form of IDS-images) for an ideology may be external to the ideology and its organizational vehicle (*associations*), or may be internal. Negative evidence whatever renders ideology implausible. When a prophecy fails and the world does not end, when revolution does not take place and proletarian class does not take the power, when the Second Coming does not occur, beleivers are confronted with *external evidence*. *Internal evidence* consists of data which derive from the ideology itself or froman association to which it is attached. When the religious leader is arreted for pederasty, the political leader has become rich with fraud or revolutionary party is allied with its ideological enemies, another kiof internal evidence must be faced that may have nothing to do with the abstact ideology (belonging to Mythical Superstructure). It severely strains credibility nonetheless.

Proposition 7.1: *The greater the degree of ideology (ER), the greater the importance of negative evidence for the whole ideology.*

Proof:

It is logic. Negative evidence is not wished ideological stimuli and it supposes very high energy of rupture of the substantive beliefs and its abstract relations, generally over its threshold of ideological resistance and so that $E_Z > u_H$ and the ideological system is distructured.

Consequence 8.5: *For highly systematic ideology, any attack upon any of its substantive beliefs is an attack upon the ideology itself.*

Consequence 7.3: *If one substantive belief is abandoned, all the others must be too.*

Note 7.1: *Internal evidence will take place within state S of the Dogmatic system H.*

7.1.1. Conditions of the Dogmatic System

In order to define a Dogmatic System we must formulate the following main conditions:

Condition 7.1: *The Dogmatic System H of which we are talking about corresponds to an urban society, understanding how so a society where the following characteristics exist: high population density, large populations, complex division of labor, good communications, high literacy, primacy of problems in interpersonal relations over*

problems posed by physical environment and institutional differentation as opossed to institutional homogeneity.

When we are talking about an urban society we did not think solely about present societies. Roman society of the High Empire and great part of the Low Empire, Bizantine and Califal societies will be able to fit within this group. Therefore we can speak of opposed urban ideologies to rural ideologies. Urban ideologies parallel urban social structure belonging to Structural Base (SB). They are diverse heterogenous and subject to change. Elaborate and incompatible ideologies coexist, avoiding conflict by means of specialization and compartmentalized thought, while much ideology, like much behavior, is unregulated. The consequence of such congery of ideologies is similar to the consequence of urban social structure. We can speak of the existence of ideological clusters of different sizes within the Doxical Superstructure (DS). To this phenomenon we denominated *compartmentalization*.

An ideology is elected (or imposed) forming a Dominant Ideology, and is modified for contemporany use (actual utility) by a social organized group (association), which subsequently changes the Structural Base (SB) because of the ideological logic of the ideology, after which the organized group modifies the ideology to cope with some problems stemming from the new Structural Base, and then the ideological logic of the ideology leads the group to attack some new task, and so on.

Condition 7.2: *By simplification, the proposed model considers a single ideology: the dominant one.*

In this approach we establish the following *limitant conditions*:

Condition 7.3: *It is an urban society.*

Condition 7.4: *The Social system is equilibrated. It exists consensual validation.*

Dogmatic System H has two subsystems: Impure subsystem formed by associations (cults, concerns and corporative body) and Ideal subsystem formed by concret ideology, values in fact, and specific goals (Figure 7.1).
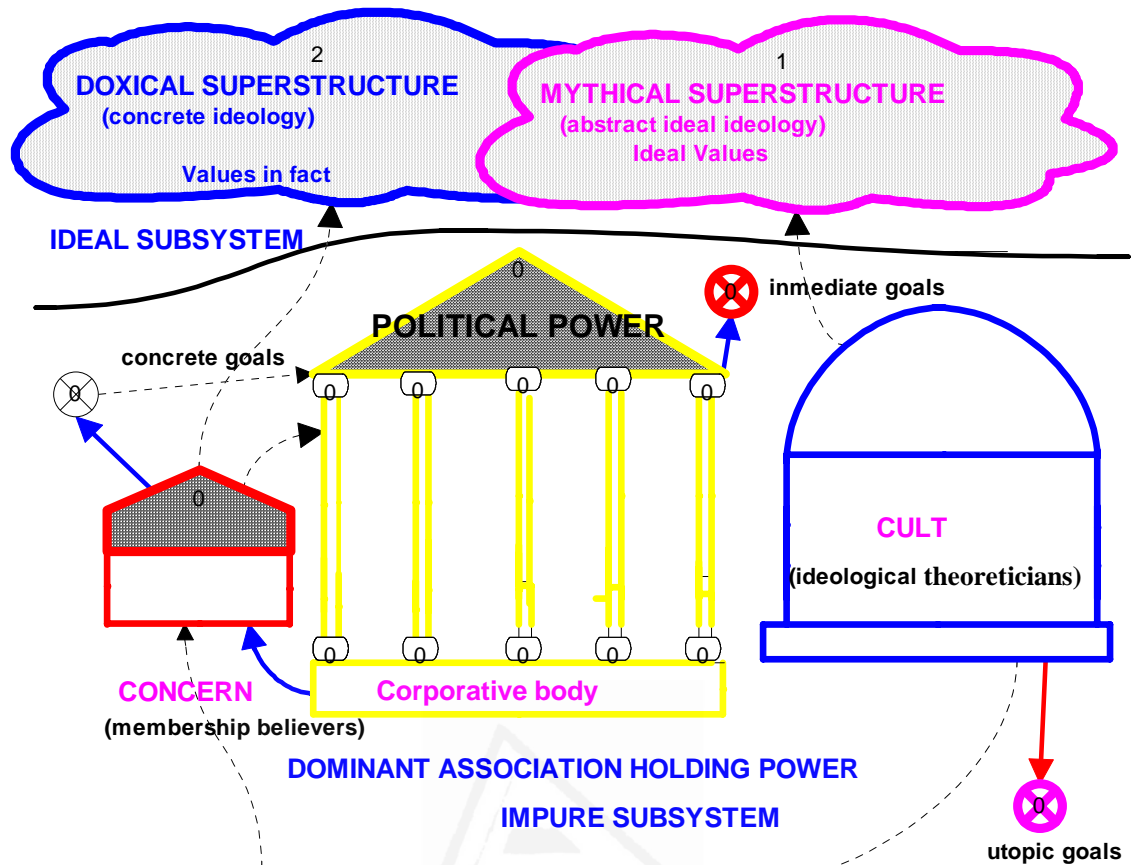
Figure 7.1

Arrows of continue outline mean effective transfer.

Arrows of discontinuous outline mean information transfer.

Dogmatic System H is Deontical Impure System (Σ) settling down sets of prescriptions and proscriptions in form of sheaves of deontical relations between its components Subjects. Simultaneously, associations closely form three related subsystems: corporative body, concerns and cult. Each one of them and separately, they are Deontical Impure Systems, with their own sheaves of deontical relations. Simultaneously everything Dogmatic System is immersed in the deontical structure of its social environment.

7.2. MATHEMATICAL APPROACH

The basis of much of the argument of this approach is the Environment Theory (Patten et al. 1976, 1978, 1979, 1980, 1981, 1982), Lloret-Climent et al. (2001, 2002) and Usó-

Doménech et al. (2002[a,b]) when distinguishing system of its double environment (input or stimulus and output or response) with the existing interactions among them.

The proposed model is simply a loop in time. In this approach we made an inversion. We consider like system H the ideology and the specific social structure that carries the ideology (associations), and one general environment consisting of the overlapping institutional structures of the society, the network of communication, the economical, political, legal, military, etc. structures, demographic structure and the physical environment, it is to say, the Structural Base (SB) (Figure 7.2).
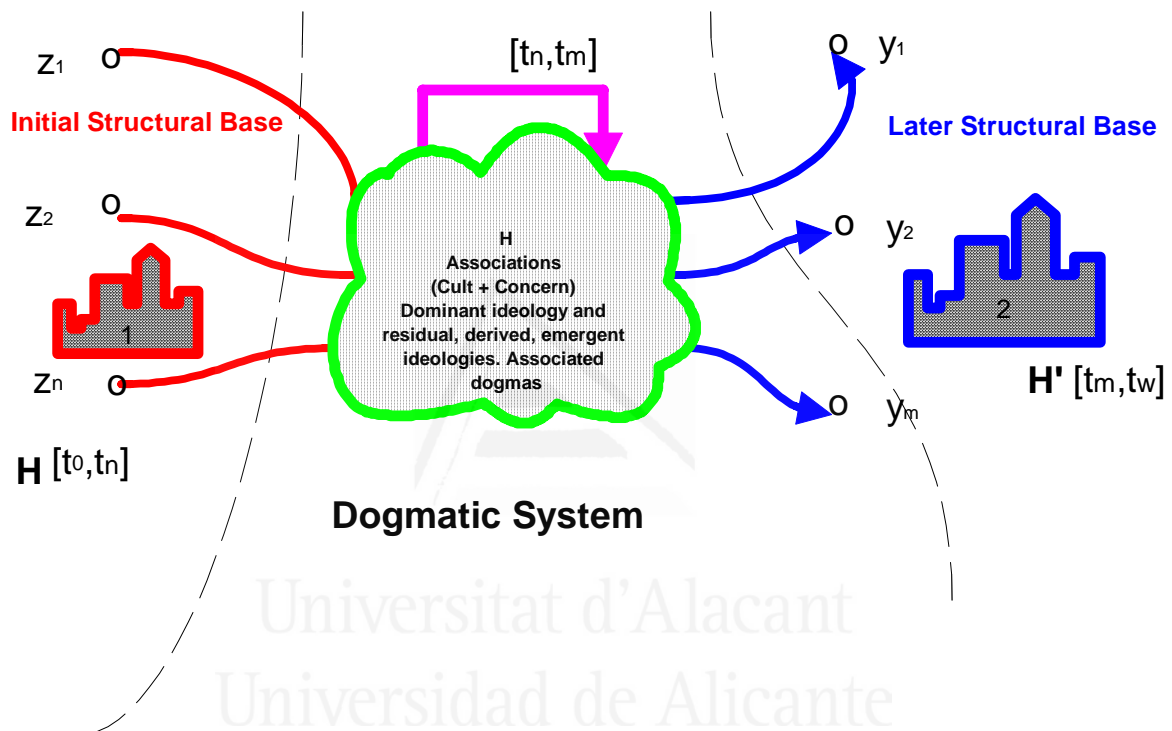
Figure 7.2.

Semiotic stimuli are doxical superstructural images (IDS-images) coming from a stimulus environment **H'** or initial structural base. Semiotic responses or denotative SB projections (SB-projections) affect structured response environment **H''** or later structural base (Lloret-Climent et al., 1998, 2001, 2002; Patten, 1978, 1980, 1982; Patten et al., 1976, 1981, 1982(; Usó-Doménech et al., 2002[a,b]). States are formed by elements belonging to H. Then, stimuli and responses can be defined of the following way:

Definition 7.8: *We define Z or* IDS-images set *as set of abstract (belief) relations incoming in the Dogmatic System* H *from* **H'**. $\forall z \in Z$ *will be a semiotic stimulus or ideological stímulus.*

Definition 7.9: *The set of IDS-images Z are* the images of ideological categories *coming from Initial Structural Base* **H'**.

Note 7.2: *The images of ideological categories is the ideological interpretation of the structure, phenomena and process that happen in the Initial Structural Base considered like stimulus environment* **H'**.

Definition 7.10: *We define Y or* SB-projection set *as set of abstract (belief) relations leaving Dogmatic System* H *to* **H''**. $\forall iy \in Y$ *will be a semiotic response or ideological response.*

Definition 7.11: *The set of SB-projections Y are* the projections of ideological categories *on the Later Structural Base* **H''**.

Note 7.3: *The projection of ideological categories is the connotative action and its materializations on the part of the association, applying its ideology on the Structural Base constructing a Later Structural Base or response environment* **H''**.

Let $[t_0, t_w]$ be a time interval. The time interval is divided in three subintervals: $[t_0, t_n]$ or stimulus interval, $[t_n, t_m]$ or state interval and $[t_m, t_w]$ or response interval.

Definition 7.12: *An set* $L[t_0, t_m]$ *is interposed (*Usó-Doménech *et al.* 2002[a]*) between the sets* $Z[t_0, t_n]$ *and* $Y[t_m, t_w]$, *if there exists a set* $\Lambda^T = \{\lambda : T \rightarrow \Lambda\}$ *such that* $L[t_0, t] \subset \Lambda^T$ *and* $\exists R_1 \subset Z[t_0, t_n] X S[t_n, t_m]$ *and* $\exists R_2 \subset S[t_n, t_m] X Y[t_m, t_w]$.

Consequence 7.4: *Interposed sets are causal connections in the propagation of the ideological action.*

Definition 7.13: *We define* state $S[t_n, t_m]$ *of the Dogmatic System H the interposed set between sets* $Z[t_0, t_n]$ *and* $Y[t_m, t_w]$ *verifying*:

$$\forall (z[t_0, t_n], y[t_m, t_w]) \in R_i, \exists s_1[t_n, t_m] \in S[t_n, t_m] \quad such \quad as \quad (z[t_0, t_n], s_1[t_n, t_m]) \in R_1$$
$$\wedge (s_1[t_n, t_m], y[t_m, t_w]) \in R_2$$

being R_1, R_2 abstract relations.

IDS-image $z[t_0, t_n] \in Z[t_0, t_n]$ serve to apply time $[t_0, t_n] \in T$ in states $s[t_n, t_m] \in S[t_n, t_m]$, and the states take IDS-image $z[t_0, t_n] \in Z[t_0, t_n]$ turning them SB-projections $y[t_m, t_w] \in Y[t_m, t_w]$. The states will be interposed between the IDS-images and SB-projections. Sets, considered *how set of action* $Z[t_0, t_n], S[t_n, t_m], Y[t_m, t_w]$ represent families of all the possible trajectories and will consider how *set of actions,* whereas $z[t_0, t_n], s[t_n, t_m], y[t_m, t_w]$ are *specific action trajectories.*

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Definition 7.14: *The* state space S^S (Usó-Doménech *et al.* 2002ª) *of H is the cartesian product of all the states S*

$$S^S[t_n, t_m] = \mathop{X}_{i=1}^{m} S_i[t_n, t_m]$$

Let m be an initial state.

Definition 7.15: *A function* ρ_0 *called* initial SB-projection of ideological categories function of H *can be defined so that:*

$$\rho_0 : S_0[t_n, t_m] X Z[t_0, t_n] \rightarrow Y[t_m, t_w]$$

Definition 7.16: *An initial SB-projection of ideological categories function* $\rho_0 : S_0[t_n, t_m] X Z[t_0, t_n] \rightarrow Y[t_m, t_w]$ *will be a causal initial SB-projection of ideological categories function iff*

$$\forall s[t_n, t_m] \in S_0[t_n, t_m] \wedge \forall z[t_0, t_n], z'[t_0, t_n] \in Z[t_0, t_n], \quad z[t_0, t_n] = z'[t_0, t_n] \rightarrow$$

$$\rho_0(s[t_n, t_m], z[t_0, t_n]) = \rho_0(s[t_n, t_m], z'[t_0, t_n])$$

Consequence 7.5: *Dogmatic System H will be an ideological causal system iff it has a causal initial SB- projection of ideological categories function.*

Definition 7.17: *Dogmatic System H becomes in* ideologically oriented *when its set of attributes is divided in* ideological causes (IDS-images) *Z, and* ideological effects (SB-projections) *Y, and it will express like a set of temporary segments (IDS-images)-(SB-projections).*

$$(z[t_0, t_n], y[t_m, t_w]) \in H[t_0, t_w], z[t_0, t_n] \in Z[t_0, t_n], y \in Y[t_m, t_w]$$

Therefore, the oriented system associates temporary sequences of SB-projections with temporary sequences of IDS-images.

Definition 7.18: *A causal ideological oriented Dogmatic System H will say* a functional system *when the reports between IDS-images and SB-projections express how a function between the temporary sets of the IDS-images and the temporary sets of the SB-projections.*

$$H : Z[t_0, t_n] \rightarrow Y[t_m, t_w]$$

Domain and rank of functional dogmatic system H it will be expressed like:

$$DomH = IC = \{z[t_0, t_n], \exists y[t_m, t_w] \in Y[t_m, t_w]/(z[t_0, t_n], y[t_m, t_w]) \in H[t_0, t_w]\}$$
$$rangH = IG = \{y[t_m, t_w], \exists z[t_0, t_n] \in Z[t_0, t_n]/(z[t_0, t_n], y[t_m, t_n]) \in H[t_0, t_w]\}$$

Definition 7.19: *To domain IC of H will be denominated* ideological creaon *whereas to rank IG will take the name from* ideological genon.

Definition 7.20: *A Dogmatic System H will be called* certain or univocal *when to single IDS-image* $z[t_0, t_n] \in Z[t_0, t_n]$ *corresponds a single SB-projection* $y[t_m, t_w] \in Y[t_m, t\ ]$.

Let $v[t_0, t_w]$ be segments of nonoriented attributes $v_1, v_2, ..., v_m$. If τ is a time so that $t_0 < \tau < t_w$, segment $v[t_0, t_w]$ can be conceived how a concatenation of two segments $v[t_0, \tau]$ and $v[\tau, t_w]$. Said two segments they are *restrictions* of $v[t_0, t_w]$ and $v[\tau, t_w]$ is a continuation of $v[t_0, \tau]$. Segment $v[t_0, t_w]$ can be written how $v[t_0, \tau]v[\tau, t_w]$ or $v[t_0, t_w] = v[t_0, \tau]v[\tau, t_w]$. For the oriented case, the representation is $[z[t_0, t_n], y[t_m, t_w]] = [z[t_0, \tau]z[\tau, t_n], y[t_m, \tau]y[\tau, t_w]]$. Let H be the set of segments for a dogmatic system H for an observing interval $[t_0, t_w]$ and so that $v[t_0, t_w] \in H$.

Definition 7.21 (Zadeh and Desoer, 1969): *To the family of segments* $H = \{v[t_0, \tau]v[\tau, t_w]\}$ *one says that* it is closed under segmentation *if for each* τ *in* $[t_0, t_w]$ *both* $v[t_0, \tau], v[\tau, t_w]$ *are elements of H. It is to say* $v[t_0, \tau]v[\tau, t_w] \in H, v[\tau, t_w] \in H$

For the case of directed attributes, let IC be the ideological creation set the family $\{z[t_0, t_n]\}$ of all the segments IDS-images in the time interval $[t_0, t_n]$ and let IG be the family $\{y[t_m, t_w]\}$ of all the segments oof SB-projections. How $H[t_0, t_w] \subset Z[t_0, t_n]XY[t_m, t_w]$ (figure 7.3)

Figure 7.3.

187
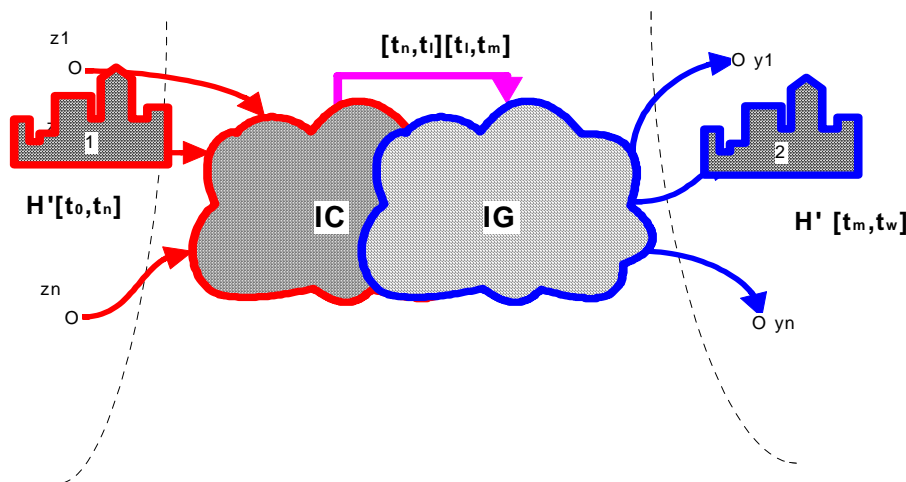
Then $\left(z[t_0,t_n], y[t_m,t_w]\right) \in H[t_0,t_w]$, and the condition of closure under segmentation will be:

$$\left(z[t_0,t_n]z[t_n,t_l], y[t_l,\tau_m]y[t_m,t_w]\right) \in H[t_0,t_w]$$

and

$$\left(z[t_n,t_l], y[t_l,t_m]\right) \in H[t_0,t_w]$$

Definition 7.22: *A* dogmatic system *H is defined how a set of ordered pairs of relations of time* $\left(z[t_0,t_n], y[t_m,t_w]\right) \in H[t_0,t_w]$, *satisfying the condition of closure under segmentation.*

Domain and rank of dogmatic system H are:

$$DomH[t_0,t_w] = IC[t_0,t_w] = \{z[t_0,t_n], \exists y[t_m,t_w] \in Y[t_m,t_w]/(z[t_0,t_n], y[t_m,t_w]) \in H[t_0,t_w]\}$$
$$rangH[t_0,t_w] = IG[t_0,t_w] = \{y[t_m,t_w], \exists z[t_0,t_n] \in Z[t_0,t_n]/(z[t_0,t_n], y[t_m,t_w]) \in H[t_0,t_w]\}$$

representing respectively the sets of segments IDS-images and SB-projections that can be associated with the Dogmatic System H.

We consider the Initial Structural Base Environment **H'** how a source of IDS-images. If **H'** takes how the totality from interconnected objects with which H interacts (Figure 7.4)
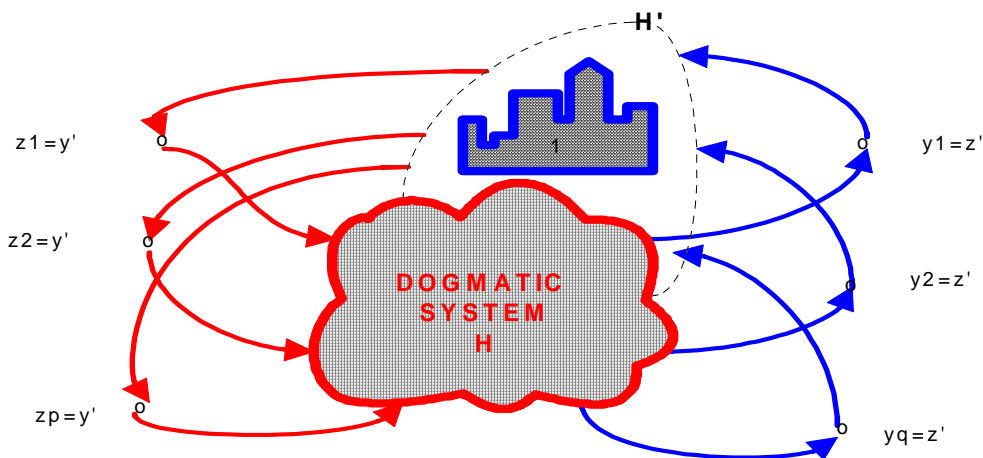
Figure 7.4

Then it is clear that H and **H'** are identical objects how set of pairs (IDS-images)-(SB-projections) with the single difference of the existing reversibility in what it is IDS-images and in what is SB-projections (Figure 7.5).
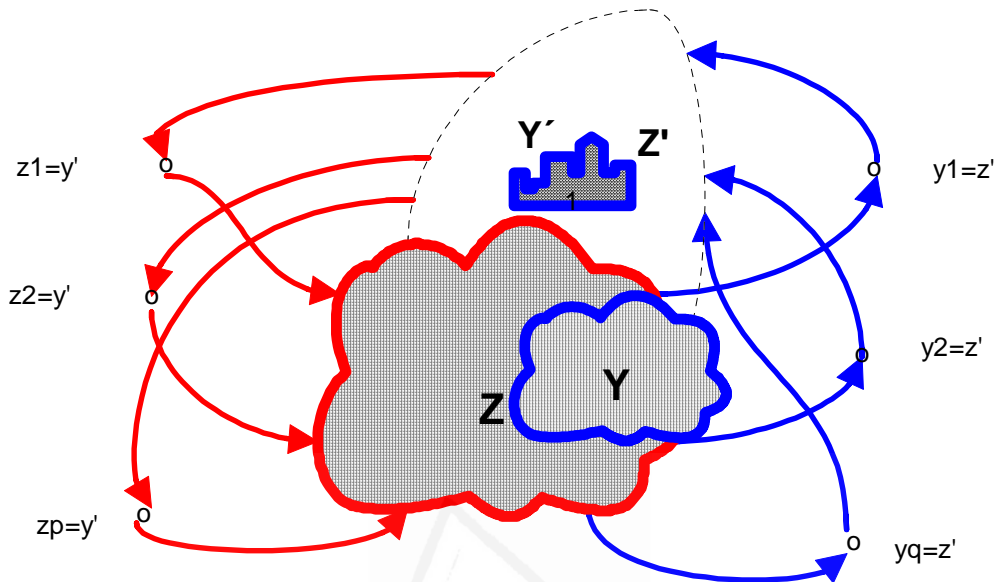
Figure 7.5.

H and **H'** are reciprocal objects, logical dualities and only differ in the direction of the terminal attributes. H and **H'** can therefore be conceived how a "united pair".

Definition 7.23: *A Dogmatic System H* is determined *if its SB-projection segment corresponding to a given IDS-image is unique.*

It is to say, $\forall z[t_0,t_n] \in Z[t_0,t_n]$ exist one and only one $y[t_m,t_w] \in Y[t_m,t_w]$.

Dogmatic System H has two environments (see figure 7.2) or Structural Base environs (SB-environs) first of which **H'** (*Initial Structural Base*), acts on the own Dogmatic System H and second **H''** (*Later Structural Base*) it is formed from the component Dogmatic System. Each one of both SB-environs does not intersection with the other, nevertheless, the Dogmatic System is also, a part of both SB-environs, one received and the generated other. SB-environ includes an exhaustive –and mutually exclusive division of surrounding structural base environment. Therefore, environment H' is the set of all the ideological interactions (IDS-images) acting on Dogmatic System H, and

environment H" is the generating source or of new ideological flows (SB-projections) and future interactions. From this point of view, H is united with its surrounding social world through its *afferent SB-environ stimulus* and of its *efferent SB-environ response.* Let $Z[t_0, t_n]$ be the set of allowed IDS-images of **H'** and let $S[t_n, t_m]$ be its state space. $Y'[t_0, t_n]$ is the set of BS-projections from **H'** to H, so that $Y'[t_0, t_n] \in H'[t_0, t_n]$. Then, environment **H'** generates a response process, so that:

$$H': Z'[t_0, t_n] X S'[t_0, t_n] \rightarrow Y'[t_0, t_n]$$

Let $Z[t_0, t_n]$ be a set of allowed IDS-images so that $Z[t_0, t_n] \subset Y'[t_0, t]$. It exists a function IC denominated *ideological creaon*, so that:

$$IC: S[t_n, t_m] X Y'[t_0, t_n] \rightarrow Z[t_0, t_n]$$

Ideological creaon means an implicit act of environmental creation (existence). Function IC is an existencial function in the sense that it selects a set of possible SB-projections and coming from H' and turns them an existencial set Z, whose elements are the DS-images allowed by the Dogmatic System H. Therefore, the fact of the possibility has been turned the present time, and the portion of **H'** which is afferent for H can be called *SB-environ Initial Structural Base.*

The nature of Ideological Ideological Creaon IC as selector of DS-images and receiver (Dogmatic System is "*to create*" the social social environment **H'** (Initial Structural Base) of its Dogmatic System H and, therefore:

1) To define a portion of the structure of state of H that propagates and of which H is member.

2) To contribute to the definition of the social social environment H'.

In figure 7.6 it is specified the paper of ideological ideological creaon IC like causal element.

IDS-images $_{Z_i}$

Initial Structural Base

H'

Dogmatic System **H**
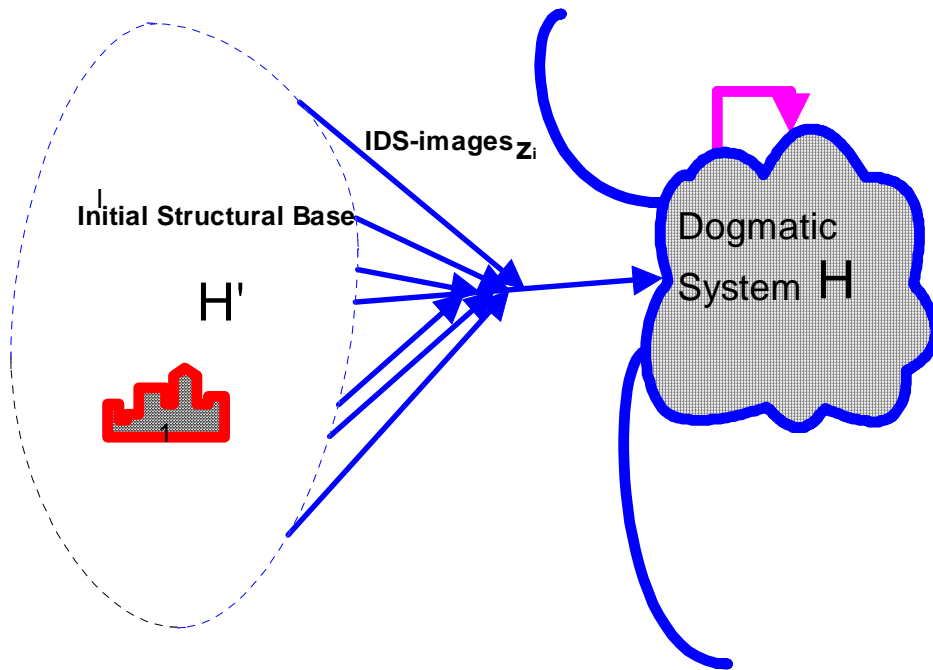
Figure 7.6.

The second notion of environment is the *Later Structural Base* **H''**. It is a set of environments implicit in the state space S of H. States of S become in BS-projections a through the interaction of the receiving system or ideological creon with the other response environment of the systems by means of an intersection of the Initial Structural Base environment of H (**H'**). That is to say, to produce a factual Later Structural Base environment from the potential environments implicit in the structure of state of H requires producing a set of potential attributes, and then the sequential selections done by the others ideological creaones carry out the total accomplishment of these potentials.

The paper of Ideological ideological genon IG is opposed but similar. All ideological ideological genons of a Dogmatic System H collectively:

1) They produce the structure of state of H that propagates.
2) They determine the social social environment **H''** (*Late Structural Base*).

The paper of ideological ideological genon as transmitting of the cause comes specified in figure 7.7.
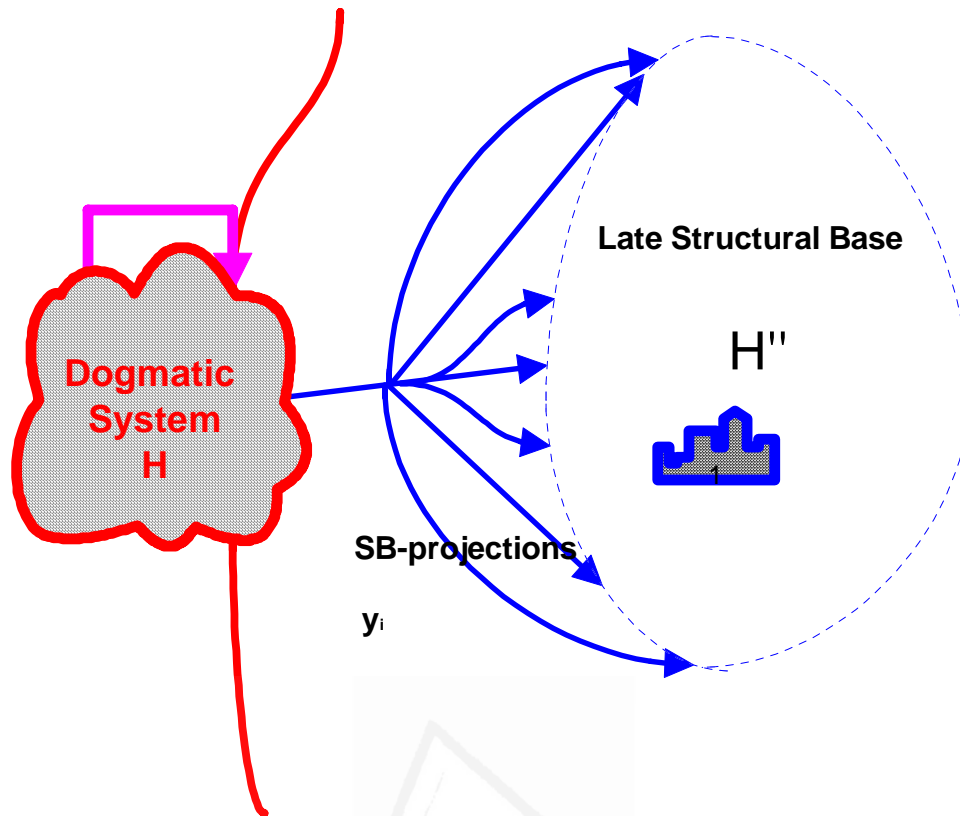
Figure 7.7.

A Dogmatic System H, defined this way, always is matched with reciprocal social social environment produced by ideological ideological genon IG and verified by ideological ideological creaon IC. A Dogmatic System H and its social social environment is a mutually consistent reciprocal pair. For the existence of a structure of internally consistent causal propagation, it is required the contact of the IDS-images and it is required the contact of the the SB-projections with social social environment for the existence of the condition of transitive closure. The endogenous propagation of the IDS-images towards the SB-projections is made by means of the state variables, and exists a border of the Dogmatic System in those points in where the cause is transferred from the IDS-image to the state or of the state to the SB-projection. However, how these hypotheses that we draw up to the present theory can lead to a unit of human society? . Figure 7.8 outlines the concept of the Dogmatic System H-Social environment.
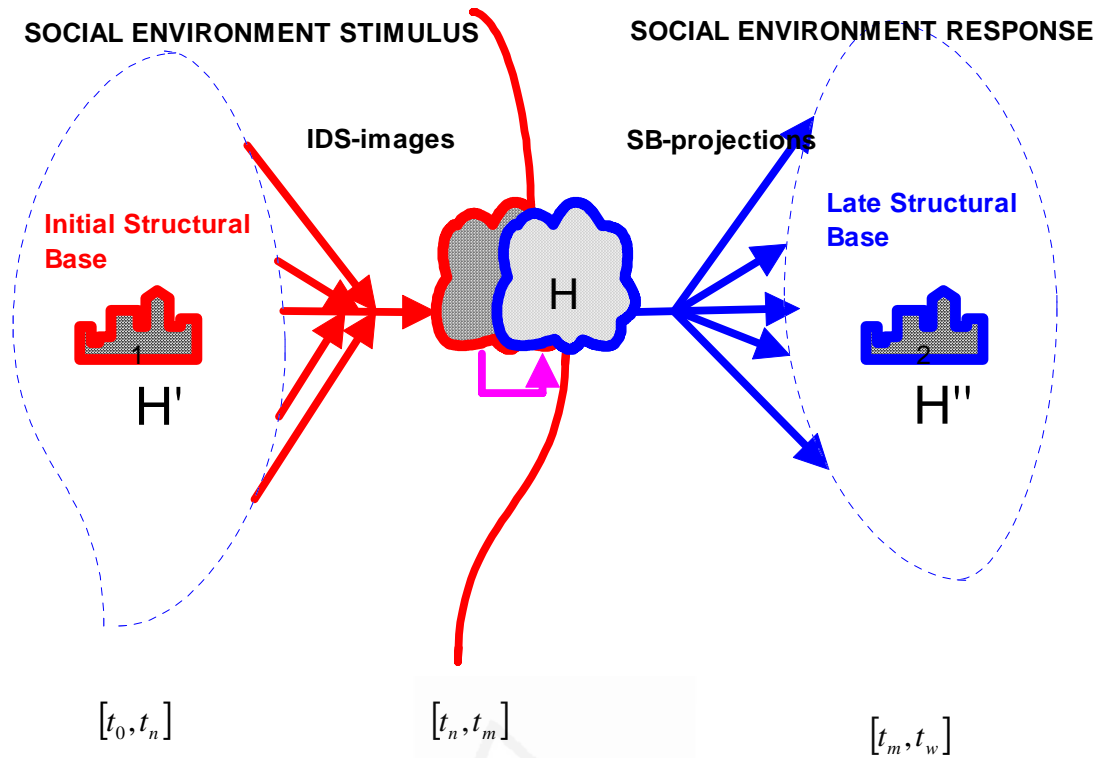
Figure 7.8.

Dogmatic System H, in any level of organization, transmits the potential cause to the environmental object painted to the right. At the same time social environment drawn to the left transmits the cause to H.

Environment, structure, function and behavior form a complex unit system-environment, which are the operational unit of existence for all the open systems in agreement with von Uexkull (1926). Therefore, one becomes a point in the directional propagation of the cause (Patten et al., 1976), where stimulus environment **H'** becomes *ideological creaon* and then ideological creaon becomes *ideological genon* becoming this as well the response environment **H''**. This sequential influence of relations jointly determines the characteristics of behavior of H and of its environments **H'** and **H''**. Therefore, in the level subsystem *structure* and *function*, are concepts intimately associated with two moments of the level system response, which is *behavior*, and each category is continuous and inseparable in the level *environment* suprasystem.

We considered all incident IDS-image like a relation coming from an alysidal set located in **H'** and so that $A_{al} \subset$ **H'**, and affecting a certain node of a certain chain of the

Dogmatic System H. Of course, this relation that unites a node n_i of a chain $\wp_i^k \in A_{al}$ of the alysidal set A_{al} with a node m_j of a chain $\wp_j^m \in H$ will have a certain energy of abstract connection. However, for H, this energy of abstract connection becomes stimulus energy E_Z. Let us suppose entering within Dogmatic System H and originating of **H'**, a set of IDS-images Z, with an energy E_Z. If the energy by group of IDS-images Z entering H coming from the **H'** is greater than the energy of rupture of the substantive beliefs of weak abstract connection, the Dogmatic System H will experience a loss of order, and therefore of structuring and information. And to the inverse one, if the group of IDS-images Z has an inferior energy to the energy of rupture of the substantive beliefs of weak connection, the Dogmatic System H will experience a net gain of order, and therefore of structure and information or an indifference to this type of IDS-images.

Definition 7.24: *We define as* threshold of ideological resistance u_H *of Dogmatic System H to the marked one by its energy* E_H *of abstract connections between substantive beliefs.*

Condition 7.5: *We will say that the set of IDS-images Z is allowed by the Dogmatic System H iff all its elements carry out:*

1) $\rho : Z[t_0, t_n] X S[t_n, t_m] \to Y[t_m, t_w]$ *satisfying the following relation*:

$$\forall z[t_0, t_n] \in Z[t_0, t_n] \wedge \forall y[t_m, t_w] \in Y[t_m, t_w]$$
$$\Rightarrow \exists s[t_n, t_m] \in S[t_n, t_m] \quad so \quad that \quad y[t_m, t_w] = \rho(z[t_0, t_n], s[t_n, t_m])$$

2) $\phi : Z[t_0, t] X S[t_0, t] \to S[t_0, t]$ *satisfying the following relation*:

$$\forall z[t_0, t_n] \in Z[t_0, t_n] \wedge \forall s_1[t_n, t_l] \in S[t_n, t_m]$$
$$\Rightarrow \exists s_2[t_l, t_m] \in S[t_n, t_m] \quad so \quad that \quad s_2[t_l, t_m] = \phi(z[t_0, t_n], s_1[t_n, t_l])$$

3) *If the threshold of ideological resistance* u_H *is greater than the energy* E_Z *by group of IDS-images Z entering H.*

Of course, all not allowed IDS-image will be a forbidden IDS-image.

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Definition 7.25: *In case that* u_H *be minor than energy* E_Z *of forbidden IDS-image we would have an entrance of an obligatory IDS-image or* obligatorily not wished ideological stimuli.

7.3. IDEOLOGICAL PROCESSES

Ideological processes influence a man's ideas *directly*. H. Walsby (1947) say on the matter

> *Although external stimuli play a great part in the determination of human behaviour, man's actions cannot be wholly explained in mere terms of mechanical, physical, chemical, biological or psychological reactions to external stimuli, for these reactions are also modified, conditioned and determined by a complex ideological system of cognitive assumptions. By chopping up (an intentional procedure which is itself largely determined by an ideological structure of assumptions), by breaking up human behaviour into sufficiently detailed, isolated, and observable component actions, we find we can explain each of them in biological, chemical, physical, or mechanical terms - according to the extent to which the breaking-up procedure is carried - without ever being compelled to assume the objectivity (or independent reality) of ideological processes; as external, objectively real processes, they simply do not enter the matter, for they have been effectively excluded by the analytical procedure of breaking up and destroying the connected nature of the actions - and it is with the connection, the correlation and integration of such mechanical, chemical, physical, biological and psychological activities, that ideological processes are concerned.*

Let $Y_\Diamond [t_m, t_w]$ be a set of possible SB-projections from H to **H''**. Let $Z''[t_m, t_w]$ the set of IDS-images that it can so be propagated from H how **H''** that $Z''[t_m, t_w] \subset Y_\Diamond [t_m, t_w]$. Let $S''[t_n, t_m]$ the stat space of H and $Y[t_m, t_w]$ the set of SB-projections. Then **H''** will be the set of SB-projections so that

$$H'': S''[t_n, t_m] X Z''[t_m, t_w] \rightarrow Y''[t_m, t_w]$$

This environment generated by the properties of the Dogmatic System H is denominated *ideological genon* IG. It exists an *ideological genon function* IG so that:

$$IG: S[t_n, t_m] X Z[t_0, t_n] \rightarrow Y[t_m, t_w]$$

IG turns the states $S[t_n, t_m]$ and the IDS-images $Z[t_0, t_n]$ in SB-projections that consequently they will be transformed into allowed DS-images $Z''[t_m, t_w]$ to H''. The portion of **H''** that is eferent from H will call *SB-environ Later Structural Base.*

Let Θ and Ξ be two arbitrary sets and let T be a time set. Let Θ^T and Ξ^T be the sets of all functions of T and Θ y Ξ respectivaly, so that $\Theta^T = \{\rho : T \rightarrow \Theta\}, \Xi^T = \{\xi : T \rightarrow \Xi\}$ and two sets $Z \subset \Theta^T, Y \subset \Xi^T$, where Z is the Initial Structural Base space and Y the Later Structural Base space respectively and the Dogmatic System is $H \subset ZXY$. Let $H \subset \Theta^T X \Xi^T$ be a Dogmatic System. Two classes of restrictions can be established:

a) *Restriction of f to* $Z(f'= f|Z)$: Let $H \subset \Theta^T X \Xi^T$ being $\Theta^{[t_0, t_w]} \subset \Theta^T$ so that $\Theta^{[t_0, t_w]} = \{\rho' : [t_0, t_w] \rightarrow \Theta\}$ an we consider $Z[t_0, t_n] \subset \Theta^{[t_0, t_w]}$. Let $X[t_0, t_n]$ be the set $x[t_0, t_n] \in H$ so that $img_1(x[t_0, t_n]) \in Z[t_0, t_n]$ being $img_1(z[t_0, t_n])$ the first DS-image, then $X[t_0, t_n] \subset Z[t_o, t_n] X \Xi^T$ and $\forall z[t_0, t_n] \in Z[t_0, t_n]$ it exists one and only one $z[t_0, t_n] \in X[t_0, t]$ so that $imag_1(x[t_0, t_n]) = z[t_0, t_n]$ and it is $x[t_0, t_n] = (z[t_0, t_n], f(z[t_0, t_n]))$ being $f(z[t_0, t_n])$ a function. Function f' de $Z[t_0, t_n]$ in Ξ^T so that $f'(z[t_0, t_n]) = f(z[t_0, t_n]), \forall z[t_0, t_n] \in Z[t_0, t_n]$.

Note 7.4: *It supposes a Dogmatic System with limited time of IDS-images and infinity SB-projections time.*

b) Restriction of g to $Y(g'= g|Y)$: Let $H \subset \Theta^T X \Xi^T$ being $\Xi^{[t_0, t_w]} \subset \Xi^T$ so that $\Xi^{[t_0, t_w]} = \{\xi : [t_0, t_w] \rightarrow \Xi\}$, we consider $Y[t_n, t_w] \subset \Xi^{[t_o, t_w]}$. Let $X'[t_m, t_w]$ be the set $x'[t_m, t_w] \in H$ so that $pr_1(x'[t_m, t_w]) \in Y[t_m, t_w]$ being $pr_1(x'[t_m, t_w])$ the first SB-

projection, then $X'[t_m, t_w] \subset \Theta^T X \Xi^{[t_0, t_w]}$ and $\forall z[t_0, t_n] \in Z[t_0, t_n]$ exists one and onlu one $y[t_m, t_w] \in X'[t_m, t_w]$ so that m and it is $x'[t_m, t_w] = (y[t_m, t_w], g(y[t_n, t_w]))$ being $g(y[t_m, t_w])$ a function. Functin g' of $Y[t_m, t_w]$ in Θ^T so that $g'(y[t_m, t_w]) = g(y[t_m, t_w]), \forall y[t_m, t_w] \in Y[t_m, t_w]$.

Note 7.5: *It supposes a Dogmatic System with infinitely time of IDS-images and limited SB-projections time.*

Definition 7.26: A ideological process *is a temporary sequence of all the abstract or concretes structures of a Dogmatic System.*

IDS-images and SB-projections csan be related by the following function:

$$\rho : Z[t_0, t_n] X S[t_n, t_m] \rightarrow Y[t_m, t_w]$$

satisfying the following:

$$(z[t_0, t_n], y[t_m, t_w]) \in H[t_0, t_w] \Rightarrow \left(\exists s[t_n, t_m] \in S[t_n, t_m] \quad so \quad that \quad y[t_m, t_w] = \rho(z[t_0, t_n], s[t_n, t_m]) \right)$$

To this function ρ will be called *ideological response process.*

Definition 7.27: *Given any Dogmatic System* H, *a* family of ideological response processes *is defined of the following way:*

$$P = \{ \rho | \rho : Z[t_0, t_n] X S[t_n, t_m] \rightarrow Y[t_m, t_w] \}$$

Let us suppose that a Dogmatic System H could generate more of an ideological response process, corresponding to a certain IDS-image. It would only be possible, if H had some notice about its future.

Definition 7.28: *We define as* function of state transition *the following function:*

$$\phi : Z[t_0, t_n] X S[t_n, t_l] \rightarrow S[t_l, t_m]$$

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This function is *a process of ideological transition.* The ideological transition of state can be conservative or rupture, depending on the type of IDS-images received by the Dogmatic System and their energy of rupture. If the process is of rupture, we will have a *Millenarian process.* Radical social change in Initial Structural Base involving the warted goals and the destruction of a group's favorable view of its place in the world, and over which group is in no realistic position to exercie control, is often accompanied by millenarian process and a new millenarian ideology. These beliefs spell out a denouement in which current evils are cataclysmically destroyed, followed by a static condition in which traditional values (residual ideologies) are reaffirmed. The believer's lige condition is converted from hopeless misery and confusion to certainty and the necessity to hold on only until the imminent cataclysm: *End of World.* IDS-images corresponding to social changes situations involving some disruptions of an established existence and throw whole categories of persons into new and undefined circumstances. There are trhee situations in Initial Structural Base:

1) Changes in social situations may rule out the possibility of continuing the traditional way of life: Demographic changes, war, invasions, conquest, urbanization, and technological change.

2) People may be caught between two apparently contradictory ways of life. The man parcitipates in two incompatibles ideologies but is at home in neither. The Low Roman Empire with the introduction of the Christianity and the displacement of the pagan religions is an historical example.

3) Rising expectations produced by eonomical and/or legal changes may not be met by rapidly rising rewards.

Millenarianism is not only option in the Middle Ages. Nor does it mean that what is rewarding is always that which has an optimistic projected outcome.

Definition 7.29: *Given any Dogmatic System* H*, it can form a family of ideological transition processes so that:*

$$\Phi = \left\{ \phi \mid \phi : Z[t_0, t_n] X S[t_n, t_l] \rightarrow S[t_l, t_m] \right\}$$

Definition 7.30: *We will call* internal process of ideological transition *to all function*

$$\varphi : S[t_n, t_l] x S[t_l, t_p] \rightarrow S[t_p, t_m]$$

To this function φ will be called *ideological transition internal process.*

By such arguments that previously exposed, ideological transition internal process will be conservative or millenarian processes.

Definition 7.31: *Given any Dogmatic System* H, *it can form a family of ideological transition internal processes so that:*

$$\Theta = \left\{ \varphi \middle| \varphi : S[t_n, t_l] x S[t_l, t_p] \rightarrow S[t_p, t_m] \right\}$$

Definition 7.32: *We will call* internal process of ideological response *to all function*

$$\mu : S[t_l, t_p] x S[t_p, t_m] \rightarrow Y[t_m, t_w]$$

To this function μ will be called *internal process of ideological response.*

Definition 7.33: *Given any Dogmatic System* H, *it can form a family of internal processes ideological response so that:*

$$M = \left\{ \mu \middle| \mu : S[t_l, t_p] x S[t_p, t_m] \rightarrow Y[t_m, t_w] \right\}$$

Definition 7.34: *We define* Π *how* ideological processes space of a Dogmatic System H *to the set of families of ideological processes* P, Φ, Θ, M *and we denoted the following way:* $\Pi = \{ P, \Phi, \Theta, M \}$ *and so that*:

$$
\begin{array}{ccc}
Z[t_0, t_w] x S[t_0, t_w] & \overset{P}{\rightarrow} & Y[t_0, t_w] \\
\downarrow {\scriptstyle \Phi} & & \uparrow {\scriptstyle M} \\
S[t_0, t_w] & \overset{\Theta}{\leftarrow} & S[t_0, t_w] x S[t_0, t_w]
\end{array}
$$

For a historical time interval $[t_0, t_w]$.

Definition 7.35: *We define the* ideological internal proceses space and we denoted, Π^* *to subspace* $\Pi^* = \{\Theta, M\}$

Dogmatic System H will be *ideologically open* or *tolerant* when it has P, Φ, Θ, M and will be *ideologically closed or fundamentalist* whwn it has Π^*. It will be *semiopened* when it has Φ or M.

7.4. FUNCTIONS OF IDEOLOGICAL TRANSFORMATION

Dogmatic System H simultaneously generates (*ideological genon*) a potential social environment that it influences, and defines or verifies (*ideological creaon*) some portion of an absolute social environment. Last social environment perceived along with Dogmatic System H includes a consistent coevolucionary pair.

Ideological transformation has a sense ampler than usually used by sociologists. It means the processes of interaction of IDS-images on the Dogmatic System (in its impure level or associations and its abstract level or it makes specific ideology) and its IDS-projections in form of action on social environment, as much at impure level as abstract. These processes of transformation can be conservative or with ideological exchange (in the classic sense of ideological transformation). In first approach, we will not distinguish between one and others.

Let H be a Dogmatic System. Functions of ideological transformation can be recognized:

Ideological transformation IDS-image-Ideological Creaon: Let f be a function of ideological transformation. Function of ideological transformation IDS-image-ideological creaon is:

$$f_{HI'C} : H'[t_0, t_n] \rightarrow IC[t_0, t_m] \quad with \quad f_{H'IC}(z[t_0, t_n]) = f(z[t_0, t_n]), \forall z[t_0, t_n] \in H'[t_0, t_n]$$

***Ideological transformation Ideological Creaon-Ideological Genon*:** Let g be a function of internal ideological transition. Function of ideological transformation Ideological Creaon-Ideological Genon is:

$$g_{ICIG} : IC[t_0, t_n] \rightarrow IG[t_m, t_w] \quad with \quad g_{ICIG}(s[t_n, t_m]) = g(s[t_n, t_m]), \forall s[t_n, t_m] \in IC[t_0, t_m]$$

***Ideological transformation Ideological Genon-SB-projection*:** Let h be an internal ideological response function. Function of ideological transformation Ideological Genon-SB-projection is:

$$h_{IGH''} : IG[t_n, t_w] \rightarrow H''[t_m, t_w] \quad with \quad h_{IGH''}(s[t_n, t_m]) = h(s[t_n, t_m]), \forall s[t_n, t_m] \in IG[t_n, t_w]$$

Variables (as much impure as abstract) belonging to $IC[t_0, t_n] \bigcap IG[t_n, t_w] = H[t_n, t_m]$ they are considered how *internal variable* of the Dogmatic System.

1) Let $z[t_0, t_n]$ be a DS-image $z[t_0, t_n] \in H'[t_0, t_n]$. All impure or abstract variable influenced by $z[t_0, t_n]$ will be in the image set $IC[t_0, t_m]$ of the function of ideological transformation IDS-image-Ideological Creaon.

2) Let $s[t_n, t_m]$ an impure or abstract internal variable $s[t_n, t_m] \in IC[t_0, t_m]$ All impure or abstract variables influenced by $s[t_n, t_m]$ will be in the image set $IG[t_n, t_w]$ of the function of ideological transformation Ideological Creaon-Ideological Genon.

3) Let $s'[t_n, t_m]$ be an impure or abstract internal variable $s'[t_n, t_m] \in IG[t_n, t_w]$. All impure or abstract variables influenced by $s'[t_n, t_m]$ will be in the image set $H''[t_m, t_w]$ of the function ideological transformation Ideological Genon-SB-projection.

Definition 7.36: *A Dogmatic System* function structure-function *F may be defined the following way:*

$$F(\alpha[t_0,t_w]) = \begin{cases} f_{H'IC} \Big| H'(\alpha[t_0,t_n]) & if \quad \alpha[t_0,t_n] \quad is \quad a \quad DS-image \\ g_{ICIG} \Big| C(\alpha[t_n,t_m]) & if \quad \alpha[t_n,t_m] \quad is \quad an \quad int\,ernal \quad var\,iable \\ h_{IGH''} \Big| G(\alpha[t_m,t_w]) & if \quad \alpha[t_m,t_w] \quad is \quad a \quad SB-projection \end{cases}$$

Definition 7.37: *A Dogmatic System* function IDS-image-SB-projection $f_{sr} : H'[t_0,t_n] \rightarrow H''[t_m,t_w]$ *can be defined the following way:*

$$f_{sr}(z[t_0,t_n]) = \bigcup_{\rho\in\Pi}\left[\bigcup_{s\in H}\rho(z[t_0,t_n], s[t_n,t_m])\right]; \forall z[t_0,t_n]\in H'[t_0,t_n], \; (z[t_0,t_n], s[t_n,t_m])\in Dom \quad \rho$$

Let Π be the ideological processes space.

Definition 7.38: *Given an ideological process $\rho \in \Pi$, the* ideological transformation IDS-image-SB-projection associated with the ideological process $\rho \in \Pi$ *is the function* $f_\rho : H'[t_0,t_n] \rightarrow H''[t_m,t_w]$ *can be defined the following way:*

$$f_\rho(z[t_0,t_n]) = \rho(z[t_0,t_n], s[t_n,t_m]) \quad with \quad \rho \in \Pi,$$

$$s[t_n,t_m]\in H[t_0,t_w]\wedge(z[t_0,t_n], s[t_n,t_m])\in Dom \quad \rho$$

Therefore, *both social environments, **H'** and **H''**, may be identified explicitly and be considered how a causal reticulum of SB-environs stimulus and reponse respectively within a Dogmatic System,* with the consequences that emerge from the three specific propositions formulated by Patten (1978), Patten et al. (1976) for the ecosystems:

First Patten's proposition: *The Dogmatic System H has the prerogative to define its social environment.*

Second Patten's proposition: *Social environment has the prerogative of the accomplishment of the internal structure and the function of the Dogmatic System H.*

Mathematical proofs of these propositions can be seen in Patten (1978) and Patten et al. (1976).

Theorem 7.1: *The function structure-function and the function IDS-image-SB-projection associated with an ideological process are related the following way:*

$$f_{sr}\left(z[t_0,t_n]\right)=\bigcup_{\rho\in\Pi}f_\rho\left(z[t_0,t_n]\right).$$

Proof:

Let

$$x\in f_{sr}\left(z[t_0,t_n]\right),\quad z[t_0,t_n]\in H'[t_0,t_n]$$

$$x\in f_{sr}\left(z[t_0,t_n]\right)\Rightarrow x\in\bigcup_{\rho\in\Pi}\left[\bigcup_{s\in H}\rho(z[t_0,t_n],s[t_n,t_m])\right]\Rightarrow\exists\rho_i\in\Pi;$$

$$x\in\bigcup_{s\in H}\rho_i\left(z[t_0,t_n],s_i[t_n,t_m]\right)\Rightarrow x\in f_{\rho_i}\left(z[t_0,t_n]\right)\Rightarrow x\in\bigcup_{\rho\in\Pi}f_\rho\left(z[t_0,t_n]\right)$$

Inversely:

$$x\in\left(\bigcup_{\rho\in\Pi}f_\rho(z[t_0,t_n])\right)\Rightarrow x\in f_{\rho_j}\left(z[t_0,t_n]\right)=\rho_j(z[t_0,t_n],s[t_n,t_m])\subset\bigcup_{s\in H}\rho_j(z[t_0,t_n],s[t_n,t_m])\subset$$

$$\bigcup_{\rho_j}\left[\bigcup_{s\in H}\rho_j(z[t_0,t_n])\right]=f_{sr}\left(z[t_0,t_n]\right).$$

The structure IDS-images-SB-projections of dogmatic system H, that is to say, the ideological processes of interaction of the IDS-images and the internal variables (states) with these and the SN-projections of behavior and action, perfectly determine the structure and the function of a Dogmatic System H, knowing the different ideological processes from their structure-function set.

Theorem 7.2: *Theorem 7.1 includes the two firsts Patten's propositions.*

Proof:

1) If a Dogmatic System H is the concept of an abstract and concrete entity formed by states and ideological processes, and the process stimulus and responses processes comprise of the social environments **H'** and **H''**, respectively, to define social environments estimates defining the Dogmatic System H how it determines the first proposition.

2) Simultaneously, the structure-function of the Dogmatic System H is determined by the interaction between the stimulus ideological processes and the internal ideological processes of response, which constitute their two respective social environments. Therefore, the structure-function of the Dogmatic System H is the one of the social environment so how it indicates the second proposition.

Third Patten's proposition: *The internal units Dogmatic System/social environment of Patten's Propositions 1 and 2 form a division in the level of organization of the total system.*

Let $H_i; i = 1,...,n$ be a component subsystem of Dogmatic System H with n components with the two social environments **H'** and **H''** in its suprasystemic level. The internal social environment stimulus of H_i will be H_i' and its corresponding social environment response will be H_i''. Units (ideological creaon/H_i') y (ideological genon/H_i'') can be considered how entities: SB-environs stimulus and response respectively (within the units of the Dogmatic System/social environment) and they will be denoted as $E_i', E_i''; i = 1,...,n$. Here, which is by hand means within the borders of the defined system. Patten's proposition 3 can be defined in term of these units: SB-environs stimulus is not superposed $E_i' \cap E_j' = \varnothing; i.j = 1,...,n$ being $\varnothing$ the empty set. SB-environs response they are not superposed either $E_i'' \cap E_j'' = \varnothing; i.j = 1,...,n$.

Definition 7.39: *Dogmatic system H is the union of the stimulus and response SB-environs* $H = \bigcup_{i=1}^{n} E_i' = \bigcup_{i=1}^{n} E_i''$

7.5. PROBABILISTIC IDEOLOGICAL FUNCTIONS

In the original Theory of Social Environment, the character of the social environments **H'** and **H''** how determinist or probabilistic has not been defined. Nevertheless, certain characteristics of both social environments can make think about their random character and also be considered how probabilistic spaces.

Example 7.1: We can mention an historical example to reinforce our hypothesis. Crucial –and well known- it is the implantation of the Christianity in Late Roman Empire, fact that supposes a radical and definitive exchange in history and culture West world, and its consequence in the historical development of the humanity. The triumph of the emperor Constantine I the Great on his rival Maxentius in the battle of the Milvius Bridge is considered a historical fact of great importance, because it makes possible that Constantine takes the absolute power on a divided empire. In this battle Maxentius organized his forces—still twice the size of Constantine's—in long lines facing the battle plain, with their backs to the river. When Constantine's army made its appearance, some of its soldiers bore unusual markings on their shields: instead of the traditional pagan standards, a new sign, the *labarum*, was mounted. According to Eusebius describes that Constantine marching at midday, "*he saw with his own eyes in the heavens a trophy of the cross arising from the light of the sun, carrying the message, Conquer By This*". During the following night, in a dream, Christ appeared with the heavenly sign and told him to make standards for his army in that form. Eusebius describes the sign as Chi (X) traversed by Rho (P). The Eusebian description of the vision has been explained as an example of the meteorological phenomenon known as the *solar halo* which can produce similar effects. Constantine deployed his own forces along the whole length of Maxentius' line. He ordered his cavalry to charge, and they broke Maxentius' cavalry. He then sent his infantry against Maxentius' infantry, pushing many into the Tiber where they were slaughtered and drowned. The battle was brief. Maxentius' troops were broken before the first charge. The meteorological phenomenon of the solar halo (denotative significance) can be considered random but it is interpreted

(connotative significance) like a divine signal that it lead to the legions of Constantine to the victory.

<div align="center">***</div>

Example 7.2: It would be possible to be objected that fortuitous interactions as the appearance of a solar halo or the explosion of Santorín volcano that destroyed of an only blow to the flourishing Crete's civilization, come from the physical environment but, is not random events coming from social environment the birth of militar or political leaders, prophets, conductors of masses and modifiers of civilizations, such as Buddha, Jesus de Nazareth, Mohammed, Luther, Lenin or Hitler? As it says Lloyd Billingsly (1986):

> *The true fanatic is a theocrat, someone who sees himself as acting on behalf of some super-personal force: the Race, the Party, History, the Proletariat, the Poor, and so on. These absolve him from evil; hence, he may safely do anything in their service.*

<div align="center">***</div>

It is in base of these ideas the supposition the existence of the probabilistic spaces **H'**, S and **H''** (stimulus, state and response respectively) how probabilístic spaces, which is to say, that in them all the stimuli, states and possible responses exist, but not with same probability.

Let **H'**, S and **H''** be three probabilístic spaces referred how stimulus, state and response respectively, and let A_i', A_i^s, A_i'' be three collections of sets belonging to **H'**, S and **H''** respectively. We suppose x, s_t and y_t three ideological behaviors that take their possible values from H', S and H'' respectively. The hypothesis that appears here is a generalization of the theory of Dempster-Shafer (Dempster, 1967) based on the concept of a multivalue application and that describes the relation of compatibility between two spaces of probability.

7.5.1. Probabilistic Ideological Creaon function

A body of stimuli (IDS-images) of the space of states S is constituted by:

1) A set of ideological processes that they associate the value of two ideological behaviors of the following form: *if* $x = h_i'$ *then* s_t *is* A_i^s.

2) A probability distribution of the stimulus space **H'**.

A body of stimuli (IDS-images) of the space of stimuli **H'** is constituted by:

1) A set of ideological processes that they associate the value of two ideological behaviors of the following form: *if* $s_t = h_i$ *then* x *is* A_i'.

2) A probability distribution of the space of states S.

A multivalue application from a probabilistic space **H'** to probabilistic space S, it associates each element in H' with a set of elements in S, is to say $c_D^r : H' \to 2^S$

The image of an element h' in S under the application is denoted like the *kernel* of h', K(h').

Definition 7.40: *An element* $h' \in H'$ *one says that* it is compatible *with an element* $h \in S$, *if it is possible that h' be a stimulus (IDS-image) of* **H'** *and h be a response (SB-projection) of S in the same time interval* $[t_0, t_w]$.

Alternatively, the multivalue application can be considered like a relation of compatibility between its elements

$$K(h') = \left\{ h \middle| h \in H'', h' \;\; compatible \;\; with \;\; h \, / (h', h) \in r_t \right\}$$

Given to a probability distribution of the space **H'** and a relation of compatibility between **H'** and S, it is induced an assignment of basic probability (bpa) of space S, denoted by $m : 2^S \to [0,1]$

$$m(A^s) = \frac{\displaystyle\sum_{K(h_i')=A^s} p(h_i')}{1 - \displaystyle\sum_{K(h_i')=\varnothing} p(h_i')}$$

Definition 7.41: *To the subsets H' y S with basic probabilities nonequal to zero, they are called* focal elements to ideological creaon (icfe).

Let A^s be a subset of S and let A' be a subset of **H'**. The assignment of the basic probability m determines two functions, similar to the belief and plausibility functions, that they measure the minimum and maximum degree of fulfillment of an ideological process of stimulus-state. These functions are the following ones:

$$min \Pr(A^s) = \sum_{A' \subseteq A^s} m(A')$$

$$max \Pr(A^s) = \sum_{A' \cap A^s \neq \varnothing} m(A')$$

If m_1, m_2 are two assignments of basic probability induced by two independent sources of stimulus, they are possible to be combined using the Dempster's theorem for the stimulus-state processes of the following way:

$$m_1 \oplus m_2(C) = \frac{\displaystyle\sum_{A_i' \cap A_j' = C} m_1(A_i') m_2(A_j')}{1 - \displaystyle\sum_{A_i' \cap A_j' = \varnothing} m_1(A_i') m_2(A_j')}$$

7.5.2.Probabilistic Ideological Genon function

A body of responses (SB-projections) for the space response **H''** is constituted by:

1) A set of processes that associate the value of two ideological behaviors in the form *if $s_t = h_i$ then y_t is A_i''*.

2) A probability distribution of the space of state S.

A body of responses for the space of state S is constituted by:

1) A set of processes that associate the value of two ideological behaviors in the form $if \quad y_t = h_i''$ then s_t is A_i^s.

2) A probability distribution of the space response **H''**.

A multivalue application from a probabilistic space S to probabilistic space H'', it associates each element in S with a set of elements in **H''**, is to say $g_D^r : S \rightarrow 2^{H''}$

The image of an element h' in S under the application is denoted like the *kernel* de h', K(h').

Definition 7.42: *An element* $h \in S$ *one says that* it is compatible *with an element* $h'' \in H''$, *if it is possible that h' be a stimulus (IDS-image) to S and h be a response (SB-projection) to **H''** in the same time interval* $[t_0, t_w]$.

Alternatively, the multivalue application can be considered like a relation of compatibility between its elements

$$K(h) = \left\{ h'' \middle| h'' \in H'', h \quad compatible \quad with \quad h''/(h, h'') \in r_t \right\}$$

Given to a probability distribution of the space S and a relation of compatibility between S and **H''**, it is induced an assignment of basic probability (bpa) of space **H''**, denoted by $m': 2^{H''} \rightarrow [0,1]$

$$m'(A'') = \frac{\sum_{K(h_i)=A''} p(h_i)}{1 - \sum_{K(h_i)=\varnothing} p(h_i)}$$

Definition 7.43: *To the subsets S and **H''** with basic probabilities nonequal to zero, they are called* focal elements to ideological genon (igfe).

Let A'' be a subset of **H''** and let A^s be a subset of S. The assignment of the basic probability m determines two functions, similar to the belief and plausibility functions, that they measure the minimum and maximum degree of fulfillment of an ideological process of state-response. These functions are the following ones:

$$min \Pr(A'') = \sum_{A^s \subseteq A''} m(A^s)$$

$$max \Pr(A'') = \sum_{A^s \cap A'' \neq \varnothing} m(A^s)$$

If m_3, m_4 are two assignments of basic probability induced by two independent sources of stimulus, they are possible to be combined using the Dempster's theorem for the state –response processes of the following way:

$$m_3 \oplus m_4(C) = \frac{\sum_{A_i^s \cap A_j^s = C} m_3(A_i^s) m_4(A_j^s)}{1 - \sum_{A_s^s \cap A_j^s = \varnothing} m_3(A_i^s) m_4(A_j^s)}$$

8. VALIDATION OF BELIEFS SYSTEMS

8.1. VALIDATION OF BELIEF SYSTEMS AND IDEOLOGIES

In according to Gordon Bjork (1986): *An ideology is a belief system which explains the nature of the world and man's place in it. It explains the nature of man and the derivative relationships of humans to one another.*

Ideologies face two critical problems in the reality, *the problem of commitment* and *the problem of validation*.

Ideologies persist because they and/or the social vehicle that carry them are able to generate and maintain commitment. For commitment to be mantained, however, an ideology must also, independently, seem to valid. Commitment and validation are two separate phenomena, in spite of the near universal myth that the human is committed because his beliefs are valid. Ideologies not only seem external and valid but also worth whatever discomforts believing entails. Humans often take the trouble to validate their beliefs because they are committed to them. An ideology with high utility limits available altenative ideology by excluding them, and limitation of alternatives increases the utility of whatever one has left. Utility for a group is not always identical to individual utility that motivates group reinforcement. Insofar as humans must collaborate to attain specific goals, they must compromise with collective utilities. Groups retain or change ideologies accrding to the history of reinforcement.

By virtue of its structure (within the Doxical Superstructure DS), an ideology may be able to fend off negative evidence in a given stimuli social environment H' but experience difficulty as social conditions (within Structural Base SB) change. Ideologies may responding to a changing social environment not only with adjustments in the social vehicles that carry them (*Social States*), but also with changes in the ideological logic (*Semiotic States*). Consider the possibilities that are open when an ideology is challenged by stimuli:

1) The ideology may be discarded, or at least the level commitment reduced.
2) The ideology may be affirmed in the very teeth of stimuli (*the triumph of faith*).

3) The believers may deny that the stimuli (*events*) were relevant to the ideology, or that the substantive belief that was changelled was importantly related to the rest of ideology.

The validation of belief is a largely social process. The social power of ideology depends on its external quality. Ideologies seem, to believers, to transcend the social groups that carry them, to have an independent existence of their own (Durkheim, 1965; Berger and Luckmann, 1968). For ideologies to persist must not only motivate commitment through collective utility but also through making the ideology itself seem to be valid in its own right. Perceived consensus is a necessary but not sufficient condition for the social power of ideologies. Therefore ideological validation is not simple a matter of organizonatonal devices for the maintenance of believer commitment, but also of the social arrangements wherebery the abstact system of ideology is accorded validity in terms of its own criteria. The appropiate criteria for determining validity or invalidity are socially defined. Logic and proofs are just as much social products as the ideologies they validate.

Cyclical principle of validation: *An idea is valid if it objectively passes the criterion of validity itself.*

Conditions of validation are the following:

1) *Social condition*: Criterion of validity is chosen consensually and it is applied through a series of social conventions (Berger and Luckmann, 1968).

2) *First nonsocial condition*: Ideology has a logic of its own, which may not lead where powerful members of the social group wantit to.

3) *Second nonsocial condition*: The pressure of events (physical or semiotic stimuli coming from the stimulus social environment H') that may be pressure on believers to relinquish an ideology. For an ideology to survive the pressure of events with enough member commitment to make it powerful it must receive validation beyond the level of more consensus.

Note 8.1: *The pressure of the events is translated in form denotative significances like DS-images on the component subjects of the Dogmatic System of the set of believers belonging to Structural Base.*

Main Principle of validation: *The power of an ideology depends on its ability to validate itself in the face of reason for doubt.*

Definition 8.1: *We define as* internal evidence of an ideology *(IE) the data which derive from the ideology itself or from a social group or organization to which is attached.*

For highly systematic belief system (an ideology), any attack upon any of its principles is an attack upon the system itself. Then:

1) If one of the basic propositions (substantive beliefs) of an ideology is brought under attack, then so the entire ideology. In consequence, an ideology is at the mercy of its weakest elements.

2) An ideology has powerful conceptual properties, but those very properties highlight the smallest disagreement and give it importance in its logical connections with other items of ideology.

3) Even if an ideology is entirely nonempirical, it is vulnerable because even one shaken belief can lead to the loss of commitment to the entire ideological structure.

4) An ideology as the religious ideologies, with relatively little reference to the empirical world cannot be much affected by external empirical relevance, simply because the events do not bear upon it. The essential substantive belief in the mercy of God can scarcely be challenged by the continued wretchedness of life.

5) Nevertheless, concrete ideologies are directely subject to both internal and external evidence.

6) The abstract ideology is protected from external evidence by its very nature. A cult undedr fire may be able to preserve its ideology only by retreating to abstraction. Negative external evidence may motivate system-building at the level of the abstract ideology, where internal evidence is far more important.

7) The separibility of the abstract ideology from its concrete expression depends on the ability of believers no affiliated with the association (cult and/or concern) that carried it socially to understand and use it, that is to say, subjects belonging to the Structural Base.

8) If the validation of an ideology comes from empirical events and the ability to systematically relate propositions according to an internally consistent logic, it can be reconstructed and perpetued by any social group with only a few hints.

9) The adaptation of an ideology is some sort of compromise between the need of *consensual validation* and the need for independence from the associations that carries it.

Definition 8.2: Consensual validation *is the confirmation of reality by comparison of one's own perceptions and concerns with those of others, including the recognition and modification of distortions.*

Consensual validation, describes the process by which human being realize that others share their perceptions of the world. This bolsters their self-confidence since the confirmation of their observations normalizes their experience. Consensual validation also applies to our meanings and definitions. Arriving at a consensus of what things mean facilitates communication and understanding. When we all agree what something is, the definition of that something has integrity. Reality is a matter of consensual validation (Ghiselin, 1952; Needleman, 1970). Our exact internal interpretations of all objects may differ somewhat, but we agree on the generic class enough to communicate meaningfully with each other. Phantasy can be, and often is, as real as the "*real world*." Reality is distorted by strong, conflicted needs. People seek affiliations with groups that enable them to maintain an ideal balance between the desires to fit in and stand out. These motives operate in dialectical opposition to each other, such that meeting one signal a deficit in the other and instigate increased efforts to reduce this deficit. Thus, whereas feelings of belonging instigate attempts to individuate oneself, feelings of uniqueness instigate attempts to re-embed oneself in the collective. The physicalistic accretion to this rule of consensual validation is that, physical data being the only "real" data, internal phenomena must be reduced to physiological or behavioral data to become reliable or they will be ignored entirely. Public observation, then, always refers to a

limited, specially trained public. It is only by basic agreement among those specially trained people that data become accepted as a foundation for the development of a science. That laymen cannot replicate the observations is of little relevance. What is so deceptive about the state of mind of the members of a society is the "consensual validation" of their concepts. It is naively assumed that the fact that the majority of people share certain ideas and feelings proves the validity of these ideas and feelings. Nothing is further from the truth.

Note 8.2: *Consensual validation as such has no bearing whatsoever on human reason.*

Just as there is a "*folie a deux*" there is a "*folie a millions.*" The fact that millions of people share the same vices does not make these vices virtues and the fact that they share so many errors does not make the errors to be truths (Fromm, 2002). On the other hand, when the ideology is identified with the community (or with a consensus), and this community, as well, it is not truely identified with a true socio-political institution based on the land (nation), but with a transcendental principle, personified in the norms of a church, sect or another type of messianic organization, its effects on the secular political body, within as it prospers but with which it is not identified, they are inevitable and predictable destructive. The process of consensual validation, then ties the content of ideological beliefs to the social order (existing in the Structural Base) itself. It is established a feedback process:

1) If the social order remains, then the ideological beliefs must somehow be valid, regardless of the pressure of the events.
2) If all agrees upon the ideological beliefs, then the social order is safe.

Commitment of believers is the resultant of two opposite forces.

1) Social support (associations and nonmilitant people), which maintains ideology.
2) Problems posed by pressure of events, which threaten ideology.

When ideology is shaken, further evidence of consensus is required. This can provided by social rituals of various sorts, which may have any manifest content, but which act to convey the additional messages (Borhek and Curtis, 1983). Each member of a believer group, in publicly himself through ritual is rewarded by the public commitment of the others. Patriotic ceremonies, political meetings, manifestations by the streets of the

cities, transfers and public religious ceremonies are classic examples of this. Such ceremonies typically involve a formal restatement of the ideal ideology in speeches, as well as rituals that give opportunities for individual reaffirmation of commitment. For Durkheim (1965) ideological behavior could be rendered sociologically intelligible by assuming an identity between societies and the object of worship. The ideal of all totalitarian ideology is the total identity between the civil society and the ideological thought, that is to say, the establishment of the unique thought without fissures. Thus consensual validation and validation according to abstract ideal (Ideal Mythical Superstructure) are indistinguishable in the extreme case. If a certain ideology has a sole raison d'être affirmation of group membership (fundamentalist ideologies), no amount of logical or empirical proof is even relevant to validation, though proofs may in fact be emphasized as part of the ritual of group life.

We have the following examples of consensual validation in actual ideologies:

1) F*alse patriotism* is the belief that whatever government says goes.

2) *Neoconservatism* is the belief that the *status quo* should be maintained.

3) *Radical Progressism* is the belief that the social reality can change undermining the foundations of a millenarian culture.

4) *Shallow utilitarianism* is whatever the majority says goes, and since the majority, that's what shallow utilitarians believe in. This is often called *groupthink*. Erich Fromm (2002) called it "*the pathology of normalcy*" and claimed it was brought about through consensual validation.

5) *Islamic fundamentalism.* From the perspective of the Islamists, his Islamic behavior makes him a moral person. Living the dictates of Islam makes him "*good.*" He does well, and he is good. His ethical beliefs and actions find consensual validation and continuous reinforcement in any and every geographical area of the *umma*. He no longer doubts, no longer even wonders. In a crude sense, he knows who he is, where he belongs, and what his purpose in life is. He knows never to doubt. His is not to reason why. Besides, he has lost the will, if not the capacity. By Islamic standards, the most virulent jihad is good. Jihadism is the ethical life of Islam. The Islamist embraces it right down to the last mitochondrion in the last cell of his body. He could not give up Islam even if he wanted, and he never commits the perditious sin of wanting.

8.2. LOGICAL APPROACH TO VALIDATION

For a logical approach to the validation of belief systems (ideology), we will use the Neutrosophic logic [Gershenson. C (2001); Liu, F. (2001[a,b]); F. Smarandache, (1999, 2003); F. Smarandache, J. Dezert, A. Buller, M. Khoshnevisan, S. Bhattacharya, S. Singh, F. Liu, Gh. C. Dinulescu-Campina, C. Lucas, C. Gershenson, (2001); Haibin Wang, Praveen Madiraju, Yanqing Zhang, Rajshekhar Sunderraman, (2005)]

Let IDSi be a IDS-image originating of stimulus environment (Initial Structural Base) affecting the Dogmatic System. Let L be a set of DS-images.

Definition 8.3: *We define as a* true IDS-image that *IDS-image which is permitted syntactically and semantically and which external evidence provides with a degree of veracity in its existence.*

Considering the neutrosophic principles we shall establish the following Axioms:

Axiom 8.1: *Any IDS-image IDSi is provided with a neutrosophic veracity $\wp$, element of a neutrosophic set $E =] ^-0, 1^+ [^3$. non enumerable and stable for multiplication.*

Axiom 8.2: *Any IDS-image IDSi is provided with a neutrosophic veritative value $v \in]^-0,1^+[^3$ such that $v = V(\wp)=V((T, I, F))$, V reciprocal application of E in $]^-0,1^+[^3$ and which possesses the following properties:*

1) *$V(0) = ^-0.$*

2) *$V(\wp_1, \wp_2) = V(\wp_1). V(\wp_2).$*

If $T = 1^+$ it will designate absolute truth and if $T= ^-0 \equiv F = 1^+$ it will designate the absolute falseness of the IDS-image. If complementariness is designated by M, the principle of complementariness between two IDs-images: IDSi and $IDS\widehat{i}$, it exists iff

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$(\wp_1 + \wp_2) \in \left]^-0,1^+\right[^3$. When $\wp_1 \neq 0$ y $\wp_2 \neq 0$, such that v $(\wp_i^k$ M $IDSi_{kj}) = 0$, it is necessary that $\wp_1 + \wp_2 = {}^-0$, as the sum of veracities does not admit opposing elements.

Axiom 8.3: *If $\neg IDSi$ designates the non-IDS-image $IDSi$, with the neutrosophic veracity $\neg\wp$, we will have to $V(\wp + \neg\wp) = 1^+$.*

Axiom 8.4: $\forall IDSi \in L \: / \: v = V(\wp) = V((T, I, F)) = ((1^+, {}^-0, {}^-0))$

Definition 8.4: *We define as* absolute true IDS-image TIDSi *a IDS-image that it has* $v = V(\wp) = V((T, I, F)) = ((1^+, {}^-0, {}^-0))$

Let S be a Believer Subject. Let IDSi be a IDS-image. We denote as Δ the operator *a priori and the equivalence operator as* $\equiv$. We shall designate as $(\Delta \equiv)$ the *equivalence a priori* operator and as $(\Box\equiv)$ the necessarily *equivalent operator*. We shall designate as V the *true being* operator and as $\Box$V the necessarily *true* operator. We designate as F the *false being* operator. We shall designate the *equivalent a posteriori* operator as $\nabla\equiv$. We may establish the following Theorems:

Theorem 8.1: *Each absolute true IDS-image IDSi considered by S is equivalent a priori to a necessary IDs-image* $*IDSi$*, that is,* $\forall IDSi \exists *IDSi \: (IDSi(\Delta \equiv) \Box *IDSi).$

Proof:

We shall consider the neutrosophic veritative value $v \in \left]^-0,1^+\right[^3$ of a specific IDS-image IDSi which shall be $T = 1^+$ if it is true and $T = {}^-0 \equiv F = 1^+$ if it is false. Therefore $IDSi \leftrightarrow T = 1^+$ is a priori by stipulation, and $T = 1^+$ is necessary if IDSi is true and necessarily false $F = 1^+$ if r_{ij} is false. That is $IDSi(\Delta \equiv) *\wp_i^k$ and $(\Box *IDS_i \vee \Box \neg *IDSi)$.

Theorem 8.2: *Each absolute true IDS-image IDSi considered by S is necessarily equivalent to an a priori S-image* $*IDSi$: $\forall IDSi \exists *IDSi\,(\,r_{ij}\,IDSi\,(\square \equiv)\;\Delta *IDSi\,)$.

Proof:

a) Given a true IDS-image IDSi we establish the IDS-image $^{A}IDSi$ for T = 1^{+} and such that $IDSi(\Delta \equiv)^{A}IDSi$ VIDSi $\Rightarrow \square V^{A}IDSi$. If IDSi has as neutrosophic veritative value T = 1^{+}, then $IDSi \equiv {}^{A}IDSi$ will have the same neutrosophic veritative value, therefore $IDSi(\square \equiv)\,IDSi \equiv {}^{A}IDSi$. Thus, we have demonstrated that each true IDS-image is necessarily equivalent IDS-image a priori, specifically $IDSi \equiv {}^{A}IDSi$.

b) In the case of Fr_{ij}, the existence of a IDS-image $*IDSi$ will be necessary such that $(IDSi(\square \equiv)*IDSi \wedge \Delta \neg *IDSi)$. For FIDSi $\Rightarrow F^{A}IDSi$ as $(IDSi \equiv {}^{A}IDSi)(\square \equiv)\neg IDSi$ and therefore, due to this selection of $*IDSi$ there cannot be $(IDSi\,(\square \equiv)*IDSi$. For FIDSi, $*IDSi$ is chosen, that is $\neg(IDSi \equiv {}^{A}IDSi)$. Thus, clearly there is $(IDSi\,(\square \equiv)*IDSi \wedge \Delta \neg *IDSi)$ due to the selection of $*IDSi$. Therefore, Theorem 8.2 is demonstrated.

Theorem 8.3: *Each necessary IDS-image IDSi considered by S is equivalent a posteriori to an absolute true IDS-image* $*IDSi$, *that is,* $\forall IDSi \exists *IDSi\,(\square\, IDSi(\nabla \equiv)\,*IDSi)$.

Proof:

If IDSi V $(\wp)= v = (1^{+},{}^{-}0,{}^{-}0)$ is necessary.

$\square\,IDSi \Rightarrow (\nabla \equiv)(*IDSi / v = (1^{+},{}^{-}0,{}^{-}0) \vee *IDSi / v =({}^{-}0,{}^{-}0,1^{+}))$. The second term $*r_{ij} / v =({}^{-}0,{}^{-}0,1^{+})$ implies F$*r_{ij}$ which contradicts Theorem (.1 as the IDS-image IDSi is true, being equivalent a priori to $*IDSi$ which is necessary and therefore $v = (1^{+},{}^{-}0,{}^{-}0)$.

Theorem 8.4: *Each a posteriori IDS-image IDSi considered by S is necessarily equivalent to an absolute true IDS-image* $*IDSi$: $\forall IDi \exists * IDSi \, (\nabla IDSi \, (\square \equiv) \, * IDSi)$.

Proof.

If $*IDSi$ has $v = (1^+, {}^-0, {}^-0)$ as being true, it will imply that $\left(IDSi / v = (1^+, {}^-0, {}^-0) \vee IDSi / v = ({}^-0, {}^-0, 1^+) \right)$. For $v = (1^+, {}^-0, {}^-0)$ it is obvious. For $v = ({}^-0, {}^-0, 1^+)$ it contradicts Theorem 8.2.

8.3. VALIDATION AND EMPIRICAL RELEVANCE

The following propositions are proposed:

Proposition 8.1: *The greater el ideological degree (DId, the greater of the negative evidence for the whole ideology.*

Proposition 8.2: *The less the degree of empirical relevance, the less the importance of external evidence (pressure of events) but the greater the importance of external evidence.*

Proposition 8.3: *The suprasocial form of an ideology derives most significantly from its abstract ideal form belonging to Mythical Superstructure. The current social influence of an ideology derive of its concrete form belonging to Doxical Superstructure.*

Proposition 8.4: *The more systematic and empirically relevant and ideology is, the greater the feasibility of preserving it as and abstract ideal apart from a given concrete expression.*

Proposition 8.5: *The greater the Ideological degree (DId) and the greater the degree of empiricism, the less the reliance on internal evidence and the greater the reliance of external evidence.*

Proposition (Borhek and Curtis, 1983) 8.6: *The extent of commitment to ideology varies directly with the amount of consensual validation available, and inversely with the pressure of events.*

9. SEMIOTIC VISION OF IDEOLOGIES

9.1. LANGUAGE AND WORLD VISION (WV)

Well it is known that the only form that has the human being to know the reality is the linguistic communication. By linguistic or verbal communication is understood generally the transmission of information or its restriction by mediation of images, symbols or ideas. Nevertheless, if the intention of the man is to describe total and completely the reality with words, will have to also describe the words that uses and next to describe the words that use to describe the first words, and so on. Moreover, the reality is lost in a vicious circle. In addition, the language is dualist or relational, and therefore, the meaning of any affirmation or negation is exclusively based on its own opposite one. All enunciation and definition establish borders or limits; it classifies something and, that way, always it is possible to be shown that what is within certain limits, which must coexist with is in its outside. The idea of the limitless thing even lacks meaning, without resisting it with the limited thing.

We do not defend the nonexistence of an absolute reality. We will limit ourselves to indicate that any idea applicable to the own reality does not exist, is this of the physical, social nature, etc. Reason generates illusion, never reality. Therefore, the reality is devoid of sense. Let א be the reality and ב a part thereof such that ב ⊂ א. Any proposal on the reality must be included in one of the four following categories (Wilber, 1970):

P1) ב

P2) ¬ ב

P3) ב ∧ ¬ ב

P4) Neither ב nor ¬ ב

Theorem 9.1: *Any proposition based on a certain language **L** that includes the reality contradicts to itself.*

Proof:

1) By P1 is affirmed that ב must be a being with categories of absolute, infinite and limitless. Nevertheless, an absolute and limitless being ב excludes ¬ב, and all exclusion is limitation. Therefore, the limitless being is limited and the affirmation is contradicted to itself.

2) By P2, ¬ב excludes the being א and therefore it is limited, and the affirmation is contradicted to itself.

3) By P3, the reality includes so much ב as ¬ב, that it is inherent as much in the one as in the other, but this excludes it from not being neither the one nor other, to transcend ב and ¬ב. The affirmation is contradicted to itself.

4) By P4, if is affirmed that neither ב nor ¬ב, and it transcends to both, excludes it from the property of immanency, it is to say to be equipped with ב ∧ ¬ב. Therefore, the affirmation is contradicted to itself.

Therefore, since all affirmation belonging to a certain language L only has sense based on its opposite one, it has been demonstrated that any affirmation is relative and if the same sandal the reality, will be contradictory.

A direct and positive affirmation on the reality must be necessarily contradictory or devoid of meaning.

a) *It is contradictory* as soon as the own affirmation comprises of the reality, talking about therefore to itself, and all affirmation trying to affirm something on itself usually is contradictory.

b) *It is devoid of meaning* because to describe the whole it is equivalent not to describe anything.

This process corresponds to the inutile attempt to divide the universe in observer and observed, narrative and narrated, separating it and turning it thus false with same himself. The linguistic communication, that in the amplest sense is simply the transmission of a concatenation of words, is not more than the reflection of the reality in a mirror of illusion. In agreement with Wilber (1977), two types of symbolic elaborations used by the language exist to indicate or to suggest the reality and that can be used of three main ways to speak about the reality. Both types of symbolic elaborations are the following ones:

1) *Linear, one-dimensional, analytical and logical elaboration*, and where connects a collection of symbols meticulously defined, one after another one, in a line, in agreement with an own and particular syntax. It is the corresponding elaboration to scientific, philosophical and symbolic legal text.

2) *The imaginative symbolic elaboration.* It is pictorial and multidimensional, being in myths, artistic elaboration, poetry, dreams and imagination. It lacks logic, in the strict sense of the word, but it locks up a meaning totally different from the linear elaboration.

These two types of symbolic elaboration may be used, separately or jointly, of three different ways:

a) *Kataphatical or analogical*, describing the reality in terms of as it pretends to be. One uses as positive and finite qualities and categories suggesting the limit of the absolute thing. Between these qualities, usually is included omnipresence, omnipotence, omniscience, infinite being, supreme well-being, infinite wisdom and love, infinite conscience, etc. Between the categories, aletical and deontical among others. Generally, these analogical descriptions usually belong to the linear type of symbolic elaboration, but usually they go accompanied of elaborations of imaginative type.

b) *Apophantical or negative*, describing the reality of a negative form, not being able to directly affirm nothing about the absolute thing, without falling in the vicious circle to affirm on affirmations.

c) *Dharmatical or preceptive*, discovery of the reality by one same one in form of set of experimental rules (Brown, 1972). This third form is present in the mental systems of the Hinduism, Taoism and Buddhism, as well as in Christian and Jewish (Kabbalah) mystic.

In agreement with Wilber (1977), these three ways suggest how it is the reality, which is not and what it is possible to be made to reach it. Nevertheless no of them says what is Nevertheless, the human being not only exists like individual, but that is immersed in a society. Verbal elaborations of the reality can differ enormously from world vision in world vision, culture in culture and individual in individual, since each human Subject,

besides to use a set different from kataphatical or apophantical symbols, uses its own particular series of instructions.

Definition 9.1: *By* World Vision (WV) *we understand the way to think, to hope, to project, to fear, to calculate, etc., of a human group, obligatorily collective, immersed in a society characterized by a certain culture and in a determined historical period* (Ferreras, 1980).

a) WV never is conceived, crystallized; their presences exist because they mediate and they inspire, but never appear in the objective world.

b) All WV is construction of a collective subject, since it is impossible to a single individual, to found, to build, to even express, everything an imaginary system to be related, to think, to hope or to remember. Each group in its social life is constructing a precise, specific mentality that not only it allows to comply with the objective reality, but that also allows to dream, to idealize, to escape itself.

c) WV land extends by the surface of the objective and the depths of the subjective thing.

d) WV serves to live the daily life, for the anodyne gesture and to even create a system of new connotations.

e) WV has an image of the world conscious or unconsciously perceived.

f) Before WV, arise all a series from social and historical manifestations, customs, beliefs, ideologies, projects, practices, gestures, etc.

WV is characterized by a general condition: the existence of the collective subject in all social structure. Nevertheless, it cannot make forget the individual subject existence. The individual subject is not a representative of the collective subject: he is immersed in the collective subject, but his has own autonomy. Relations of the collective subject with respect to the individual subject are explanatory mediations. Collective conscience is characteristic of a WV own of a determinate society.

We can distinguish between *Generalized Collective Conscience* (GCC) and *Particularized Collective Conscience* (PCC). GCC exists in the society, time, history, etc., without it is materialized necessarily in no social, artistic, literary, etc. structure. PCC is the materialization and conceptualisation of that GCC on the part of a group, class, clan, family, etc. The call class conscience is, therefore, the taking of conscience

on the part of a social group of the GCC. Therefore, it can be confused thus, always until certain point, the conscience of class or group, with the Particularized Collective Conscience (PCC). It is the *Individual Conscience* (IC), that breaks with the PCC and it materializes the GCC again. Complete autonomy does not exist, but the rupture on the part of an individual conscience with a certain materialization of the GCC in PCC, and the attempt on the part of the new conscience of rupture, to materialize a new GCC. We can see the process of proceeding of the collective consciences in the following figure (Figure 9.1):
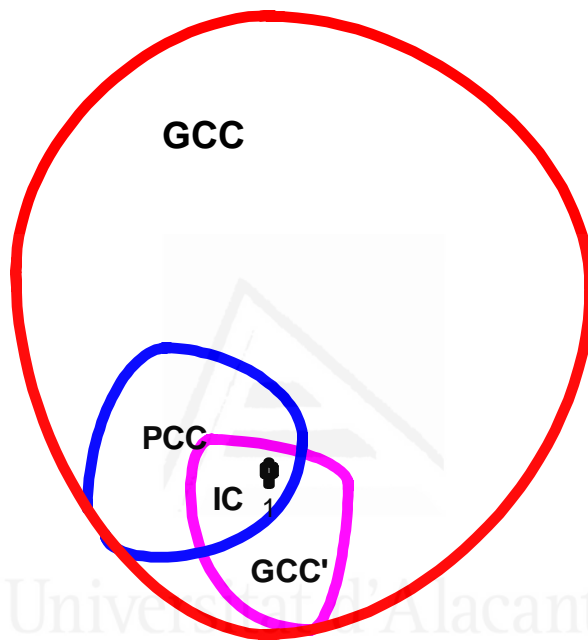
Figure 9.1.

Generalized Collective Conscience (GCC): It exists, it preexists, it is not conceptualised, etc.

Particularised Collective Conscience (PCC): It is materialised by a group, class, clan, family, etc.

Individual Conscience (IC): It belongs to each particular individual.

IC opposes the PCC with a new concept that it does of GCC; for that reason, it is in the limit between the three-dimensional body of group PCC and totality GCC. Therefore, an ideological exchange is therefore a group rupture and the creation of new Generalised Collective Conscience (GCC').

Note 9.1: *The Generalised Collective Conscience (GCC) only agrees with the Ideological Doxical Superstructure (IDS) in the case of monoideological societies.*

Primitive or relatively isolated folk societies fulfill the condition specified in Note 9.1. All these divisions between different consciences try to establish and to construct relations, in order to find new explanations to the existence and operation of the collective conscience, only subject of the social structure forming the Structural Base (SB).

The individual subject (with his IC) is put under itself to the very important influence of sociological factors (GCC and PCC), as the structure of the language, the implicit or unconscious systems of social valuation, norms of the communication, etc. That is to say, of the represented collective conscience like symbolic maps of the reality. What an individual does with these symbolic maps is a phenomenon of egoic level, but the own symbolic maps correspond to GCC of a society. It exists an immense number of symbolic maps composing the GCC, since it is here where they are rooted social conventions like the structure and the linguistic syntax of a determined culture, its logic, deontical normative, popular ethics, religious vision, familiar structure, powerful taboos, rules of communication, games, supposed general on the reality, etc. All those symbolic relations that distinguish a determined society and that all individual interiorise in greater or smaller degree by the simple beacon to belong to this society. Therefore, GCC represents the first massive accumulation of symbols in the IC.

All these deeply rooted symbolic maps fulfill, in essence, the same assignment; to in advance to mold the IC with the acceptable and significant conventionally forms in their society (GCC and PCC). These conceptions mold perceptions, the individual learns, in effect, to conform themselves and to translate the reality in the social terms that shares with the others. This is what means: "*to comprise of a society*" (or culture, subculture, group, class, clan, family, etc.), since the individual becomes member of his society (or equivalent) after satisfactorily interiorise the maps or sets of symbolic relations (GCC and PCC) constituting that society (or equivalent). The individual is included in the society when the society comprises the individual (Wilber, 1977).

This conventionalisation of the reality means to learn to make a socially verifiable correspondence one to one between symbol and symbolized thing, world and its description. The individual must learn to associate specific objects with the conventionally correct words belonging to a certain language L that the society uses to

represent an object. Thus, for example, when an individual enters a bar and requests "*a coffee*", his interlocutor, the barman, understands that it is a container (cup) full of that hot liquid, odorous, bitter and stimulating who all people agreed implicitly upon representing with the name of "*coffee*". It is through this one and other similar linguistic games, as the individual learns an amount the sufficiently great of associations allowing him to perceive and to act in the world, of a mutually comprehensible and shared way. Nevertheless, through this process of association the individual learns to take a word or a series of words devoid of meaning and grants a socially meaning to them. In the case of the word "*coffee*" in itself lacks intrinsically meaning, it does not indicate nothing else that to itself and separately it has not any specific sense.

9.2. CULTURE

In according to Borhek and Curtis (1983) *culture* consists of learned as opposed to innate and shared as opposed to truly idiosyncratic ideas, as opposed to physical artefacts. This definition of culture attributes the explanation for the sharing of certain beliefs or ideologies to a certain kind of social process, that they take place in SB. The process that accounts for the acquisition of culture by individuals is called *socialization.* It consists of regular schedules of reinforcement. At simple level, the assertion that beliefs and ideologies are cultural rejects a whole range of possible alternative propositions. Culture has the following characteristics:

1) *Culture implies a peculiar WV.* Culture creates GCC.
2) *Culture is patterned.* It consists of related, not discrete elements, which are organized according to some general pattern. To move a trait from on culture to another is usually to change its function and significance through reinterpretation. This involves placing the trait within a novel context of meaning. Humans often communicate about WV as if it was a separate particle and recognize the need for context only when communication fails. The internal consistence of culture often escapes notice; it becomes apparent only when it is violated.
3) *Culture provides orientation.* Culture is used by humans, individuals and collectively, as the primary source of solutions to the problems of orientation, and may provide solutions to substantive problems,

according to which problems may be met with traditional and acceptable solutions. The existence of one or more orientation is often so implicit that the people involved would not ordinarily recognize them without being prompted.

4) *Culture changes in response to pressure of events but only very slowly because it is to a degree systemic.* If culture is systemic, means that all WV's elements (*goals, norms, values, and orientations*) are linked and that a change in one has strong but subtle implications for change in others. As a set of solutions to substantive problems, culture is subject to immediate pressures for change. Besides providing in the first place the basic tools for any thought, feeling, judgement, or action, culture includes specific deontical norms (prescriptions and proscriptions), sets of rules on what to think, feel, and do. When these norms fail to solve practical problems, some alternative must be sought at once. Norms and values change less rapidly than technology is known as *culture lag* (Ogburn, 1950). Commitment to deontical norms and values is stronger that commitment to technology, in part because the technology is more closely geared to daily necessity.

5) *Culture are differentiated into subcultures which are coextensive with networks of communication.* Culture is coextensive with a network of communication. If societies consisted of homogenous collections of individuals, each communicating equally with all the rest, both, culture (and its peculiar GCC) and society would be undifferentiated unities. Then, the conditions of Note 1 would be fulfilled. Since societies are differentiated, cultures are too, and along the same lines. That is to say, multiple PCC. Then $GCC = \bigcup_{i=1}^{n} PCC_i$. Neither societies nor the cultures they carry are as simple as a set of discrete building blocks. Each member of society participates in a somewhat different set of cultural "worlds", forming a particular IC, each consisting of sheared meanings and extending as far a system of communication can support it (Manis and Meltzer, 1972). None of these cultural worlds (PCC) is the exclusive domain of a single human group. However, insofar as the boundaries of one kind of world are the same as the boundaries for another kind of

world, a single group tends to emerge with that unique combined culture. That is to say, if we have a human group with PCC_1 and another with PCC_2, then $PCC_3 = \bigcup_{i=1}^{2} PCC_i$. To the extent that major social cleavages are congruent with a whole list of communicative worlds, of course, the possibility of communication across the line of cleavages are lessened, subcultural distinctiveness is enhanced, and conflicts are likely to be acute, Communicative barriers, consisting, in turn, of barriers to social interaction, are cultural barriers. Cultures, as well as societies, are highly differentiated. Each participant in a subculture PCC_i has a unique perspective based on his unique social position, interest, experience and PCC available to him. These members do not participate in exactly the same parts or the subculture, that is to say $PCC \neq \bigcup_{j=1}^{m} IC_j$. In consequence, the individual member is not identical with the subculture, and the believer is not identical with the WV. To be sure, the total subculture is carried by the network of communication in which the total set of individual members participates and may not be said to exist apart from the network of interactions. Nevertheless, each individual member's participation is specialized, and most participants devote far less than their full time to the activity, whatever it is (Borhek and Curtis, 1983). Applying this to belief systems belonging to a determinate WV, the vast majority of believers are in rather substantial ignorance of the fine points of most belief systems in which they participate. Thus, culture derives a kind of transindividual power from its group expression; it does consist of something more and greater than is available to any one individual participant (Durkheim, 1965).

6) *All societies are differentiated.* Social differentation is a concomitant of institutional differentation which consists of the specialization and routinization of activities in general. In relative undifferentiated societies (see Note 1), a single social structure is used to organize all collective activities that need to be organized: work, religion, war, art, education and so on. It implies a peculiar and monolithic GCC. This social structure usually assigns positions to individuals based on age, sex, and

descent, creating therefore a restricted PCC and IC is confused generally with PCC. The kinship system is the basis for organizing any activity. Highly differentiated societies perpetuate certain bodies of knowledge and belief through such generalized structures as families, public schools, mass media, internet, etc. But in addition they are also use highly specialized structure, such as professional associations, universities, theological schools, laboratories, etc. As activities develop in specialities, special purpose structures arise to organize them. The extent of institutional differentiation is of first importance as social condition affecting the culture carried by a society (Durkheim, 1947).

9.3. DENOTATION AND CONNOTATION

A semiologic theory of the ideologies must incorporate these concepts of an extended way, because when we spoke of ideology, in its different meanings, it understands a vision of the Reality ⊇ condivided between many Subjects and in the limit of the society. Therefore, these visions of the world are not another thing that subsystems of a global semantic system, that is to say, a segmented reality.In this sense, the ideology is to us like a extrasemiotic remainder that determines the semiotic events.

Peirce (193-1935) when solving the problem of the meaning by mediation of the interpretant gave an incomplete explanation, between empiricist and metaphysician to the meaning process. A cultural unit can be a person, place, thing, feeling, situation, fantasy, hallucination, idea, hope, custom, etc. It is not only individualized by mediation of the flight of interpretings. The cultural unit is defined as "place" in a system of other opposed cultural units and that circumscribe it. A cultural unit subsists and it is recognized in the measure in which other exists than it has a different value. It is the relation between several terms of a system of cultural values what prevails to each one of them of that contributed by others (Eco, 1968). To just like in a chess game, each piece acquires some value by the position that it has with respect to others and each disturbance in the system changes the sense of the other correlative pieces.

Definition 9.2: *We define as* semantic field *a structure that formalizes the units of a certain culture constituting a portion of the vision of the Reality that is own of this culture.*

Definition 9.3: *The existence of information is independent of the fact that there is a Subject able to decode the message that it is attempted to communicate. This objective information is termed* significant *and we denote as* ⊡.

Definition 9.4: *The information in a message acquires meaning if a Subject decodes the message. This subjective information is termed* significance *and we denote as s.*

Attempts of the Structural Semantics School it exists a Semantic Field Theory as forms of the content, in a global sense. Nevertheless, and according to Eco (1968), two obstacles exist: the first one is derivative of empirical facts and the second constituent of the own semiotic process. The first obstacle derives from the fact that more the investigation does not give than a structuring of subsystems very restricted (colors, botanical classifications, etc.). The second obstacle derives from the fact that the life of the semantic fields is brief than the one of the phonologic systems. They are enough movements of aculturization, shocks between different cultures, revisions critics of the knowledge, shift of paradigm, etc. to upset the semantic fields. The hypothesis of Sapir-Whorf supposes the existence of an intimate interaction between the vision of world of a civilization and the way that this turns pertinent its own semantic units (Sapir, 1921; Whorf, 1956).

Let SB be the conditions of life (*Structural Base*), let s be the units of perceived experience (*p-significances*), let u be the corresponding cultural units and let ⊟ be the significant forms denoting s, then we have the following extrasemiotic problems:

1) SB determines s giving rise to u assigning the name of ⊟.
2) SB forces to give name to ⊟ to segment the experience in s, to that correspond the u.
3) A deep semiotic activity leads the human being to think with ⊡, which not only give rise to u and s, but that in addition stipulate to the human being to prove the exigencies of ⊟.

It is important to have in consideration as in a same culture can coexist two or more semantic fields and where a semantic field begins to dissolve to give rise to another one.

Example 9.1: In Catalan language, to say *needle* exist two different words: "*agulla*" (Arab origin) and "*fibló*" (Latin origin). It is consequence of the existence of two cultures, often faced, in the zones of Catalan language during the medieval time.

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In agreement with Eco (1968), we can affirm that:

a) *In a certain culture, contradictory semantic fields may exist*.

b) *A same cultural unit can comprise of complementary semantic fields*. A same cultural unit could occupy different positions in different semantic fields without the classifications are incompatible. For that reason it is precise to admit that the user of any language has the possibility of providing to a system of significant, diverse systems of significances.

c) *In a same culture, a semantic field may undo with facility and being reconstructed in a new field*.

Consequence 9.1: *The significance s is a cultural unit, as much in categorematical as noncategorematical terms.*

Consequence 9.2: *Semiotic systems are not synonymous or equivalent and the same thing in systems based on different units cannot be described.*

We may affirm that:

1) The significance s is a cultural unit u.

2) This cultural unit u can be individualized due to the linking of its interpreters, as it is pronounced in a concrete culture.

3) The study of the signs in a culture allows defining the value of the interpretant as in a system of positions and oppositions.

4) It is not possible to formulate a Global Semantic Field, that is to say, the formalization of the WV of a culture, because in its peripheral interconnections and manifestations, changes constantly.

5) The semantic fields are postulated like useful instruments to explain the significant oppositions of a determined group of messages.

Let ▫ be a significant and s be their significances. For each significant $▫_i$ exists a finite number of significances so that $▫_i \rightarrow s_1 \cup s_2 \cup ... \cup s_n = \bigcup_{i=1}^{n} s_i$. If $s_i \equiv u_i$ then $▫_i$ $= \bigcup_{i=1}^{n} u_i$. If during the period $\left[t_\alpha, t_\beta \right]$ of a culture exist m significant $▫_i$ that can be interpreted, then

Definition 9.5: *We may define as* semantic field $Љ = \{ \bigcup_{j=1}^{m} ▫_i \rightarrow \bigcup_{j=1}^{m} \bigcup_{i=1}^{n} u_{ji} \}$.

In according Seimas (1970), we define semantic structure as:

Definition 9.6: *By* semantic structure *we must understand the general form of organization of diverse semantic fields of social and individual nature (culture or personalities).*

Definition 9.7: *We define* denotation *like the literal, obvious definition or of the common sense of the significance of a sign.*

The denotation may be defined as elementary modality of significance alleged by the referential one. We will only talk about to denotation of significant an isolated one, is to say a *leseme* l. Leseme, like morphologic unit, sends to a certain cultural unit u. The definition of Shannon (Shannon and Weaver, 1949) considers the denotation without appealing to the referential one and can be understood like the invariable of translation processes, that is to say, the significance of a significant, what it stays as meaning if changes the significant. Nevertheless, it is impossible to apply this definition to an isolated leseme. It would be necessary that the semantic fields of different cultures was isomorphs. Therefore, we will have to understand like denotation the immediate reference that a term or concept causes in the adressee of the message. Therefore:

Consequence 9.3: *Denotation is the immediate reference that the code assigns to a term or concept in a certain culture.*

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Conseuence 9.4: *Isolated leseme denotes a position in the semantic system.*

In according Eco (1968) the notion of denotation is equivalent to the one of *ex-tension*. The term or concept, besides to specify a class of real objects, denotes a set of cultural units $\{u_i\}$ occupying a determined position within a semantic field Љ, with exception that the class has only a member. Leseme denotes the set of all those cultural units that in different semantic fields, belonging to different cultures, occupy the same position in their respective semantic field. But it would demand that the semantic fields were isomorphs.

Let C be a culture and Љ be its semantic field. We denoted like n the respective position of a cultural unit u in the semantic field Љ. We suppose like $C_1, C_2,..., C_\omega$ different cultures with their respective semantic fields **Љ₁, Љ₂,…, Љ_ω,**

Then $l =$ **Љ₁** $\cap$ **Љ₂** $\cap \dots \cap$ **Љ_ω** $= \{u^n\}_{i=1,2,...,\omega}$.

When the semantic fields or are isomorphs (real condition), the units of a field are compared with others by mediation of proofs of commutation (verifying if changing the significant one it changes the contextual significance) or by proofs of substitution (it is verified if changing significant the significance does not change). Then:

Definition 9.8: *The* denotatum *of a leseme l is its semantic bond in a determined semantic field* Љ *belonging to a certain culture C.*

Leseme l can assume different positions in diverse and complementary semantic fields belonging to C. Let C be a culture and Љ*₁, Љ*₂,…, Љ*_ω $\in C.$ Then $l \rightarrow$ { $l^\alpha \in$ **Љ*₁,** $l^\beta \in$ **Љ*₂,**.....,$l^\omega \in$ **Љ*_ω**} being $\alpha, \beta,..., \omega$ different positions.

Example 9.2: In Spanish language leseme */tierra/* opposed to */mar/* (sea) it means "mainland". Opposed to */sol/* (sun) is the Earth, third planet of the Solar System. Opposed to */cielo/* (sky) it means a series of cultural units very varied including even the connotation: "*situation of the man like material and mortal being*".

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Consequence 9.5: *The significance s of leseme l cannot be individualized in the context and with the aid of the communication circumstance.*

It is understood that all sequence of the interpretant through which the semiosis process revive leseme l and makes practicable it, rests in the connotation.

Definition 9.9: Connotation *is the sum of all the cultural units that the significant can evoke institutionally in the mind of the adressee Subject not having any psychic possibility but a cultural availability.*

In according to Eco (1968) diverse interpretations of connotation exist. We will mention those that we considered more important for our intention.

1) *Connotation like definicional meaning*: Everything leseme l connote the properties attributed to the cultural unit denoted by the in-tensional definition that commonly is applied. Let us suppose the definition of /*stars*/. It can be ingenuous (famous personage of the cinematography) or scientist, given in astronomic or astrophisical terms. Since in a same culture both forms of definition exist, even other intermediate ones, the possession of one or another forms constitutes the cultural patrimony of the adressee subject.

2) *Connotation of the semantic units that compose the significance*: Some of these semantic components comprise of the cultural unit, other no. A named cultural unit can connote its own syntactic mark. For example, /*Sun*/ in Spanish and Catalan connotes "*masculine*" and /*Moon*/ connotes "*feminine*". In Spanish /*sea*/ connotes "*masculine*" and in Catalan connotes "*feminine*". In a fable or myth, in where the objects are done animated, these connotations have semantic value.

3) *Emotional connotation:* In agreement with Stevenson (1944) the emotional meaning is a significance in which the reaction or stimulus of the receiving Subject is an emotion. The touching connotation is an absolutely idiosyncratic fact. When one institutionalizes, the emotional connotation stops of being "*Vorstellung*" (Frege, 1892), that is to say, a personal image due to the preceding experiences and influenced by the feelings. Then, the preceding socialized experiences become elements of the code. In big human groups, it is associated a series of emotional connotations justified by a series of interpretant of the

denotation. The measure of the meaning (Osgood, Succi and Tannebaum, 1957) will be the empirical way to be able to reveal the degree of institutionalization of the emotional connotations associated to lesematic stimulus.

4) *Ideological definitions*: They are incomplete definitions putting the cultural unit on approval or a complex of cultural units under one of their possible aspects. It is the "*Sinn*" of Frege (1892), or cultural way in which the object is meant. For example /*svastica* / can be defined like a "*Buddhist symbol of life wheel or samsara*" or as "*Nazi symbol*". This clears that one of the two connotations opens passage to another connotations of touching character reason why in the first case takes place a connotation of superior order of mysticism and horror in the second.

5) *Global axiologic connotations*: A chain of connotations can assume for the adressee subject positive or negative values. For example *greater consumption = greater cost of energy = greater environmental contamination = diminution of the quality of life* or *greater consumption = greater cost of energy = well-being*. First adquere a negative value, whereas second it acquires a positive value. These *terminal axiologic marks* are the final connotations of the connotations and come bound to a semantics of ideologies.

Then and for our purpose:

Definition 9.10: *We define* connotation *to socio-cultural and individual associations, the ideologies derived from the belief systems, and the emotional ones belonging to the psychology of the Subject, and that is indirect function of the Semiotic Environment (context) in which is immersed.*

A significant ▫ can connote diverse significances $\{s_i\}$, even sometimes in reciprocal opposition. To know to which of these significances connote the significant ▫, in a determined context, is equivalent to say that the selection done by the issuer or the adressee is well-known. The selection consists of identifying different and complementary positions within different semantic fields belonging to a same culture. Due to the system of dual thought own of the human being, this selection will take place through oppositions.

Example 9.3: /*cockroach*/ can connote *"animated being*", in reference to an axis *animated* versus *inanimate*. It can connote *coleopter* talking about to a zoological semantic field. "*Injurious animal*" in reference to duality *injurious* versus *noninjurious*. And so on until arriving at the more complex definitional significances, pejorative and even at the legendary and mythical connotations. Both distinctions involve the use of learned codes.

<div align="center">***</div>

The significance s tends to be multiplied from an individual sign, until it is equipped with many meaning that goes beyond which now the sign says. Different orders from meaning or levels of significance exist:

1) The first order of significance is exactly the one of the denotation, in whose level it exists a sign t consisting of significant ◻ and a denotative significance d-s.

2) The connotation is a significance of second order or c-s that uses the denotative sign t (with significant ◻ and denotative significance d-s) like its significant, with an additional associate significance.

This distinction considers the connotation as a sign that is derived from significant ◘ of a denotative sign d-t, so that the denotation takes us to a chain of connotations. Denotation is an underlying and primary significance d-s.

Consequence 9.6: *The significant ◘ or significance s depends entirely on the level in which the analysis operates. Then, which is significance s in a level of the context, it can be significant ◘ in another one.*

Subject S receives two types of semiotic stimuli:

a) Significant of the own process or being.

b) The significant of the transmitted semiotic stimulus or significant of the significance (connotation).

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We distinguish two types of significant:

Definition 9.11: *We define as* A-significant (A-◘) or first order significant, *the significant that it is inherent to the beings, processes or phenomena of the referential context.*

Definition 9.12: *We define as* B-significant (B-◘), second order significant or connotation, *the significant of significance s.*

Connotation B-◘ has a veritative value $v'(\text{B-◘}) = 1$, having simultaneously, a relative veritative value or connotative veritative value $v(s) \in [0,1]$.

Example 9.4: We received solar light rays with significant ◘) and a significance s of the light, Sun, etc, concepts with a veritative value $v(s) \in [0,1]$, having relative significant (B-(B-◘)) with a veritative value $v'(\text{B-◘}) = 1$.

<center>***</center>

Consequence 9.7: *Changes in the form of the significant ◘ can generate different connotations.*

Consequence 9.8: *All B-significant B-◘ including in a context, will be denotative, therefore, they will have for the Subject an denotative veritative value equal to 1.*

Note 9.2: *A denotative significance d-s is the significance of the absolute beings.*

Note 9.3: *The concept of denotative significance d-s agrees with the one of the relative beings.*

Let ◘ be a significant. In a determinate semantic field Jb^*_1 denotes a significance s_1 with a connotive position α, it denotes a significance s_2 with a connotive position β in other semantic field Jb^*_2, it denotes a significance s_3 with a connotive position $\beta\gamma$ in other semantic field Jb^*_3, and so on. This means that the significant ◘ deepens a series

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of ramifications in positions of diverse semantic fields. Let $\boxdot_1$, $\boxdot_2$, $\boxdot_3$, $\boxdot_4$ be a syntactic system of significant unities (Table 9.1).

TABLE 9.1

Significants		Љ*$_1$	Љ*$_2$	Љ*$_3$	Connotative chain ל
$\boxdot_1$		s_1^α	s_1^β	s_1^γ	
$\boxdot_2$		s_2^α	s_2^β	s_2^γ	
$\boxdot_3$	$\rightarrow$	s_3^α	s_3^β	s_3^γ	ל$_3$
$\boxdot_4$		s_4^α	s_4^β	s_4^γ	

Columns 3, 4 and 5 are semantic systems and sequence $\boxdot_3$, s_3^α, s_3^β, s_3^γ is a chain of connotations o connotative chain ל$_3$.

Example 9.5: An example of connotative chain will be the following one: *maximum of energetic consumption → maximum of productivity → maximum of labor positions → maximum of consumption of goods and services → maximum well-being.*

When one isolated leseme is combined with others leseme we will obtain the following ramification (Figure 9.2):
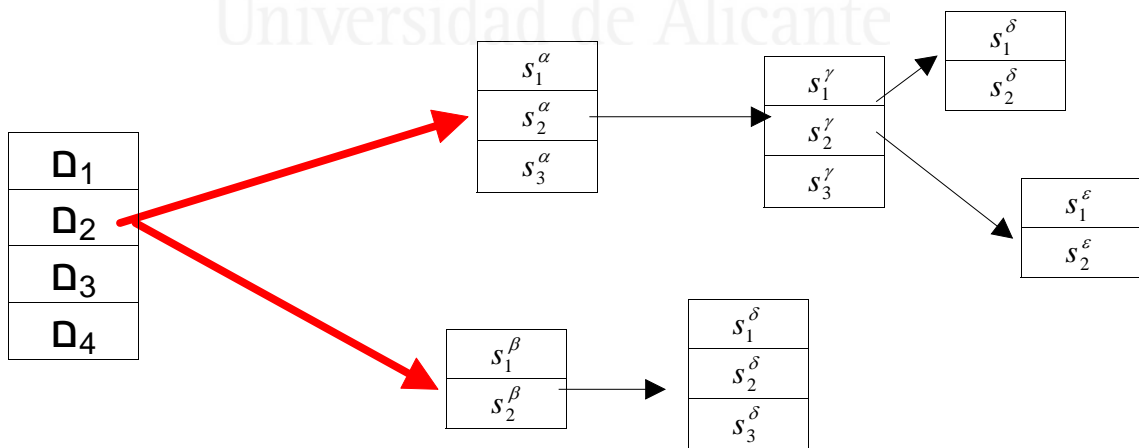
Figure 9.2.

In this scheme, assuming form part of the code of a certain cultural community, the terminals of each ramification of the significant are considered like their semantic components (*semantic markers*).

The possibility of combining lesemes in the context comes from a series of projection rules (Katz and Fodor, 1964), reason why once assigned each leseme its semantic components, a series of different interpretations from a determinate phrase can be constructed.

Definition 9.13: *We define as* sense **σ** (Eco, 1968) *to a binary selection that the adressee subject of sentence makes between the diverse ramifications that compose the leseme*.

If the meaning (*significance*) of leseme is the set of its denotation and connotations, the attributed sense is a selective path that is coming by affirmations and negations.

9.4. SEMIOTIC OF IDEOLOGIES

9.4.1. Factors of the message

The multiplicity of codes and subcodes intercrossing in a culture demonstrates that even the same message can be decodify from different points of view and appealing to diverse systems and conventions. It can take shelter of significant a fundamental denotation, but they can attribute different connotations to it. In last instance, the extreme possibility that exists a same denotative code of base is different for the issuer and the adressee, and the message can transmit a complete sense in both cases. Eco (1968) puts the following example: sentence *I Vitelli Dei Romani ono Belli* can be interpreted like "*Ahead, Vitelio, to sound of war of the Roman God*" (in Latin) or as "*Roman bull calves are beautiful*" (in Italian). We may put other examples daily. Let us suppose the phrase *He follows Jesus*. We may interpret it as "*He is a disciple of Jesus*" or as "*He follows the track of person called Jesus*".

This takes us problems to two fundamental:

1) Conditions exist that allow to the decoding in a sense or another one.
2) The message is affected by certain indetermination that as well turns it possible source of information.

Some factors orient towards the reading of the preceding phrase.

1) The reference to the *Universe of Reasoning* (Lyons, 1968). A series of preceding or estimated messages that they indicate to us that is being spoken of the history of the Christianity allows us to attribute to Jesus the denotación wished by the issuer. But it is to explain if the phrase means that "*he is a disciple*" or who "*came after Jesus*".

2) The reference to an *ideology*, understood of a coarse way as a certain form acquired by the preceding knowledge of the adressee, a system of prevention and opinions, a perspective of the universe. In this sense, the adressee will assign to a connotation or another one to /*follows*/: the designated person will appear like a faithful disciple of Jesus or like epigono that has spoken of Him later.

3) The *circumstance of the communication*. If the phrase has been pronounced by a priest in a mass-media, their denotative significance and its different connotative senses can be individualized clearly. A series of circumstances orients the adressees to deduce the ideology of the issuer, and the subcodes to which can make reference. Although it is possible that a particular adressee, with antichristian ideology, can catch the denotación exactly /*Jesus*/, catch the different connotations from "*faithful disciple*" and, to load this connotative chain $\aleph_i$ with a negative sign, receiving this way, a message different from which receive the other presents.

For that reason and in agreement with Eco (1968), although it is admitted that the sign denotes the real objects, that is to say, perceived objects,

Consequence 9.9: *The circumstance appears like the reality set that conditions the selection of codes and subcodes binding the decoding with its own presence.*

Therefore, the process of the communication, although does not indicate referential, is developed in the referential one. Then

Definition 9.14: The circumstance *is the complex set of material, economic, social, biological, ecological and physical agreements in which the human beings communicate.*

Let St be a statement (concept or sentence) and let Cr be a circumstance. We suppose $\{St\}_{i=1,\ldots,n}$ the set of all posible statements such that $St \in \{St\}_{i=1,\ldots,n}$ and $\{Cr\}_{j=1,\ldots,m}$ the set of all possible circumstances such that $Cr \in \{Cr\}_{j=1,\ldots,m}$. Let $\{\sigma\}_{k=1,\ldots,w}$ be the set of all possible senses of all possible statements such that (Table 9.2)

TABLE 9.2

STATEMENT	SENSE			
	σ_1	σ_2	....	σ_w
St$_1$	(St_1, σ_1)	(St_1, σ_2)	....	(St_1, σ_w)
St$_2$	(St_2, σ_1)	(St_2, σ_2)	....	(St_2, σ_w)
St$_3$	(St_3, σ_1)	(St_3, σ_2)	....	(St_3, σ_w)
....	....	....	....	
St$_n$	(St_n, σ_1)	(St_n, σ_2)	....	(St_n, σ_w)

That is to say, it will be the cartesian product $\{St\}_{i=1,\ldots,n} X \{\sigma\}_{k=1,\ldots,w}$. We do not consider the improbability of many of these binary relations. If we introduce the circumstances, one will become a table of three dimensions, formed by triplete (St_i, σ_k, Cr_j), corresponding to the double cartesian product $(\{St\}_{i=1,\ldots,n} X \{\sigma\}_{k=1,\ldots,w}) X \{Cr\}_{j=1,\ldots,m}$. It indicates to us that:

1) In each statement St_i could be anticipated an arbitrary circumstance Cr_j as to attribute to (St_i, σ_k) an inverosimil sense .

2) And of the most ambiguous statement can be deduced a circumstance that attributes to it the most obvious sense.

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Consequence 9.10: *A statement will have an obvious or inverosimil sense depending on the circumstance.*

1) The circumstance changes the sense of the message. For example: a red flag means danger in a beach, revolutionary ideology in a political manifestation or privateering ship in an historical or adventures movie.

2) The circumstance changes the function of the message. For example: the signaling of prohibition in a highway has a different touching sense that in a parking.

3) The circumstance changes the information degree. For example: the cross has a information degree different in the neck from a believer who the flanks of an ambulance or in the hospitable facade.

Nevertheless, the code takes part indeed to limit and to classify possibilities and not others. Culture C classifies a series of frequent circumstances in which a statement (leseme or sentences) acquires a possible meaning, is to say, it has a sense. Therefore, it is the culture the one that takes part like a Recognoscitive Grammar in the semantics of statements, forming rules of circumstantial competence establishing that semantic *path of connotations* must be followed and which no.

The intercrossing of circumstances and ideological budgets, along with the multiplicity of codes and subcodes make that the message appears as a plastic form to which diverse senses can be attributed. Therefore, the information of a message (Shannon, 1949) will have to be processed like a consisting of value the wealth of possible and individualizables selections at the level of the message-significant one. Information can be reduced when the message-significant one is related to certain subcodes and it becomes message-significance, that is to say, in definitive selection executed by the adressee subject. Therefore, we will have two types different from information:

1) *The information of the source*: it is physical information, computable quantitatively, statistically equiprobable and reducible to the system like correction of probabilístic terms and always opened to different possibilities.

2) *The semiotic information*: noncomputable quantitatively but that can be defined by mediation of the series of significances that can generate once put in contact with the corresponding codes. It is not totally indetermine, being reduced of definitive way by the interpretation or selection of a concrete message.

9.4.2. Message and codes

The message opened to a multiplicity of codes and subcodes appears as a form that is empty of all sense, but from the point of view of the logic of significants, with a very precise organization. This organization is the one that orients the decoding and selection of the senses, exactly just as the ideology, circumstances or other extrasystemic factors. We can establish two types of judgements in reference to the existing codes: semiotics and factuals (Eco, 1968).

Definition 9.15: *We define as* semiotic judgement *that in which the predicate is contained implicitly in the subject*.

Definition 9.16: *We define as* factual judgement *that in which the predicate is added to the subject like a new attribute, due to a synthesis that takes place between the empirical data and a new form of thought.*

A judgement is semiotic in the sense that it constitutes the statement of the intensities that a code attributes to a certain cultural unit u_i. Therefore a judgement is semiotic according to a convention and that when changing the convention judgements that were semiotics turn factual and vice versa (White, 1950). In agreement with diverse authors (Austin, 1961; Quine, 1953)

1) A judgement is semiotic when its condition really depends on its significance.
2) A judgement is factual when its significance depends on a condition really given by a comparison with the empirical referential.
3) A semiotic judgement says what the code anticipates.
4) A factual judgement says what it does not anticipate the code, and therefore enriches the code.

Example 9.6: /*all man born in Spain is Spaniard*/ is a semiotic judgement because exists a pre-arranged code in which exists the distinguisher "*man born in Spain*". Nevertheless /*Josep is Spaniard*/ is a factual judgement.

<div align="center">***</div>

Example 9.7: /*In the Idus of March Caesar was assassinated in the Roman Senate*/ is a factual judgement. But from the same date (*Idus of March*), the same statement

becomes a semiotic judgement because the code has fixed /*Caesar*/ the directional connotation "*assassinated in the Roman Senate*". /*Caesar was assassinated in the Roman Senate*/ is logically certain if he were really assassinated in the Roman Senate.

<div align="center">***</div>

A factual judgement only has semiotic importance if it is admitted like true, independently of its verification or falsification. In the measure that is accepted like true, the code enriches and it provides new connotations. It exists therefore dialectic between codes and messages, thus the codes govern the issue of messages, but new messages can reconstruct the codes and is a proof of the creativity of the language and the dialectic "*creativity governed by rules*" versus "*creativity that changing rules*" (Chomsky, 1962). The factual judgement can be considered like a creativity allowed by rules of a code; the syntactic rules allow to articulate messages that enrich of senses the different semantic units. A diachronic dimension is inserted in the synchronous dimension of the code as a system of subcodes and altering its structure, following its dynamic possibilities and their combinatory capacity, as if the code tended to reconstruct itself continuously, but in a superior level.

9.4.3. Semiotic system and WV

A semiotic system as WV is one of the possible ways of gives form to the world, and like so, it constitutes a partial interpretation of this one, being able to be reviewed theoretically whenever new messages, when reconstructing semantically the code, introduce new connotative chains ל$_i$ and for that reason, new attributions of value.

Example 9.8: A message as /*the ogres eat the children*/ not only prints to leseme /*ogre*/ with a *cannibalism* connotation, but that prints all the chains of connotations with a axiological attribute of *negativity*. It is clear that a series of messages explaining that ogres eat the children, but who are children of another species, in the same way that we eat the "*children*" of other animals, could change the global axiological connotation. For that reason, an adressee appeals generally to his patrimony of knowledge, to his own partial WV, to choose the subcodes that converge in the message.

<div align="center">***</div>

An ideology is a conceptualization or materialization of a WV. But conceptualization, crystallization, etc., that once appeared, immobilizes the WV that gave origin it. Any ideology, is crystallized immediately in a series of behaviors (*rules, organized associations, cults, discipline, rituals, liturgies, etc.*) that necessarily moves away of the WV that was its origin. According to Ferreras (1980) WV never is crystallized, conceptualized; it exists in the society, in its Doxical Superstructure, being able to mediate a series of social behaviors and ways to relate, but its existence is only verified by its effects. It have not, then, "*an objective presence*" of the WV, but "*a subjective presence*" or "*interior*" and, of course, diffusely perceived, by the subjects of the same society that has generated or produced this certain WV. WVs mediates the deep and nonconscious homologíes between the effects (literary works, art, science, deontical rules, etc.) and the society. Nevertheless, ideologies not only mediate, but that already explains the effects, but at the same time that explain them, they close, in a certain sense, all way to an explanation of these effects. Therefore, ideologies are historical crystallizations of a social class, group, etc. conscience; like something already given and constructed (by the associations that carry them). The cause that an ideology contains a high degree of falsification (the majority) have not to make forget us that happening of History usually transforms into ideological all type of WV, which not invalidate the human necessity of the ideological combat, of the fight necessity (*polemos*).

To define this partial WV, this prospective segmentation of the reality, is equivalent to define the ideology like *false conscience* (Marx and Engels, 1976). Naturally, this "*false conscience*" own of the Marxist theory, arises as theoretical camouflage from concrete social relations and certain material conditions of life. In this case, the ideology is a message that starting off of a present description, tries a theoretical justification and gradually it is gotten up to the society like element of the code. A semiotic theory of the ideologies is not interested in knowing as it is born the message nor which are its political or economic causes; however, if it interests to know in what sense the new element of the code may be called "*ideological*".

9.5. IDEOLOGICAL TRANSMISSION

We retook here the theory of images and projections exposed previously (Usó-Doménech et al., 2009[b]). We will denote like s_Σ the denotative significance (d-significance). We are going to suppose the existence of an only WV or an only ideology in the Ideological Doxical Superstructure (IDS).

Definition 9.17 (Usó-Doménech et al., 2009[b]): *For each d-significance s_Σ exists an only one IDS-significance $\varepsilon^D{}_\Sigma$ that we will denominate so like* doxical superstructural image (IDS-image) *of s_Σ in IDS.*

However, at the same time the human adressee adds a connotative significance $c - \vec{s}{}_\Sigma^D$.

Definition 9.18: *Corresponding to each IDS-significance s_Σ^D in IDS, will exist an only c-significance $c - \vec{s}{}_\Sigma^D$ to which we will call* connotative-SB-projection (CSB-projection) *of the IDS-significance s_Σ^D in the structural base (SB) and that $c - \vec{s}{}_\Sigma^D =$ for each ξ_Σ and for each $i_\Sigma \in I_\Sigma, i_\Sigma \in c - \vec{s}{}_\Sigma^D(\xi_\Sigma), iff\ i_\Sigma^C \in s_\Sigma^D(\xi_\Sigma)$.*

Note 9.4: *Connotative significance $c - \vec{s}{}_\Sigma^D$ can simply be an only significance or a connotative chain ℷ$_i$ of that the receiving subject only perceives its end.*
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A significant ◘ denotes significance s_Σ.

Note 9.5: *With the existence of ideologies any message becomes fixes formula of connotation and blocks any critical process of metasemiosis.*

Nevertheless, it can occur the case in that the metasemiotized message is not possible, and is that is certain the hypothesis of Sapir-Whorf (Sapir, 1921 and Whorf, 1956).

Hypothesis of Sapir-Whorf: *The syntactic structure of a language L is the own ideological network that imposes to the user a certain WV.*

Verbal times of the Indo-European languages, with their forms of present, past, future, conditional, past participle, etc., give to a WV of temporary course different from Eastern languages (Chinese, for example). Logical systems are different, therefore, and with it a total and radically different vision of the Nature.

In this point, the acquired experience, as soon as "*culture*", no longer are a strange remainder to the semiotical universe. It is organized in semiotic structure. The systems of significances are homologous to the systems of significants and from the semiotic point of view they are recognizibles. We are before a denotative semiotics, that is the plane of expression of a connotative semiotics (Hjelmslev, 1961). It is evident that the semantic systems arise from material conditions of life, but the semiotics can recognize them solely if the experience of these conditions of life has been codified. In this point, the elements of the ideology as culture may be described by the linguistic system.

The selection of a code or another one, given by connotations $c-^1\vec{S}_\omega^D$ and $c-^2\vec{S}_\omega^D$ can be determined by factors of practical order: the maximum of energy could be good having, even at the cost of degradation of environment, or accepting an insufficient energy before running the risk of an ecological catastrophe. This set of valuations constitutes the type of ampler recognition, and therefore, a new extrasemiotic remainder. Nevertheless, if it is socialized in SB, this remainder is semiotically again organized.

We are going to consider the SB in times t_n and t_{n+1} like two containers that we will denominate β and α respectively. System $\beta-\alpha$ will be considered like source of information, corresponding the "phantasmagoric" referential, that are an extrasemiotical being, the message to communicate that things or events happen in β. Semiotics ha not to verify that it happens in β, but must control if the messages referred to β are grammarly correct. System $\beta-\alpha$ has been a system-code transmitting certain information and not others; it is playing the role of filter, polarizing lens or demon of Maxwell. We have then the concept of *doxical filter* that we have previously exposed. What represents the doxical filter in system $\beta-\alpha$ understood like system-code? It represents the *ideology*, which in this case is the same structure of the code (Eco, 1968).

In system $\beta-\alpha$ two phenomena happen:

1) They exist units of significance imposed like pertinent by the acquired experience.

2) It exists a syntactic structure of the code, which comes conditioned by the pertinent elements of the semantic system.

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In according to Eco (1968), there are two possible answers for the sructuration of the code:

1) They are accepted like pertinent only certain semantic units and not others, and a code with certain syntactic structures prevail, and for that reason culture has determined the structure of the code.

2) Syntactic structure of the code precedes to the individualization of the pertinent elements of the meaning; then, the semantic system does not generate the syntactic structure of the code, but that happens inversely. Then, the WV is considered in terms imposed by the system of generative rules of the code. In this case, language L determines culture and not culture determines language. That is to say, the hypothesis of Sapir-Whorf prevails.

We thought that both phenomena happen. Although language L determines culture (*second option*), the acquired experience accepts answers and not others, somehow modifying the syntactic structure of the code (*first option*). The evolution of the different Indo-European languages demonstrates this hypothesis. It is possible to be reinforced seeing the evolution of the different Romanic languages coming from the Latin.

A certain way to use a language L is identified with certain way to think a society, with its WV. Therefore, we may say:

Definition 9.19: *We define semiotically* ideology *like the final connotation of the chain of connotations* ל*, or like the connotation of all the connotations of leseme.*

9.5.1. An ecological case

Example 9.9: Let us suppose that the significance represents "ם = *energy consumption*". We will call α to the signal "*minimum of energy*" and ω to the signal "*maximum of energy*". Each one of these two signals would correspond to two denotative significances $s^D{}_\alpha, s^D{}_\omega$ that would correspond to two images $\varepsilon_\alpha, \varepsilon_\omega$ in IDS. The connotative projection of ε_α can suppose "$c - \vec{S}^D_\alpha = $ *minimum well-being*" and the one of ω, "$c - \vec{S}^D_\omega = $ *maximum well-being*". Why a certain adressee chooses a connotation and not another alternative? The experience has taught to him what α may

be hoped of the denoted situation and the patrimony of knowledge has become stabilized. This cultural patrimony represents a extrasemiotical remainder until it becomes and occasional or idiosyncratic, not communicating anybody. However, without the experience it has been socialized, the cultural data happens to be element of a semantic system, with a connotative subcode that establishes an imprisonment of prefixed references, from the significant one, by mediation of its denotation, until arriving at the connotation "*suitable energy*". The mechanism we can see it in figure 9.3.
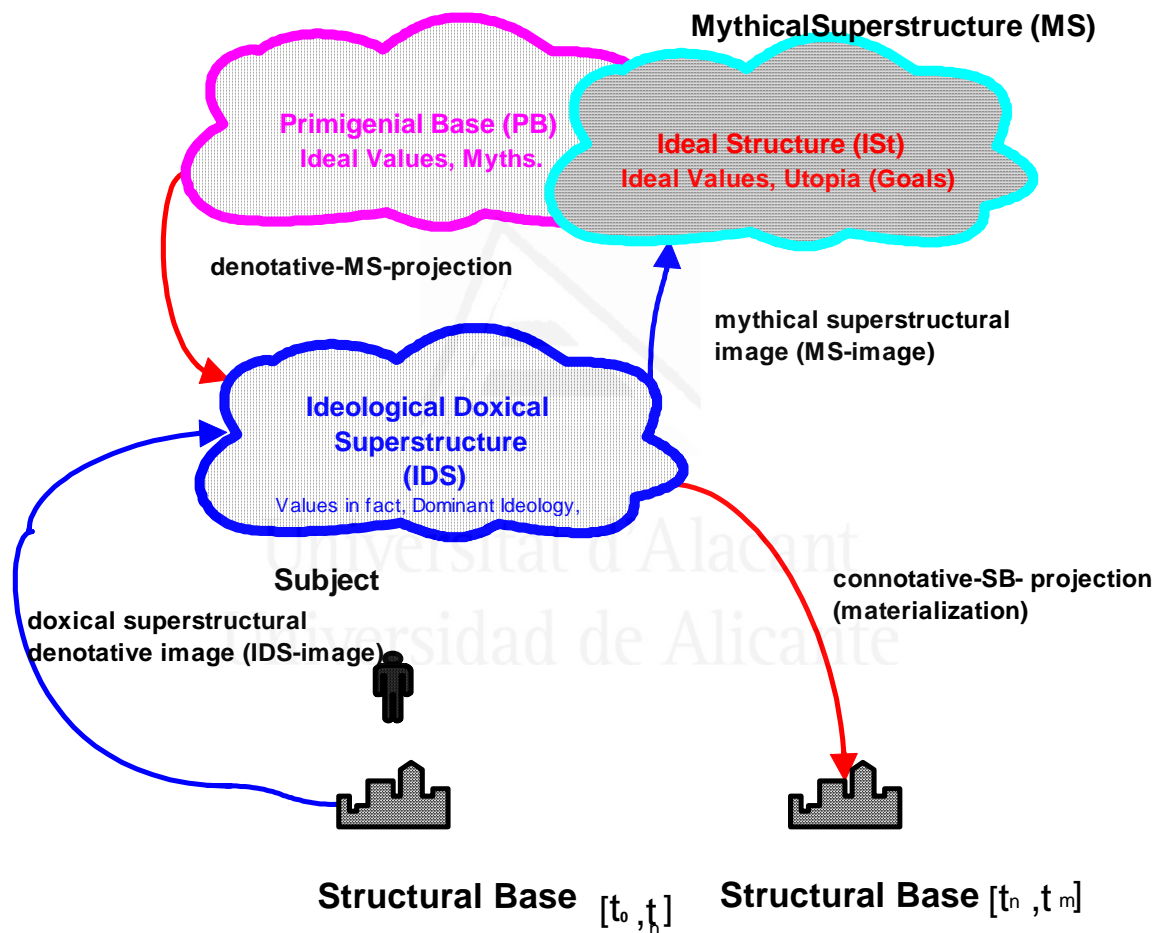
Figure 9.3.

Now let us suppose the case of two ideologies in IDS. We suppose the existence, in SB of two human groups, believing respectively in each one of the two ideologies (figure 9.4).
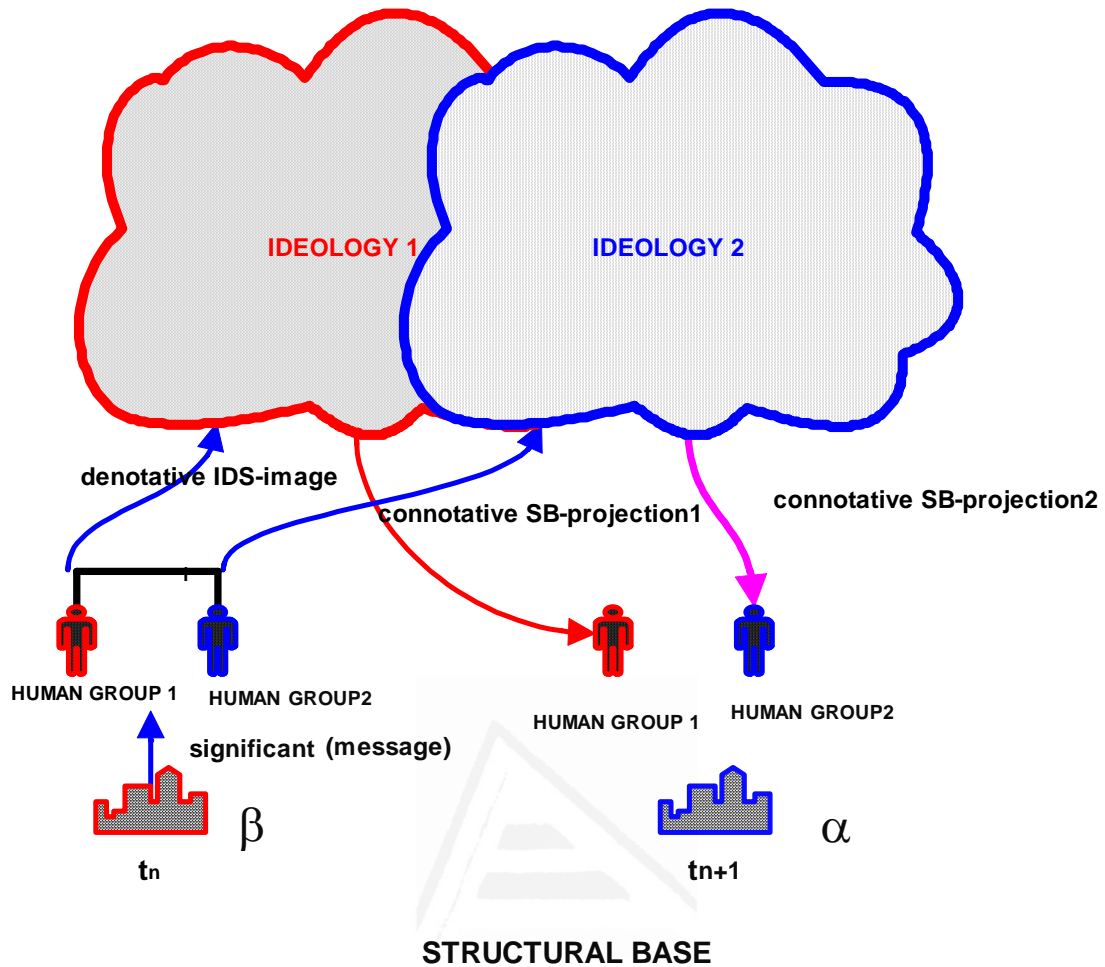
Figure 9.4.

Nevertheless, signal ω may denote, according to the adressee "*well-being*" or "*danger*" (degradation of environment), being based on two equally legitimate codes. We are before a series of semantic systems of secondary level that oppose values of the type "*desirable versus danger*". Each unit of these semantic systems "$c-{}^{1}\vec{S}_{\omega}^{D}$ = *maximum well-being*" and "$c-{}^{2}\vec{S}_{\omega}^{D}$ = *danger*" becomes the connotative significance of the significant "□ = *energy consumption*" represented by the denotative significance ε_{ω} of the semantic system in the first level.

Thus it may exist for a human group 1 a connotative code for $c-{}^{1}\vec{S}_{\omega}^{D}$ that establishes /*maximum of energy*/ = "*maximum of the productivity*" and other that establishes /*maximum of energy*/ = "*maximum well-being of the society*" and finally a subcode that whatever establishes /*maximum well-being of the society*/ = "*justification to any cost*". And it may exist for human group 2 an other connotative code for $c-{}^{2}\vec{S}_{\omega}^{D}$ that

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establishes /*respect by environment* / = "*elimination of all cost of unnecessary energy*". These systems of values are semantic systems that sometimes are excluded mutually. When they do not do it, they can be included in an ampler code than it offers transformation rules to translate the more restricted systems in terms of a more complete system. Now we suppose that somebody, belonging to human group 1, identifying message α with the connotation "*well-being*", uses it always thus. α becomes a symbol thus, in the emblem of "*well-being*". The fixed connection between the significant "◘ = *energy consumption*" and *Idea of Well-being* acts metaphorically. Then we were before a *rhetorical artifice* or *rhetorical figure*. We do not consider the case that somebody, with a nonconfesable interest, issues message α when the situation denoted habitually by α does not take place in SB. In this case, we would have a *falsification*. In this falsification case, still it is not possible to be spoken of ideological use of a language L, with the meaning of ideology like false conscience and camouflage (Eco, 1968). When message α becomes rhetorical figure connoting "*well-being*" automatically, conscientious or unconsciously, the believers of human group 1 reject the possibility of applying to the message, possibly the connotation of "*danger*". Due to the ampler semiotical system, second connotation $c-^2\vec{S}_{\omega}^{D}$ is equally foreseeable, but the use of the first connotation $c-^1\vec{S}_{\omega}^{D}$, optimistic type, is imposed or induced, it gives to the message a fixed ideological function. The message has become ideological instrument hiding the other relations. Then the ideology makes the function of false conscience from the Marxist perspective. According to Eco (1968), from the semiotical point of view a message α exists that has happened to be significant unit of a rhetorical subcode. This significant "◘ = *energy consumption*" connots a significance $c-^1\vec{S}_{\omega}^{D}$ or a significance $c-^2\vec{S}_{\omega}^{D}$, like semantic unit of an *ideological code*. In this case, the message hides (instead of communicating) the material conditions that had to express. In addition, it is because it has assumed falsifying functions preventing to see the different semantic systems in the totality from its mutual relations.

In our system $\beta - \alpha$ two phenomena happen:

a) The units of significance = *minimum of energy; maximum of energy* are imposed like pertinent by the acquired experience.

b) The syntactic structure of the code is conditioned by the pertinent elements of the semantic system.

10. THE IDEOLOGICAL DISCOURSE

10.1. CULTURAL UNITS AND INTERPRETANT

The main problem of interpretation of the Reality by mediation of a language L is to make depend the verification on the significant ◻ with the absolute being O to whom it is referred. It creates two problems with very difficult solution:

1) *Semiotic value of the significant ◻ is made depend on its veritative value v* (Usó-Doménech et al, 2009). One of the main reefs of semantic science is to define referential (absolute being) of concepts like /*dragoon*/ or /*fairy*/, that does not correspond to anything existing in the physical world. A logical answer would be that the function of the sign necessarily has not to be a physical object, but a property, relation, process, etc. However, this appeal to referential does not aid to understand as the sign works but that explains like the referential works (Eco, 1968). Of cases like /*dragoon*/, a solution consists of saying that are concepts without referential and only with a reference. These concepts can be defined as terms with the *same null extensions*, differing in its meaning (*secondary extension*) in the description that we may do.

2) *It is had to individualize the absolute being O to that the significant ◻ talks about, which leads to one insoluble aporia.*

10.1.1. Cultural units

Statements (propositions) exist to which are attributed veritative values v (*truth, uncertainty and falsification*), if they are compared with empirical events (Usó-Doménech et al, 2009). The subject adressee of the message always relates the message to "things" of which he speaks or he is spoken.

Example 10.1: Eco (1968) proposes the following clarified example: Let us suppose the two following phrases: /*Caesar was assassinated in the Roman Senate in the Idus of*

March/ and /*Ulysses reconquered his kingdom of Ithaca killing to the Procidas*/. From the semiotic point of view, it matters that:

1) In our culture codes with which the first phrase is understood, studied in the school and connote an existing "historical truth".

2) In classic Greece codes existed with which the second phrase was understood, the teachers taught and connoted "historical truth".

Nevertheless, for us, men of XXI Century, the second phrase connote legend or literary fiction that considered like historical truth during all the Classic Antiquity and part of the Middle Age. Therefore, from the thesis that we defend here

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Consequence 10.1: *Semiotic takes care of the signs like social forces. Any attempt to determine that it is the referential of a sign forces to define this referential in terms of an abstract unit that is not another thing that a cultural convention.*

Consequence 1 forces to release to the term "*denotation*" of its classic sense of historical commitment with the referential and to be equipped with a sense indicating another way in that the significance appears. Then, what is the significance of a term? It depends on the culture in which the subject catches that term. It is, therefore, a *cultural unit*.

Let C^k be a culture belonging to set of cultures C.

Definition 10.1: *We define as* cultural unit u_i^k *belonging to a certain culture* $C^k \in C$, *to all organization that is distinguished and defined culturally. Semiotically, a cultural unit* u_i^k *is an inserted semantic unit in the Global Semantic System.*

A cultural unit can be a person, place, thing, feeling, situation, fantasy, hallucination, idea, hope, custom, etc.

Let $\left(\underset{sem}{\equiv} \right)$ be the operation of semantic equivalence and $\left(\underset{sem}{\subseteq} \right)$ be the operation of semantic inclusion. The cultural units can be:

1) *Invariable:* intercultural units that all culture recognizes like such. For example, /*horse* / denotes, not a physical object, but a cultural unit that remains constant although translates /*horse*/ by /*caballo*/ (Spanish), /*cavall*/ (Catalan), /*cheval*/ (French), /*pferd*/, (German). Then $u_i^k \left(\underset{sem}{\equiv} \right) u_i^l \left(\underset{sem}{\equiv} \right) u_i^m \left(\underset{sem}{\equiv} \right) \ldots \left(\underset{sem}{\equiv} \right) u_i^m$.

2) *Variable*: cultural unit $u_i^l \in C^l$ has a different connotation that $u_i^m \in C^m$, with a greater or smaller extension in its meaning. For example, /*crime*/ has not the same connotation in the western modern society that in the Islamic or tribal worlds. Then $u_i^l \neg \left(\underset{sem}{\equiv} \right) u_i^m$.

3) *Extensional:* cultural unit *vary* in the extension of the meaning. For example, the term /*wind*/ has in Japanese around 50 meaning, depending if the wind comes from sea, is spring wind, comes from the top of a volcano, etc. This multiplicity of meaning even gets to modify the lexicon, forcing to apply to 50 terms instead of one (*kaze*). Then $\left(u_i^l \underset{sem}{\subset} u_i^m \right) \vee \left(u_i^m \underset{sem}{\subset} u_i^l \right)$.

4) *Privative:* It is own of a certain culture and nonexisting in another one. $u_i^l \in C^l \wedge u_i^m \notin C^m$. For example bullfights of bulls (*corridas de toros*) are privative of Hispanic but not of Anglo-Saxons cultures.

   a) *Indifferent privative*: example previously mentioned (bullfights of bulls) and the league of baseball, privative of the North American culture.

   b) *Opposed privative:* when they give to world totally opposite visions. For example $u_1^W =$ /*Christ is Son of God, and in Him they subpilfer two natures, human and divine, and one single person*/ (Western Culture) and $u_1^{Is} =$ /*Allah is the only God, and Mohamed His prophet* / (Islamic Culture). These privative opposite cultural units are ideological and generally causes of conflicts throughout the history of the humanity.

10.1.2. The Interpretant

To recognize the presence of cultural units is equivalent to understand the language like social phenomenon. Anyone of the two previous cultural units u_1^W, u_1^{Is} have not any

referential, and the logical-scientists mentalities can define them like lacking of meaning, or *pseudo-statement*. Nevertheless, neither the scientist nor the linguist will be able to explain why immense amounts of humans have fought ferociously to favor and against similar affirmations. Moreover, it is because both precise messages transmit meaning that they exist like cultural units within both civilizations and they become supports of connotative significances, initiating a range of semantic reactions able to imply behaviors that can mobilize enormous masses. The civilization to which the message talks about provides a series of explanations and definitions of the terms */person/*, */nature/*, */prophet/*, etc. Each definition is a new linguistic message having to be explained by mediation of other linguistic messages that define the cultural units of the preceding message. It is to say $u_1^k \mapsto u_2^k \mapsto ... \mapsto u_n^k \mapsto .....$, being $\mapsto$ the operation of *semantic explanation*.

Definition (Peirce, 1931-1935) 10.2: The Interpretant *of an object O is defined like another representation that talks about the same object.*

Interpretant can assume diverse forms (Eco, 1968):

1) An equivalent (or apparently equivalent) sign of another code. For example, to the word */cow/* corresponds the pictorial expression of a cow.
2) The index (subscript or supraindex) marking a singular object.
3) Definition in the terms of the same communicative code. For example, the term */salt/* means "*sodium chloride*".
4) Touching association that acquires value of fixed connotative significance. For example, for the western culture */dog/* connotes "*fidelity*" and nevertheless, for the traditional Islamic culture connotes "*impure animal*".
5) Simple translation of the word to another language.

Definition 10.3: *Series* $u_1^k \mapsto u_2^k \mapsto ... \mapsto u_n^k \mapsto .....$ *of semantic explanations are defined as* chain of interpretants *that indefinitely connect the cultural units of a society, and they are pronounced in form of denotative significances.*

Therefore, a process of limitless semiosis takes place. Then:

Hypothesis 10.1: *All language L is a self-explanatory system, by mediation of successive series of systems of cultural conventions that are explained.*

In Usó-Domènech et al. (2009), significants of first order (A-ם) and second order (B-ם) were defined. The same notion of interpretant demonstrates that in the life of each culture, each cultural unit can be simultaneously and indifferently, significant and significance, that is to say, (A-ם) and (B-ם). For example, /*water*/ is interpretant of /*H₂O*/, but simultaneously /*H₂O*/ is the interpretant of /*water*/. In a determined situation, a *water bottle* can be the interpretant of */water*/, or the gesture signal imitating to put the thumb next to the mouth, with the rest of the fingers closed and with movement towards the lips (anthropological sign understood by all the cultures).

Let $\iota\left(u_i^k\right)$ be the interpretant of a determined cultural unit $u_i^k . \in C^k$.

Property 10.1 (interpretant reflexivity): *Every cultural unit is interpretant of itself*
$$\iota\left(u_i^k\right) = \iota\left(u_i^k\right).$$

Property 10.2 (interpretant symmetry): *If* $u_j^k = \iota\left(u_i^k\right) \Rightarrow u_i^k = \iota\left(u_j^k\right).$

Property 10.3 (interpretant transitivity):
If $u_j^k = \iota\left(u_i^k\right)$ *and* $u_m^k = \left(u_j^k\right) \Rightarrow u_m^k = \iota\left(u_i^k\right).$

Therefore, we have an algebraic relation. At sight of the exposed thing, we can issue a new definition of interpretant.

Definition 10.4: *We define* interpretant *like the significance of a significant* (B-ם), *considered in its nature of cultural unit, shown by mediation of another significant and demonstrating its independence (like cultural unit) of the first significant.*

10.2. SEMANTIC MODELS OF CONNOTATION

Diverse models of connotation exist. We are going to expose some of them:

10.2.1. The model of Quillian or model of limitless semiosis

Quillian model (Quillian, 1968) is based reciprocally on a series of nodes connected by different types from associative vehicles. For each meaning of leseme, a node must exist anticipating the term that is to define. The definition of a type X_1 anticipates the use of a series of different significants, like their interpretants, receiving the name of *tokens* (Peirce, 1931-1935) being lesemes. The configuration of the lesemes' meaning comes given by multiplicity of bonds with different tokens, each one of which it becomes type X_2, of where it leaves a new configuration including as tokens many others lesemes, some from which were lesemes of own type X_1. The complete structure will have to form an enormous aggregation of ramifications in which each sign will be defined by another sign and each sign will become interpretant or interpreted of other signs. From an sign adopted as central type is possible to get to cross all the universes of cultural units, each one of which can be center and to generate infinite peripheries. This model tries to be a class of pluridimensional network, equipped with topological properties, in where the routes are extended and shortened and where each term comes near to the others through short cuts and direct contacts, remaining simultaneously tie to the others by always movables relations. Nevertheless, in fact, an able graph does not exist representing the model in all its complexity. The model of Quillian admits that the code can be fed with new researches and collect new data from other incompletes. It is a model of linguistic creativity. In addition, it gives a comprehensive image of the discussions of Wittgenstein on the meaning like a continuous superposition of correlations (Wittgenstein, 1953).

10.2.2. Model of Eco or model of wavelengths

Starting the model of Quillian, Eco (1968) proposes that each cultural unit of the Global Semantic Universe issues a determined wavelength, being in tune with a limitless number of other cultural units. It is the model of a code. The wavelengths change because of new issued messages, and for that reason the union possibilities change with the time. In other words, it verifies the hypothesis of De Mauro (1970) of which the components of the meaning have not *numerus clausus*, and are not closed in a system of pertinent units, constituting open series.

10.2.3. Model of the state-soup

Let us suppose Reality like a discreet source of generating null memory of data $\Delta = \{\Delta_1, \Delta_2, ..., \Delta_N\}$. This source issues a sequence of symbols belonging to a fixed and finite alphabet (Abramson, 1980) whose elements form a structure of data. These symbols are chosen with a fixed law of probability and we will admit that they are independent statistically. Probabilities with which the symbols appear are $p(\Delta_1), p(\Delta_2), ..., p(\Delta_N)$. The amount of information generated by the occurrence of Δ_i is:

$$I(\Delta_i) = \log \frac{1}{p(\Delta_i)} = -\log p(\Delta_i)$$

Also is called *value of surprise of the symbol.* Formula to calculate *the average amount of information $I(\Delta)$ associated to the source Δ* is:

$$I(\Delta) = \sum_\Delta p(\Delta_i) \cdot I(\Delta_i)$$

That is to say, we will take the values of surprise of each one of the possibilities of the source Δ and they are weighed in agreement with *an occurrence probability $p(\Delta_i)$.* The sum of everything will be the amount of research generated by the source Δ. The measure comes near to 1, the amount of information associated with the occurrence of the symbol tends to 0. In the case limit in that the probability of the symbol is 1, the occurrence of Δ_i does not generate any information. The information is not generated by the occurrence of the symbols thus do not exist alternative possibilities.

It exists a primitive state constituted by primitive symbols and their meaning. This way, in this initial state we can consider the existence of a singularity formed by an infinite number of elements that are in a minimum state of energy and having a form so that it belongs jointly to the structure of the language, but without any relation with the other elements to constitute a text. This state-soup represents an abstract model of the semantic associations in free state. In this state, there will be an infinite temperature of information, volume zero and infinite entropy. We have spoken of this *singularity* in the sense defined by present cosmology (Davies, 1983), since it represents the absolute no-cognoscibility and where it is possible to apply the principle *of absolute ignorance* of Hawking and therefore with an absolute lack of all information, is to say $I = 0$ o $H = +\infty$. This singularity is in a state of maximum disorder or thermodynamic balance. If it is compared with a perfect gas, the most probable state in certain amount of gas

closed in a container with key is of uniform density, and the position of individual molecules is at random, that is to say, any configuration between a high number of the possible configurations, will be equally probable. This one would be situation in our system before to begin to use language, when this singularity is had only which we have defined as the "*state soup*" (Usó-Domènech and Mateu, 2004), and is constituted by all the symbols of the language and is generated by its corresponding grammar. This one is the limit of our measure of information, the statistical situation of maximal entropy.

We will designate like Ω *a receiver of information* in Δ. Ω will be denominated sign and will be formed by the elements that exist before any interaction in the "*state-soup*".

From which way $I(\Omega)$ receives information of Δ or on Δ? $I_\Delta(\Omega)$ will be used to designate to this new information, indicating the subscript Δ the part of $I(\Omega)$ that has received information from Δ. The information transmitted from Δ to Ω is the total amount of information available in Σ, $I(\Omega)$, except an amount R or *noise* being expressed like:

$$I_\Delta(\Omega) = I(\Omega) - R$$

In the same way

$$I_\Delta(\Omega) = I(\Delta) - \varepsilon$$

being ε *the equivocity* of the information generated in Δ that is not transmitted to Σ. The information generated in Δ is divided in two parts:

1) Part $\left[I_\Delta(\Omega)\right]$ transmitted to Δ
2) Part ε not transmitted or *equivocity*.

Simultaneously, the information that is in Ω can divide of similar way in two parts:

1) Part $\left[I_\Delta(\Omega)\right]$ represents the information received from Δ.
2) The part surplus whose source is not Δ, or *noise* R. An increase of R causes that a part of the sign Ω is hidden, and of this form $I_\Delta(\Omega)$ will decrease by mediation of an increase of equivocity ε

If the noise increases, an amount of information is lost, and diminishes the amount of transmitted information, but if it does not affect to Δ, then $I_\Delta(\Omega)$ continues having the

same value. It happens that $\{\Delta_i\}$ is cause of $\{\Sigma_i\}$ depending on the real data. $\text{Sign}\,\Omega$ would have to us that happens exactly in the source Δ since $\Omega_1, \Omega_2, ..., \Omega_n$ knows it. From an informational point of view, $\Omega_1, \Omega_2, ..., \Omega_n$ takes more information than on which it has happened in Δ.

Although, for a determined structure of data, each symbol has certain a significant one or concrete fits, a temporary exchange of this structure, can determine an exchange in the symbol that represents it, that is to say, an exchange in fact in its significant and its significance or decoding on the part of the Subject.

1) Now let us suppose the existence of a *selective device*, to a species of spoon removing the state-soup. When shaking the soup are taken place different configurations, connections and proximities between the different elements. We can establish two options: The selective device can be humour, own idiosyncrasies, previous knowledge of the Subject, etc. Each individual is at readiness to reach "*spaceship*" or "*President Obama*", from leseme /*cat*/.

2) The second option, more refined, is the *semantic charges* equipped to the lesemic elements establishing a system of attractions and repulsions, so that they approach to each other and other no. This species of *semantic magnetic field* would reduce the interrelation possibilities and, in fact, it would constitute a code.

From the selective devices, either option 1 or 2, the Quillian's model is constructed.

A code is not a simple system of oppositions, although this one puts in order in a situation with very high entropy. In fact, a code (Eco, 1968) is outlined like:

1) The system of the significant units and its rules of combination.

2) The system of the semantic systems and the rules of semantic combination of the different units, which are distinguished of their semantic components and they are made mutually compatible or incompatible.

3) The system of possible couplings and the rules of transformation from the one to the other.

4) A set of circumstantial rules that anticipates diverse circumstances of communication corresponding to diverse interpretations.

The code is not a condition of the Global Semantic Universe or one underlying structures, of a stable way, to the complex of bonds and ramifications that constitute the operation of all association of signs. If lesemes in freedom in the state-soup represents a model of infinite entropy, the code is the rule that provides semantic charges to the units following a system of attractions and repulsions. If we accepted the existence of the of a structure of the Human Spirit (idealistic philosophy), then the same semantic charge is inserted in lesemes like a species of own quality. The code is, nevertheless, a changing social convention in time and space, and the semantic charges a transitory condition of the system. It is not an ontic property and it have not the aletical modality of existence and necessity. For that reason we affirmed that the semantic charges are cultural phenomena and that the state-soup is a combinatorial place of a highly undetermined game. What we suppose that codes they are transient, safe in some cases of strong and lasting semantic fields and lasting, such as the scientific definitions, and it is impossible to institute and to describe like stable structures.

10.3. PERSUASIVE TRANSMISSION

An exhaustive semiotic treatment will have to treat, not only the linguistic codes, but also the iconographic codes, as much classic as modern. In these codes, they will have to be including cinema, television, publicity, informalism, comics, sacred and lay painting, sculpture, architecture, etc. The ideological transmission, at modern times, is using technical advertising highly developed. According to Eco (1968), the publicity techniques are founded on the informative budget that an announcement (cartel, spot, etc.) attracts plus the attention at the most violates the usual communicative norms, and by this cause, it upset a system of rhetorical expectations. In addition, it is certain that a good publicity always will try to make the reclamation by mediation of original solutions that prevail by their own originality. And it is done in such a way that the reaction of the auditor (usuary) does not only consist of a reaction of unconscious type before any stimulus, but in a recognition of the genius, impelling to an acceptance, as much of the offered thing, as of the aesthetic one of the own announcement.

The advertising codes work by mediation of two registries:

a) *Visual registry.*

b) *Verbal registry*, that has the primary function to fix the message, since with frequency, the visual contact appears with ambiguity characteristics.

Often the image is plagued of rhetorical solutions (tropos and arguments) that can give rise to diverse decoding. The written text takes part with purely referential functions to lead to the user in the wished direction. Nevertheless, they are possible to be produced so much a homology of rhetorical solutions as a total discordance. It is possible to be given:

1) Image with aesthetic function and a text with touching function.
2) Image that comes by simple tropos and text introducing rhetorical places.
3) Image with argumental place and text that contradicts it.

Et cetera.

It does not enter within ours intentions to make a study of the different levels from the advertising communication. Nevertheless, we will pay attention to four aspects of an advertising message, interesting by its application to the ideological transmission, due to its condition of persuasive message:

1) Messages with rhetorical redundancy and ideological redundancy.
2) Messages with rhetorical information and ideological redundancy.
3) Messages with rhetorical redundancy and ideological information.
4) Messages with rhetorical information and ideological information.

It is this last one that offers more interest for our intentions. Generally, this type of messages uses original rhetorical artifices, and therefore, by mediation of a high informative tension at rhetorical level, they cause shocks in the ideological field. They constitute in themselves, a mediatic form in which the ideological information constitutes the primary aim of the persuasive act. It is wanted to persuade to conserve or to change the ideological systems. Its difference with the commercial persuasion is evident. In this one, a certain pragmatic picture exists that demands a certain ideological fund, and that must confirm more than to change. The consumption is consequence of a certain ideology of liberal type. Ideology comes implicit in same existence of the publicity.

Hypothesis 10.2: *The auditor from their origin must know connotative significances of an ideological advertising rhetoric.*

Hypothesis 10.3: *The notion of ideological information is a neutral notion that does not imply the valuation of ideology nor its conditions of veracity or falsification*.

We can pay attention to two cases of advertising persuasive rhetoric that are well different:

1) The existence of advertising announcements directed to problems affecting the life of the colectivity, and that they have like primary aim the change to belief systems affecting the social behavior: campaigns of road security, campaigns against cancer, aid to the childhood, etc.

2) Use of false arguments of the type *post hoc, ergo to propter hoc*, leaning in premises, arguments, topical fields clearly heuristic: economic crises because of the capital and globalization, Science like enemy of the planet, family like unnatural and repressive being, etc.

 In fact, both cases previously exposed would be equally informative. And equally informative, and that at the moment faces the ideological system In fact both cases previously exposed would be equally informative and that now faces the ideological system and its derivatives values in fact in use. Announcements which they persuaded to the population things such as to persecute the Jews, to take to the political adversaries to concentration camps etc., or others like to teach homosexual practical in schools, to legalize drugs, to practice euthanasia by apparently merciful reasons, etc.

Consequence 10.2: *The rhetoric of the publicity establishes the ways according to which the message is highly informative, and the means adapted for them.*

Consequence 10.3: *The attitude that is adopted in front of the advertising persuasive messages, although has a great semiotic component, depends on the system of values in fact derived from a certain ideology.*

Consequence 10.4: *If publicity implies a great amount of joints logics, and despite it is understood quickly, it means that the arguments and premises communicated were codified already, and for that reason they can be understood.*

10.4. PERSUASION MECHANISMS OF CONNOTATIVE PROJECTIONS

Let ל^j_i be a connotative chain. Index i expresses a connotative chain and supraindex j expresses a connotative chain after passing through a certain doxical filter. Let L be a language. The experience of the individuals or social groups moves in a double land; all it is articulated linguistically by mediation of a set of the connotive chains $\text{ל} = \{\text{ל}^j_i\}^{j=1,...,m}_{i=1,...,n}$, and can, at any moment, by poor who are the invoked significants, to be translated to an organizing language. Language L is surpassed always and the possibility of a linguistic structuring is outlined permanently. This exteriority is real; the individual is in front of diverse sublanguages $L_i \subset L$, formed by the different connotative chains or those they do of crucible of his experience and so that $\text{ל} \in L_i$. These sublanguages L_i are supported by social groups, associations, individuals that update them with their behaviors, giving a social dimension assuring its coherence and permanence. Therefore, all social experience is located inside a semantic field of connotative significances. By definition, it can never be the corresponding one of the language L, which includes it. The individual finds a sublanguage L_i constituted that it seems apt to translate all the sense of his history; it enriches him yet what his existence can have of specific, but at the same time, this existence loses his chaotic sense, is ordered, completed in an intelligible place with the other human lives. Community and difference are overlapping closely. In addition, suddenly, this dissymmetric and heterogenous environment is reconstructed. Sublanguage L_i explains, gives a sense, and fixes the identity of the condition. By this only fact, it is validated and reassumed in its generality. The encounter with the sublanguage L_i is rare time theoretical or abstract. It happens through an individual mediation that is conscious vehicles and that they incarnate it in his existence. They appear as unified forms with which the others could be identified. Peculiarly, they are the true connotative significances for this one sublanguage. The contingency of the encounter is not for that reason less evident. Moreover, although it is contingent, this encounter does not let have irreversible effects. Individual is marked by the sublanguage L_i that has totalized his experience; here

significance is pronounced the quasi-biological incidence of the connotative significances on the human being. The better proof is the fact than sometimes a other sublanguage L_j cannot be sufficient.

Example 10.2: In the Germany of 1932, the workers who adhered as much to the Communist party as to the Nazi party, they have initially happened the same experiences, they have known the same difficulties. However, the reality of their experiences, recognized in both cases, have been differently constructed in a sublanguage L_i or another one L_j, referred to opposed explanatory systems. Only psychological or psychosocial causes, give account of the selection that could be done. Nevertheless, how it is arrived at this selection of sublanguages? By mediation of a technique of persuasion defined as *Rhetoric*.

<div align="center">***</div>

Aristotle (1926) admits the existence of an *apodictic* reasoning (*αποδεικτικός*), in which the conclusions are extracted by syllogisms of unquestionable premises, founded on *first principles*. This type of reasoning does not admit discussion and they prevail by the same authority of its arguments. It follows the *dialectic* reasoning (διαλεκτική), that argues on probable premises, in which it was lawful and possible at least two possible solutions and the reasoning tends to decide which of the two is most acceptable. In last term it is the *rhetorical* reasoning, leaving from probable premises and reaches nonapodíctic conclusions being based on the rhetorical syllogism or *entimema* (*ενθύμημα*). However, rhetoric did not try solely to obtain a rational establishment, but also touching; therefore one *appeared like a technique to subjugate the listener*. In its long history, rhetoric has enjoyed many definitions, accommodated differing purposes, and varied widely in what it included. Discerning how language is working in others' or one's own writing and speaking, one must (artificially) divide form and content, *what* is being said and *how* this is said. Because rhetoric examines so attentively the *how* of language, the *methods* and *means* of communication, it has sometimes been discounted as something only concerned with style or appearances, and not with the quality or *content* of communication. Rhetoric studies the effectiveness of language comprehensively, including its emotional impact (*pathos*) as much as its propositional content (*logos*). To see how language and thought worked together, however, it has first been necessary to artificially divide content and form.

In the sense to consider rhetoric as art of the persuasion (or as a *subtle deceit*) happens to have the consideration of technique of human reasoning, controlled by the doubt, and put under all the historical, social, psychological, biological, etc. agreements of all human act. Nevertheless, diverse degrees of persuasive reasoning exist, being a series of gradations going from the honest and cautious persuasion to the persuasion as deceit.

In agreement with Eco (1968) two contradictions in the rhetoric stand out:

1) Rhetoric tends to indicate the attention in a reasoning to convince to the auditor of whom he still ignores, and of an unusual way (informative).

2) The result is obtained starting off which the auditor knows and wants, trying to demonstrate that it is a natural conclusion.

That is to say, an oscillation between redundancy and information exists and for that reason it is necessary to redefine rhetoric in a double sense:

Definition 10.5: *We define* Rhetoric *like:*

1) A generative technique, or argumental mechanisms allowing generating persuasive argumentations based on dialectic existing between information and redundancy.

2) Container of argumental techniques verified and assimilated by the social body belonging to Structural Base (SB).

In the second option, rhetoric is a container of codified solutions (Eco, 1968) according to which, persuasion only confirms the departure code, by mediation of a final redundancy. In according to Eco (1968) it is the second option the one that is used daily, calling rhetorical reasoning that that uses done phrases, acquired opinions, touching incentives already consumed, but effective for receivers off guard. In order to convince the auditor, the speaker must try demonstrating that their conclusions derive from some premises, which cannot be discussion object, by mediation of a type of arguments that cannot be put in doubt. Premises and arguments appear as forms to think on whose pertinence the auditor already is convinced. On these premises, they are articulated arguments. In according to Perelman (Perelman and Olbrechts-Titeca, 1958) premises keep in *places*, warehouse of possible argumentations, generating formula of entimemas. Some faced places are contradictory, although taken separately they can be

convincing to the auditor. It exist *Places of quantity*, where the statistically majority thing becomes normative. It exist Places *of quality*, where the normative thing is only the exceptional thing. In order to incline to the auditor taking attention to premises and arguments, the speaker stimulates his attention; for this they serve to the traslative and *rhetorical figures,* that are not but aesthetic forms, thanks to which the reasoning seems new, with a note unexpected information.

10.5. RHETORICAL FIGURES

For our intentions we are going to define some of the more important rhetorical figures and than they are widely used in the ideological discourse having and objective to transmit the ideology, assuring its permanence and diffusion (Beekman, J., Callow,1974; Corbett, Edward P. J., 1971; Lakoff and Johnson, 1980)

Definition 10.6: *A* discourse *is an instance of language use whose type can be classified based on such factors as grammatical and lexical choices and their distribution in: Main versus supportive materials, theme, style and the framework of knowledge and expectations within which the addressee interprets the discourse.*

Definition 10.7: *A* trope *is the figurative use of an expression.*

The model of Quillian is governed by a limitless semiosis, that is to say, each leseme, sooner or later, acquires connections with another one, and each substitution has to depend on a connection that the code anticipates. Of course, connections can be created about which nobody has thought. In this case, we have an ambiguous message. The aesthetic function of the language tends to still create nonexisting connections, and therefore, to enrich the possibilities of the code.

By the importance that has with respect to the belief systems and ideologies, we are going to study three rhetorical figures: *metaphor, metonymy and parable*. Rhetorical figures of metaphor and metonymy can be explained using Quillian and state-soup models. By mediation of a suitable device the state-soup has been shaken and let us suppose that a code has formed that raises a system of paradigmatic relation. Both rhetorical figures can be explained as two forms of operational substitution operating on paradigmatic or sintagmatic axes.

10.5.1. The metonymy

Metonymy is a figure of speech in which a thing, concept, person, or group is represented by something closely associated with it. Metonymy is often contrasted with metaphor. Metonymy is characterized by association, whereas metaphor establishes a relationship of similarity. Thus refering to a king as the throne is an instance of metonymy. Referring to the king as a lion is an instance of metaphor.

Definition 10.8: *A* metonymy *is broadly defined; a trope in which one entity is used to stand for another associated entity and, more specifically, a replacive relationship that is the basis for a number of conventional metonymic expressions occurring in ordinary language.*

Definition 10.9: *A* conventional metonymy *is a metonymy that is commonly used in everyday language in a culture to give structure to some portion of that culture's conceptual system.*

Let $c - s_i$ and $c - s_j$ be two connotations (*cultural units*). We denote like **μ** the relation of metonymy and $c - s_i$ **μ** $c - s_j$ we will say that $c - s_i$ is metonymically related to $c - s_j$ or $c - s_j$ is a metonymy of $c - s_i$. The metonymy has the following properties:

a) *Reflexive property:* $c - s_i$ **μ** $c - s_i$. Every connotation is metonymy of itself.
b) *Symmetrical property:* $c - s_i$ **μ** $c - s_j = c - s_j$ **μ** $c - s_i$.
c) *Transitive property:* If $c - s_i$ **μ** $c - s_j$ and $c - s_j$ **μ** $c - s_k$ then $c - s_i$ **μ** $c - s_k$

We are to define the operation of *Metonymic substitution*.
In the common practice of the language, proximities have been verified on the *sintagmatic axis*.

Example 10.3: Two lesemes have been connected (Figure 10.1).

SINTAGMATIC AXIS
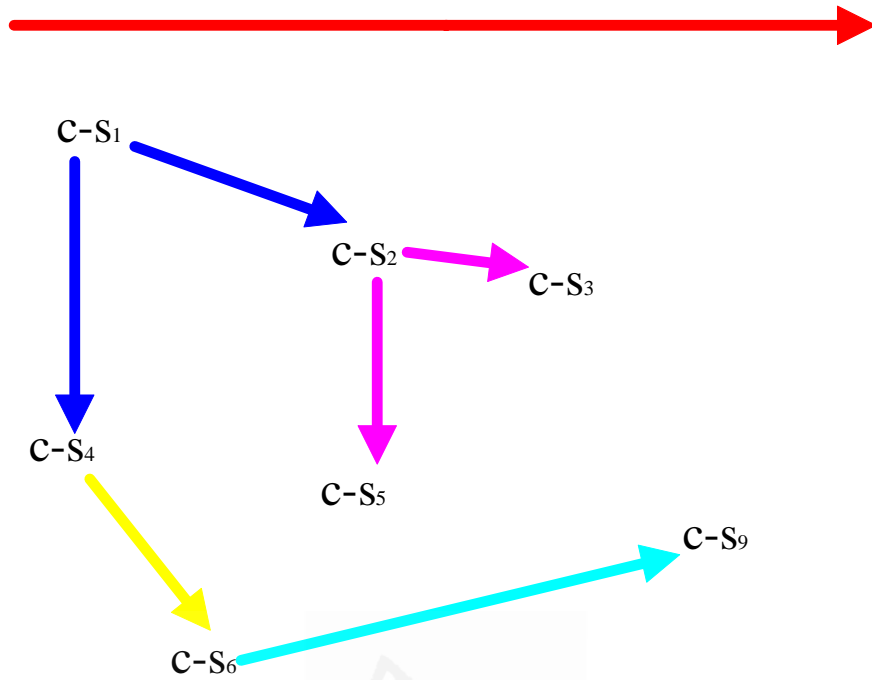
Figure 10.1.

Let $c - s_i$ and $c - s_j$ be two lesemes. We define an *operation of metonymic substitution*, denoted by (⊠), and so that $c - s_i (⊠) c - s_j \rightarrow c - s_j$.

In figure 10.1 we can establish the following metonymic substitutions:

$$c - s_1 (⊠) \; c - s_2 \rightarrow c - s_2$$

$$c - s_1 (⊠) \; c - s_4 \rightarrow c - s_4$$

$$c - s_2 (⊠) \; c - s_3 \rightarrow c - s_3$$

$$c - s_2 (⊠) \; c - s_5 \rightarrow c - s_5$$

$$c - s_4 (⊠) \; c - s_6 \rightarrow c - s_6$$

$$c - s_6 (⊠) \; c - s_9 \rightarrow c - s_9 \qquad .$$

Then

$$c - s_1 (⊠) \; c - s_2 \rightarrow c - s_2 (⊠) \; c - s_3 \rightarrow c - s_3 \quad\blacktriangleright\quad c - s_1 (⊠)^2_{i=1} c - s_3 \rightarrow c - s_3$$

$$c - s_1 (⊠) \; c - s_2 \rightarrow c - s_2 (⊠) \; c - s_5 \rightarrow c - s_5 \quad\blacktriangleright\quad c - s_1 (⊠)^2_{i=1} \; c - s_5 \rightarrow c - s_5$$

$$c - s_1 (⊠) c - s_4 \rightarrow c - s_4 (⊠) c - s_6 \rightarrow c - s_6 (⊠) c - s_9 \rightarrow c - s_9 \quad\blacktriangleright\quad c - s_1 (⊠)^3_{i=1} c - s_9$$

***

Generalizing

$$c - s_i (\maltese)^{\mathbf{m}}_{\mathbf{i=1}} \ c - s_j \rightarrow c - s_j$$

being m the number of existing semantic connections of substitution between $c - s_i$ and $c - s_i$ in the model of Quillian.

Example 10.4: Let us suppose a message that to affirm for the first time "*the President of United States lives in the White House, in Washington*". A semantic proximity exists that can induce to the metonymic substitution /*the official notice of the White House*/ or /*the official notice of Washington* / instead of "*the official notice of the President*". From this moment, the metonymic substitution enter the logic of the auditors (interpretants) and "*White House*" or "*Washington*" become two connotations of /*President of the United States*/ or vice versa.

***

Let $c - s_0$ be a connotative significance of null meaning. Metonymic substitution has the following properties:

1) *Conmutative property:* $(c - s_i (\maltese) c - s_j \rightarrow c - s_j) = (c - s_j (\maltese) c - s_i \rightarrow c - s_i)$.

2) *It has not Neuter element*: $(c - s_i (\maltese) c - s_0 \rightarrow c - s_0) \neq (c - s_0 (\maltese) c - s_i \rightarrow c - s_i)$.

3) *Associative property:*

$$(c - s_i (\maltese) c - s_j \rightarrow c - s_j)(\maltese)[(c - s_k (\maltese) c - s_l \rightarrow c - s_l)(\maltese)(c - s_m (\maltese)(c - s_n \rightarrow c - s_n)] = [($$

$$c - s_i(\maltese) c - s_j \rightarrow c - s_j)(\maltese)(c - s_k (\maltese) c - s_l \rightarrow c - s_l)](\maltese)(c - s_m (\maltese) c - s_n \rightarrow c - s_n)$$

We are to define the operation of *double metonymic substitution*.

Let $c - s_i, c - s_j$ be two connotative significances fulfilling the condition of metonymy so that $c - s_i \, \boldsymbol{\mu} \, c - s_j$. Let $c - s_i^*, c - s_j^*$ be its two equivalent in a different context and so that $c - s_i \equiv c - s_i^* \wedge c - s_j \equiv c - s_j^*$ and so that $c - s_i^* \, \boldsymbol{\mu} \, c - s_j^*$. We will designate by $(\maltese)^{\leftrightarrow}$ the operation of double metonymic substitution.

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Theorem 10.1: $c - s_j (\mathbf{\Sigma})^{\leftrightarrow} c - s_i^*$

Proof:

By the symmetrical property of the metonymic relation, we may establish that:

$$c - s_i (\mathbf{\Sigma}) c - s_j \ \wedge \ c - s_j (\mathbf{\Sigma}) c - s_i$$

$$c - s_i^* (\mathbf{\Sigma}) c - s_j^* \ \wedge \ c - s_j^* (\mathbf{\Sigma}) c - s_i^*$$

If

$$[(c - s_j (\mathbf{\Sigma}) c - s_i) \wedge (c - s_i \equiv c - s_i^*)] \rightarrow c - s_j (\mathbf{\Sigma}) c - s_i^*$$

$$[(c - s_i^* (\mathbf{\Sigma}) c - s_j^*) \wedge (c - s_j \equiv c - s_j^*)] \rightarrow c - s_i^* (\mathbf{\Sigma}) c - s_j$$

Therefore $c - s_j (\mathbf{\Sigma})^{\leftrightarrow} c - s_i^*$

Theorem 10.2: $c - s_i (\mathbf{\Sigma})^{\leftrightarrow} c - s_i^*$

Proof:

If

$$[(c - s_i^* (\mathbf{\Sigma}) c - s_j^*) \wedge (c - s_j (\mathbf{\Sigma}) c - s_i)] \rightarrow (c - s_i^* (\mathbf{\Sigma}) c - s_i)$$

then

$$[(c - s_i^* (\mathbf{\Sigma}) c - s_i) \wedge (c - s_i \equiv c - s_i^*)] \rightarrow c - s_i (\mathbf{\Sigma})^{\leftrightarrow} c - s_i^*$$

We are to define the operation of *Multiple Metonymic Substitution*.

Let $c - s_i, c - s_j, ..., c - s_n$ be n connotative significances fulfilling the condition of metonymy so that:

$$c - s_i \, \mathbf{\mu} \, c - s_j \dots \ c - s_i \, \mathbf{\mu} \, c - s_n, c - s_j \, \mathbf{\mu} \, c - s_k .., c - s_j \, \mathbf{\mu} \, c - s_n \dots c - s_{n-1} \, \mathbf{\mu} \, c - s_n .$$

Let $c - s_i^*, c - s_j^*, ..., \ c - s_n^*$ be its equivalents in a different context and so that

$$\left(c - s_i \equiv c - s_i^* \right) \wedge \left(c - s_j \equiv c - s_j^* \right) \wedge ... \wedge \left(c - s_n \equiv c - s_n^* \right) \text{ and so that:}$$

$$c - s_i^* \, \mathbf{\mu} \, c - s_j^*, ..., c - s_i^* \, \mathbf{\mu} \, c - s_n^*, c - s_j^* \, \mathbf{\mu} \, c - s_k^* .., c - s_j^* \, \mathbf{\mu} \, c - s_n^* \dots c - s_{n-1}^* \, \mathbf{\mu} \, c - s_n^* .$$

Theorem 10.3:

$$(c - s_j(\maltese)^{\leftrightarrow} c - s_i^*) \wedge \ldots \wedge (c - s_n(\maltese)^{\leftrightarrow} c - s_i^*), (c - s_i(\maltese)^{\leftrightarrow} c - s_j^*) \wedge \ldots \wedge$$

$$(c - s_n(\maltese)^{\leftrightarrow} c - s_j^*) \wedge \ldots \wedge (c - s_i(\maltese)^{\leftrightarrow} c - s_n^*) \wedge \ldots \wedge (c - s_{n-1}(\maltese)^{\leftrightarrow} c - s_n^*)$$

Proof:

By the symmetrical property of the metonymic relation, we may establish that:

$$c - s_i(\maltese) c - s_j \wedge c - s_j(\maltese) c - s_i, \ldots, c - s_i(\maltese) c - s_n \wedge c - s_n(\maltese) c - s_i$$

$$c - s_j(\maltese) c - s_k \wedge c - s_k(\maltese) c - s_j, \ldots, c - s_j(\maltese) c - s_n \wedge c - s_n(\maltese) c - s_j$$

$$\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$$

$$c - s_n(\maltese) c - s_{n-1} \wedge c - s_{n-1}(\maltese) c - s_n$$

and

$$c - s_i^*(\maltese) c - s_j^* \wedge c - s_j^*(\maltese) c - s_i^*, \ldots, c - s_i^*(\maltese) c - s_n^* \wedge c - s_n^*(\maltese) c - s_i^*$$

$$c - s_j^*(\maltese) c - s_k^* \wedge c - s_k^*(\maltese) c - s_j^*, \ldots, c - s_j^*(\maltese) c - s_n^* \wedge c - s_n^*(\maltese) c - s_j^*$$

$$\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$$

$$c - s_n^*(\maltese) c - s_{n-1}^* \wedge c - s_{n-1}^*(\maltese) c - s_n^*$$

If

$$[(c - s_j(\maltese) c - s_i) \wedge (c - s_i \equiv c - s_i^*)] \to c - s_j(\maltese) c - s_i^*$$

$$\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$$

$$[(c - s_n(\maltese) c - s_i) \wedge (c - s_i \equiv c - s_i^*)] \to c - s_n(\maltese) c - s_i^*$$

$$[(c - s_k(\maltese) c - s_j) \wedge (c - s_j \equiv c - s_j^*)] \to c - s_k(\maltese) c - s_j^*$$

$$\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$$

$$[(c - s_n(\maltese) c - s_j) \wedge (c - s_j \equiv c - s_j^*)] \to c - s_n(\maltese) c - s_j^*$$

$$\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$$

$$[(c - s_n(\maltese) c - s_{n-1}) \wedge (c - s_{n-1} \equiv c - s_{n-1}^*)] \to c - s_n(\maltese) c - s_{n-1}^*$$

and

$$[(c - s_i^*(\maltese) c - s_j^*) \wedge (c - s_j \equiv c - s_j^*)] \to c - s_i^*(\maltese) c - s_j$$

therefore

$$(c - s_j(\maltese)^{\leftrightarrow} c - s_i^*) \wedge \ldots \wedge (c - s_n(\maltese)^{\leftrightarrow} c - s_i^*), (c - s_i(\maltese)^{\leftrightarrow} c - s_j^*) \wedge \ldots \wedge (c - s_n(\maltese)^{\leftrightarrow} c - s_j^*)$$

$$\wedge \ldots \wedge (c - s_i(\maltese)^{\leftrightarrow} c - s_n^*) \wedge \ldots \wedge (c - s_{n-1}(\maltese)^{\leftrightarrow} c - s_n^*)$$

Theorem 10.4: $c - s_i(\maltese) \overset{\leftrightarrow}{} c - s_i^*, ..., c - s_i(\maltese) \overset{\leftrightarrow}{} c - s_n^*, c - s_j(\maltese) \overset{\leftrightarrow}{} c - s_j^*, ...,$

$c - s_j(\maltese) \overset{\leftrightarrow}{} c - s_n^*, ..., \; c - s_n(\maltese) \overset{\leftrightarrow}{} c - s_n^*$

Proof:

If

$$[(c - s_i^*(\maltese) c - s_j^*) \wedge (c - s_j(\maltese) c - s_i)] \rightarrow (c - s_i^*(\maltese) c - s_i) \qquad \text{(a)}$$

……………………………………………………………

$$[(c - s_i^*(\maltese) c - s_n^*) \wedge (c - s_n(\maltese) c - s_i)] \rightarrow (c - s_n^*(\maltese) c - s_i) \qquad \text{(b)}$$

$$[(c - s_j^*(\maltese) c - s_k^*) \wedge (c - s_k(\maltese) c - s_j)] \rightarrow (c - s_k^*(\maltese) c - s_j) \qquad \text{(c)}$$

……………………………………………………………

$$[(c - s_j^*(\maltese) c - s_n^*) \wedge (c - s_n(\maltese) c - s_j)] \rightarrow (c - s_n^*(\maltese) c - s_j) \qquad \text{(d)}$$

……………………………………………………………

$$[(c - s_{n-1}^*(\maltese) c - s_n^*) \wedge (c - s_{n-1}(\maltese) c - s_n)] \rightarrow (c - s_{n-1}^*(\maltese) c - s_{n-1}) \qquad \text{(e)}$$

then of

(a) $\Rightarrow [(c - s_i^*(\maltese) c - s_i) \wedge (c - s_i \equiv c - s_i^*)]$ therefore $c - s_i(\maltese) \overset{\leftrightarrow}{} c - s_i^*$

(b) $\Rightarrow [(c - s_i^*(\maltese) c - s_n) \wedge (c - s_n \equiv c - s_n^*)]$ therefore $c - s_i(\maltese) \overset{\leftrightarrow}{} c - s_n^*$

(c) $\Rightarrow [(c - s_j^*(\maltese) c - s_j) \wedge (c - s_k \equiv c - s_k^*)]$ therefore $c - s_j(\maltese) \overset{\leftrightarrow}{} c - s_k^*$

(d) $\Rightarrow [(c - s_j^*(\maltese) c - s_n) \wedge (c - s_n \equiv c - s_n^*)]$ therefore $c - s_j(\maltese) \overset{\leftrightarrow}{} c - s_n^*$

(e) $\Rightarrow [(c - s_{n-1}^*(\maltese) c - s_n) \wedge (c - s_{n-1} \equiv c - s_{n-1}^*)]$ therefore $c - s_n(\maltese) \overset{\leftrightarrow}{} c - s_n^*$

Multiple metonymic substitutions are essential to understand mathematically the ideological transmission through messages of advertising type. Any reader of publicity understands this process developed in theorems 10.3 and 10.4 with no need to be involved in a so laborious analysis. We may formulate the following hypothesis:

10.5.2. The metaphor

With metaphor, we may build layers and layers of data such that the metaphor is refined, and thus a long way from the object itself, but also encapsulates as many aspects of the object as possible. A *rich metaphor* (words of a poem for example) can

often lead to an intuitive grasping of what is being discussed without once mentioning the name of the thing. *Raw metaphor* is when we get as close as possible to the object. Maths and Science try to do this, but they are still metaphors. What is implied in this is that all metaphors have a potentially hierarchic structure. Thus, the maps we make are metaphors. The symbols of these maps *replace* generic *whole/aspects* terminology that symbolise the object. What this process does is create hierarchy in that all additional facades are within the initial context (*whole, part*) and each refinement is often within the context of a previous refinement.

Definition 10.10: *A* metaphor *is the expression of an understanding of one concept in terms of another concept, where there is some similarity or correlation between the two or is the understanding itself of one concept in terms of another.*

A metaphor is a word used in an unfamiliar context to give us a new insight; a good metaphor moves us to see our ordinary world in an extraordinary way. For example:

My salad days
when I was green in judgment. (Shakespeare)

What is at issue, of course, is not just metaphor as a useful (or even a necessary) means of communicating something we already know. This would be *allegory*, not metaphor. Rather metaphor is a way of *knowing,* not just a way of communicating. In metaphoric knowledge and its expression are one and the same; there is no way *around* the metaphor, it is not expendable. One can insist that certain metaphor are incorrect or inappropriate or do not "fit," but then all one can do is suggest other metaphor that are preferable. One cannot do without *any* metaphor.

Definition 10.11: *A* conventional metaphor *is a metaphor that is commonly used in everyday language in a culture to give structure to some portion of that culture's conceptual system.*

Definition 10.12: *An* ontological *metaphor is a metaphor in which an abstraction, such as an activity, emotion, or idea, is represented as something concrete, such as an object, substance, container, or person.*

Definition 10.13: *A* containment metaphor *is an ontological metaphor in which some concept is represented as*

    a) *Having an inside and outside, and*
    b) *Capable of holding something else.*

Definition 10.14: *An* entity metaphor *is an ontological metaphor in which an abstraction is represented as a concrete physical object.*

Definition 10.15: Personification *is an ontological metaphor in which a thing or abstraction is represented as a person.*

Definition 10.16: *A* substance metaphor *is an ontological metaphor in which an abstraction, such as an event, activity, emotion, or idea, is represented as material.*

Definition 10.17: *An* orientational metaphor *is a metaphor in which concepts are spatially related to each other, as in the following ways: Up or down, In or out, Front or back, On or off, Deep or shallow and Central or peripheral*

Definition 10.18: *A* structural metaphor *is a conventional metaphor in which one concept is understood and expressed in terms of another structured, sharply defined concept.*

Definition 10.19: Mixed metaphors *are different metaphors occurring in the same utterance, especially the same sentence, which are used to express the same concept. Mixed metaphors often, but not always, result in a conflict of concepts.*

Definition 10.20: *A* new metaphor *is a metaphor that is not already part of the conceptual system of a culture as reflected in its language.*

We denote like **M** the relation of metaphor and $c-s_i \mathbf{M} c-s_j$ we will say that $c-s_i$ is metaphorically related to $c-s_j$ or $c-s_j$ is a metaphor of $c-s_i$. Metaphor has the following properties:

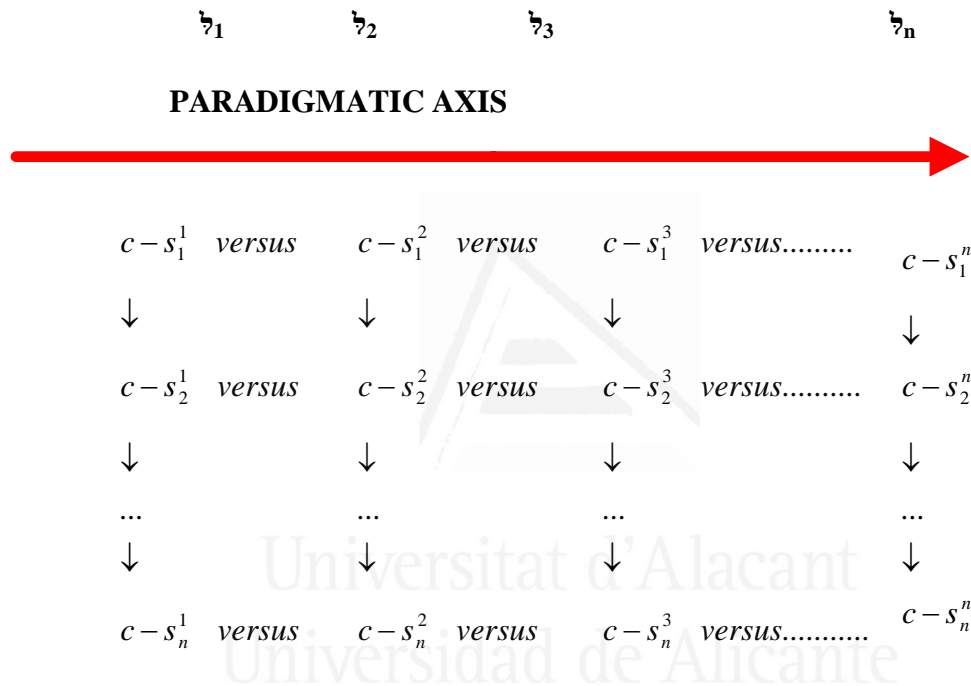   a) *Reflexive property:* $c-s_i \mathbf{M} c-s_i$. Every connotation is metaphor of itself.

b) *Antisymmetrical property:* $c - s_i \, \mathbf{M} \, c - s_j \neq c - s_j \, \mathbf{M} \, c - s_i$.

c) *Transitive property:* If $c - s_i \, \mathbf{M} \, c - s_j$ and $c - s_j \, \mathbf{M} \, c - s_k$ then $c - s_i \, \mathbf{M} \, c - s_k$

Then, metaphorical relation is an order relation.

We are to define the *operation of metaphoric substitution*.

Let $\natural_i$ be a connotative chain and $c - s_j^i$ be connotative significances. The code will be of the following way (Figure 10.2):

$$\natural_1 \qquad \natural_2 \qquad \natural_3 \qquad\qquad\qquad \natural_n$$

PARADIGMATIC AXIS

$$\longrightarrow$$

$c - s_1^1$ *versus*	$c - s_1^2$ *versus*	$c - s_1^3$ *versus*.........	$c - s_1^n$
$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$
$c - s_2^1$ *versus*	$c - s_2^2$ *versus*	$c - s_2^3$ *versus*..........	$c - s_2^n$
$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$
...	...	...	...
$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$
			$c - s_n^n$
$c - s_n^1$ *versus*	$c - s_n^2$ *versus*	$c - s_n^3$ *versus*...........	

Figure 10.2.

Rows go on the *paradigmatic axis* and columns are connotative chains. We are going to establish the following rule of substitution: any connotative significance can be replaced by another one, belongs or not to the same connotative chain. We will denominate **(ר)** to operation of metaphoric substitution and so that $c - s_i^k \, (ר) \, c - s_j^l \to c - s_j^l$ and that we can read $c - s_j^l$ has metaphorically replaced $c - s_i^k$ or $c - s_j^l$ is a metaphor of $c - s_i^k$.

a) Simple metaphors

2) *Substitution by primary antonymy:* $c - s_1^1 \, (ר) \, c - s_1^2 \to c - s_1^2$

3) *Substitution by secondary antonymy:* $c - s_1^1$ (ꙍ) $c - s_2^2 \to c - s_2^2$

4) *Substitution by n-th antonym:* $c - s_1^1$ (ꙍ) $c - s_n^2 \to c - s_n^2$

5) *Substitution by obvious connotation:* $c - s_1^1$ (ꙍ) $c - s_n^1 \to c - s_n^1$

b) Mediate metaphors

6) *Substitution by sharpness:* $c - s_1^1$ (ꙍ) $c - s_n^n \to c - s_n^n$

And so on.

Any type of defined metaphor previously can be created by the operation of metaphoric substitution. It is enough that leseme exists or is introduced in the code.

Let us suppose that in language L a habitual practice exists in which is replaced $c - s_1^1$ by $c - s_1^2$. This case $c - s_1^2$ becomes by convention in the one of the possible connotations of $/ c - s_1^1 /$. **S**ubstitution by antonymy, turned usual, enters to comprise of the code and in the end it fossilizes like a *catachresis*. Metaphorical substitution takes place by the fact that in the code connections exist, and therefore, proximity.

Metaphoric substitution has the following properties:

1) *Metaphoric substitution has not commutative property:*
$$c - s_i^k (ꙍ) c - s_j^l \to c - s_j^l \neq c - s_j^k (ꙍ) c - s_i^l \to c - s_i^l.$$

2) *Multiple substitution:* If $c - s_i^k (ꙍ) c - s_j^l \to c - s_j^l$ and $c - s_j^k (ꙍ) c - s_m^l \to c - s_n^l$ then $c - s_i^k (ꙍ) c - s_m^l \to c - s_n^l.$

Note 10.1: *Metonymic substitutions are not metaphorical substitutions, because conducting the operation of substitution on the part of speaker, he thinks more actually of the message that in the own code.*

Any symbolic representation of the reality ⊐ can be considered like a *text* T. Logically a text can be divided in subtexts, such as $T_i \subseteq T$. Simultaneously, each subtext can be divided in smaller units, arriving at the word (or an elementary sign) level that would be, relamente, the primitive text.

Let T_1 and T_2 be two text and T_1^* be a subtext of T_1, such as $T_1^* \subseteq T_1$. We define as $\underset{significance}{\equiv}$ the *operation of semantic resemblance* and $\underset{significance}{\approx}$ the *operation of semantic equality* such as $T_1 \underset{significance}{\approx} T_2$ such that T_2 is used to enhance the *meaning* associated with T_1.

Axiom 10.1: *Operation of semantic equality is a suboperation of semantic resemblance.*

Definition 10.21: *A* metaphor *is when we say* $T_1 \underset{significance}{\approx} T_2$.

10.5.3. The Parable

The word parable (in Greek *παραβολή*) means "*a casting, putting, throwing, turning*", which the Romans called *parabola* in classical rhetoric and it is the any fictive illustration in the form of a brief narrative. Later it came to mean a fictitious narrative, generally referential to something that might naturally occur, by which spiritual and moral matters might be conveyed. A parable always teaches by comparison with real or literal occurrences--especially "homey" everyday occurrences a wide number of people can relate to. Well-known examples of parables include those found in the synoptic Gospels, such as *The Prodigal Son* and *The Good Samaritan*. In some Gospel versions, the parables are announced with the phrase, *The Kingdom of God is like* . . . . Technically speaking, biblical parables were originally examples of a Hebrew *genre* called *meshalim* (singular *mashal*), a word lacking a counter-part in Greek, Latin or English. *Meshalim* in Hebrew refer to *mysterious speech*, i.e., spiritual riddles or enigmas the speaker couches in story-form. It is only in the Greek New Testament that these *meshalim* are conflated with allegorical readings. Non-religious works may serve as parables as well.

Definition 10.22: *A* parable *is a brief allegory that is used to teach a moral lesson.*

Note 10.2: *A parable is a metaphor that has been extended to form a brief, coherent fiction. Parables are stories, of course, but of a particular kind -- stories that set the familiar in an unfamiliar context, which is also, what a metaphor does.*

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Note 10.3: *Parables is not used by religious ideologies solely. Different kinds of policy assumptions are based on distinct political beliefs and their often-implicit philosophical traditions, and that these "political parables of citizenship and personhood" provoke different kinds of political activism.*

We denote like P the relation of parable and $c - s_i \, \mathbf{P} \, c - s_j$ we will say that $c - s_i$ is parabletically related to $c - s_j$ or $c - s_i$ is a parable of $c - s_j$. In this case $c - s_j$ always explains or interprets $c - s_i$.

Example 10.5: From Luke 8:4-15.

Parable: *[4] "While a large crowd was gathering and people were coming to Jesus from town after town, he told this parable: [5] 'A farmer went out to sow his seed. As he was scattering the seed, some fell along the path; it was trampled on, and the birds of the air ate it up. [6] Some fell on rock, and when it came up, the plants withered because they had no moisture. [7] Other seed fell among thorns, which grew up with it and choked the plants. [8] Still other seed fell on good soil. It came up and yielded a crop, a hundred times more than was sown.' When he said this, he called out, 'He who has ears to hear, let him hear.' [9] "His disciples asked him what this parable meant. [10] He said, 'The knowledge of the secrets of the kingdom of God has been given to you, but to others I speak in parables, so that,'"though seeing, they may not see; though hearing, they may not understand.'*

Explanation: [11] " 'This is the meaning of the parable: The seed is the word of God. [12] Those along the path are the ones who hear, and then the devil comes and takes away the word from their hearts, so that they may not believe and be saved. [13] Those on the rock are the ones who receive the word with joy when they hear it, but they have no root. They believe for a while, but in the time of testing, they fall away. [14] The seed that fell among thorns stands for those who hear, but as they go on their way they are choked by life's worries, riches and pleasures, and they do not mature. [15] But the seed on good soil stands for those with a noble and good heart, who hear the word, retain it, and by persevering produce a crop.'

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The properties of parabletical relation are:

a) *Reflexive property:* $c - s_i \, \mathbf{P} \, c - s_i$. Every connotation is parable of itself.

b) *Antisymmetrical property:* $c - s_i \, \mathbf{P} \, c - s_j \neq c - s_j \, \mathbf{P} \, c - s_i$.

c) *Transitive property:* If $c - s_i \, \mathbf{P} \, c - s_j$ and $c - s_j \, \mathbf{P} \, c - s_k$ then $c - s_i \, \mathbf{P} \, c - s_k$

Transitive property indicates the possibility of chained parables as in the case of Ignacy Krasicki (Milosz, 1983) Then, parabletical relation is an order relation.

10.5.4. Other rhetorical figures

Definition 10.23: *An* allegory *is an extended metaphor, especially a story in which fictional characters and actions are used to understand and express aspects of concepts relating to human existence.*

Definition 10.24: Antonomasia *is the use of a proper name to stand for something else having an attribute associated with that name, or the use of a general term to stand for a referent having a proper name.*

Definition 10.25: *A* synecdoche *is a figure of speech in which the one of the following (or its reverse) is expressed: A part stands for a whole, an individual stands for a class or a material stands for a thing.*

10.5.5. Some characteristics of the Rhetoric

When Rhetoric codifies forms of something unexpected, it is not directly, but that codifies general relations of the unexpected thing. Rhetoric does not say "*metonymy consists of naming to the President by mediation of the White House*", but says "*metonym consists of naming an object by mediation of which it has with a first semantic relation of proximity*". This unexpected relation can be filled of an unexpected way by anyone. In addition, Rhetoric does not codify the relations of the unusual thing that are against to all the systems of expectations of the code or the psychology of the auditors. It only codifies those expectations that, even being unusual, can be integrated in the system of expectations of the auditor (Eco, 1968).

Rhetoric codifies a type of judicious information. The unexpected thing regulates in such a way that the unexpected thing as much as the informative thing takes part to persuade, that is to say, to reconstruct the partly known thing.

According to Eco (1968), Rhetoric is an immense container of codified solutions. These solutions can be classified of the following way:

1) *Stylistic solutions*.

2) *Sintagmas with a fixed iconographic value*, using metonymies, such as the figurative messages of Christmas, etc.

3) *Prefixed connotations with fixed emotional value*: flags, references to the family or maternal love, concepts like honor, mother country, etc.

4) *Extra-techniques proofs* (Aristotle, 1926): appeal to solutions of touching effect, beyond the communicative value of the signs.

Nevertheless, they exist systems of stimuli working like signs without apparently they can be codified like such, although provoke emotions. They are *presignificant symbolic systems* and they are used indeed because they have been codified like such:

1) Symbols of the personal language of the individual.

2) Archetypical symbols.

These seconds are interesting from the point of view of the Mythical Superstructure and its influence on formation and permanence of the ideologies. Stimuli caused by this type of symbols can be considered of two different ways:

1) From the point of view of the adressee subject (auditor), agreements are extra-semiotics taking part to determine the selection of connotative subcodes to decode segnic aspects of the message. They stipulate touchingly to interpret the message of certain form, and for that reason they are introduced in the communicative circuit.

2) From the point of view of the issuer (speaker). He articulates these stimuli because he knows its effects and therefore, articulates like signs, assigning to them a codified answer and he stipulates them to promote certain interpretative selections in the adressee subject (auditor).

Note 10.4: *These presignificant symbols and their associate stimuli are codified following certain historical and social conventions and comprise of the belief systems and ideologies.*

10.6. THE ANALOGY

In preceding chapters, we established the deontical modalities: *obligation, prohibition, permission and analogy*. We have dedicated ours first chapters to the four first modalities. Nevertheless, a Deontical Impure System Σ, is to say, the human society presents five modalities in many of theirs relations. *Analogy and allegory* are essential in the understanding of the transmission conservation and materialization of the belief systems and ideologies, belonging to Doxical Superstructure (IDS). The fundamental question in this ongoing debate is, how do we know an analogy really exists? For example, do we have any objective way to determine if one mountain is analogous with another? Or whether an anatomical feature (or a protein/substrate binding site) is analogous to another?

Example 10.6: There you have it: the two domains (*Aquinas and midwife*) are aligned so that their common relational structure (Aquinas helps the medieval teological students produce an idea; the midwife helps the mother produce a child) is in correspondence. After the mapping occurs, information from the vehicle is carried over to the topic in the form of inferences, so that we now see Aquinas as helping give birth to ideas that had been developing in the minds of medieval students, as the midwife helps give birth to children that had been developing inside of mothers.

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According to the hermetic classic book *Tabula smaragdina*, the triple principle of the analogy between the outer and the interior world it consists of:

1) Unit of the source or the origin of both worlds.
2) The influence of the psychic world on the physical world.
3) The influence of the material world on the spiritual one.

Nevertheless, the analogy not only consists of that relation between external and internal world, but between the diverse phenomena of the physical world. The material, formal similarity, is only one of the cases of analogy. This may also exist with respect to actions or processes. Sometimes, the selection (materialization form) denotes the analogical foundation, of the internal origin to begin with or the pursued goal.

Example 10.7: A good example of analogy being used in scripture can be found in chapter 8 of the book of Isaiah: *Because this people has rejected the gently flowing waters of Shiloah, . . . therefore the Lord is about to bring against them the mighty floodwaters of the River — the king of Assyria with all his pomp. It will overflow all its channels, run over all its banks and sweep on into Judah, swirling over it, passing through it and reaching up to the neck.* (Isaiah 8:6-8). In this analogy, the devastation of Judah caused by the invasion of the king of Assyria is likened to the devastation caused by the power of a flood, which destroys everything in its path. It is important for us to recognize that this is not a literal flood, but that the imagery of a flood is being used to describe the effects of the invasion. The writer of this passage clearly intended it to be interpreted as an analogy because he explicitly stated that the floodwaters of the river represent the king of Assyria.

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The analogy as procedure of unification and arrangement continuously appears in the myth, the art and the poetry. Its presence always exposes a spiritual force (mystical) in action, the necessity to reunite what is dispersed.

Example 10.8: In religious Literature it is possible to be read that the Order of Saint Bruno preferred for its establishments the steep and recondite places; the Benedictine Order, the high mounts; Order of the Cister, the pleasant valleys; the Jesuit Order, the cities. The predilection establishes a symbolism of the landscape, to the inverse one, the chosen places speak eloquently of the spirit who animated to each one of those communities.

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It exists a assymetry of metaphorical statements. Like metaphors, analogies are always assymetrical. The primary purpose of analogy, in most cases, is to compare a lesser-

known domain with a better-known one. This allows one to carry structure from the better-known domain over to the lesser-known domain, in the form of inferences, to produce more knowledge about it. This sort of directional production of inferences is what produces the assymetry in metaphors as well. In metaphor, the vehicle corresponds to the better-known domain, and the topic to the lesser-known, and inferences are produced from the vehicle to the topic. The "*Aquinas was a midwife*" metaphor demonstrates this. The inferences about internal development are carried from the vehicle to the topic, and no inferences are made in the other direction.

Definition 10.26: *An* analogy *is a figure of speech in which there is a likeness in one or more ways between things unlike otherwise*.

Definition 10.27: *An* analogy *is when we say that* $T_1^* \subseteq T_1 / T_1^* \overset{significance}{\equiv} T_2$.

In analogy there is no replacement, only aspectual comparison, and implied in this is that if $T_1 \overset{significance}{\approx} T_2$ in certain states, there is a chance that other similar states will also be found.

The analogy has the following characteristic:

Definition 10.28. Principle of sufficient identification: *It exists a relative assimilation between objects, not by their values, but by the sense of their situations, since it only concerns the dynamic position, is to say the symbolic position of the objects, and it is considered the nucleus of the symbolic action.*

Example 10.9: Let us suppose we establish two parallel actions: "*The Sun is due to the darknesses*" and "*The hero kills the monster*". A correspondence between the two the described phrases and actions exists.

1) *Analogy of phrases:* Series of three elements (subject, verb, predicate).
2) *Analogy of action:* Two actions of common tempo. Both subjects, both verbs and both predicates correspond. The elements of the series could be replaced freely and be interchanged without the system underwent break or confusion.

3) *Substitution:* "*The Sun kills the monster*" and "*The hero is due to the darknesses*".

4) *Sufficient Identification:* "*The hero is the Sun that is due the monster of the darknesses*".

***

It is comprehensible that this identification is sufficient from the moment at which it takes place exactly in the symbolic tension. When agreeing in their functions, that reveal property to a same essence, both objects, that in the existential are different, become unit in the symbolic thing and are interchangeable. In the scholastic language, one takes place *coniunctio* (integrating conjunction) of what before it was *distinctio*. By this cause, the symbolic technique consists of systematizing the progressive identifications, within the common and true tempos. The symbolic image is not a "example" (external and possible relation between two objects or connections), but an internal analogy (necessary and constant relation).

10.6.1. Analogy and metaphor

To infer the analogy underlying somebody's thinking from the metaphors used in their speech is chancy; sometimes one set of metaphors is conventionalized for a given topic, but people can, on command, rapidly switch to a different set of metaphors to express the same ideas about the same topic. The structure mapping theory of metaphor treats metaphors as analogies, at least in their underlying cognitive mechanisms. Some metaphors are obviously similar to analogies, and may even be considered analogies. "*Encyclopedias are gold mines*", for instance, clearly involves the mapping of relational structure between the encyclopedia and gold mine domains. Other metaphors are less obviously analogical. "*My lawyer is a shark*" seems primarily designed to map a few specific attributes of sharks onto my lawyer, in order to highlight those attributes in my lawyer. In most metaphors, even those that are ostensibly about specific attributes (e.g., "*My lawyer is a shark*" is about "*aggression*" or some similar attribute), there is also relational information that can and will be mapped in the process of understanding the metaphor. However, structure mapping theory can handle similarity comparisons and metaphors that only involve the mapping of attributes. It is thus more like a literal similarity comparison (e.g., "*Alligator meat is like chicken*") than analogical comparisons (e.g., "*The atom is like the solar system*").

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On the surface, the existence of these two different types of metaphor seems to make the possibility of a general theory of metaphor that *treats metaphor as analogy impossible*. However, it turns out that literal similarity comparisons may also involve the same processes as analogies, which means that metaphors that are like literal similarity comparisons could also be like analogies. Yet it is generally the ideas we care about.
To distinguish between *analogy* and *metaphor*, we note that:

1) When analysing a metaphor, we then notice aspectual similarities between it and a different metaphor and say $T_1MA \underset{\text{significance}}{\equiv} T_2MB$; this is *analogy*, and the ability to do this rests with the sharing of the proposed template. *Metaphor is like analogy*. Analogies involve the structural alignment of two (or more) structured representations (representations containing objects, their relations, and their attributes, along with relations between relations) so that the common elements in the representations are mapped onto each other

2) *Systematicity* requires that, all things being equal, higher-order mappings are preferred. This means that mappings involving relations between relations will be preferred to mappings involving relations between objects, and mappings between relations between objects will be preferred to mappings between objects or their attributes.

3) The *one-to-one mapping constraint* requires that each element in a representation be connected to at most one element in the other domain. For instance, in "*The atom is like the solar system*" analogy, once we map the planets in the solar system domain onto electrons in the atom domain, we cannot also map the planets onto the nucleus or some other element in the atom domain.

4) *Parallel-connectivity*, requires that when elements are mapped onto each other, their arguments are also mapped. For instance, when we map the "*Revolve around*" relation in the "*Atom is like the solar system*" analogy, then parallel connectivity requires that the arguments (planets-sun in the solar system domain, and electrons-nucleus in the atom domain) be mapped as well.

These constraints allow analogical comparisons to preserve the maximum amount of common structure between the two (or more) domains being compared, and this in turn makes for easier and more productive inferences, which are what motivates most

analogies in the first place. While structure mapping theory was originally intended as a theory of analogy, it can also be extended to literal similarity comparisons like "*Alligator meat is like chicken*" which are designed to highlight common objects or attributes, and not common relational structure. To do this, the mappings are restricted to objects or attributes. Since metaphors resemble both types of comparisons, structure mapping has been used as a theory of metaphor.

Theorem 10.5: *A metaphor is a verbal construction, which express an analogy.*

Proof

Let $T_1 \underset{significance}{\approx} T_2$ a metaphor. Since for Axiom 10.1 $\underset{significance}{\approx} \subset \underset{significance}{\equiv}$ then $T_1 \underset{significance}{\equiv} T_2$.

Theorem 10.6: *An analogy can be expressed non-metaphorically, and metaphors can be so confused as to not express any coherent analogy.*

Proof

It is trivial.

Conclusion: *Metaphors are a special case of analogies.*

10.7. RHETORIC AND IDEOLOGY

From very old it is known that the rhetorical formulas sent certain ideological positions. Let us consider, for example, the case of Populists leaders. It is impossible that one of them says /*the defense of the free world*/ or /*the law state*/, since these rhetorical formulas are closely tie to political positions identified with the United States and their allies, or political systems where are respected (at least theoretically) the independence of the three powers. We can identify these ideological positions like a world vision very precise, made and explained by mediation of structural models.

Being Rhetoric and ideology intimately overlapping we can anticipate that both independently cannot act one of the other. According to Eco (1968), a revision of the ideological expectations can be proposed appealing to the redundancy, to a purely referential function of the messages. For example, associations maintaining the thesis of validity of the homosexual marriage, upsetting without a doubt some ideological expectations, could communicate their ideological option by mediation of constructed messages following rhetorical rules, of the type: "*we maintain that the conventional marriage is reactionary and source of aggressiveness and sexual violence*".

Consequence 10.5: *Each real upheaval of the ideological expectations is effective in the measure that is made in messages that upset systems of rhetorical expectations.*

Consequence 10.6: *Each deep upheaval of the rhetorical expectations is as well a summary of the ideological expectations.*

It exists a clear relation between Rhetoric and ideology. Therefore:

Consequence 10.7: *The ideology may be considerer like a cultural unit that is equipmentable to a rhetorical formula like a significant unit.*

For that reason it is possible to construct a connotative code that it makes correspond to any rhetorical expression an individualized ideological unit.

11. THE ABSTRACT LEVEL OF THE BELIEF SYSTEMS

11.1. SUBSTANTIVE AND DERIVED BELIEFS

Since we have exposed previous chapters, a belief system (BS) is a set of related ideas, learned and shared, which has some permanence in time and space, and to which individuals and/or groups exhibit some commitment. The conditions of *permanence, commitment, and connectedness* are variable characteristics through which we expect belief systems to be related to social organization. Any belief system will be formed by two essential levels:

1) **Ideal or abstract level.**
2) **Material level or text.**

First of the levels or abstract level BS it is the reason for this chapter. It is enrolled in the individual mind and has been acquired by means of a physical transmission, either oral or visual, through a *textual materialization*, like written, pictorial, architectonic, musical, etc, text. We may in fact affirm that a belief system is, a cybernetic process of feedback (Figure 11.1).

Definition 11.1: *The abstract belief level BS is formed by a set of elements denominated* substantive beliefs (s) *forming the unquestionable truths of the system (axioms) and a set of* derived beliefs *(d), formed from substantive beliefs.*

Substantive beliefs constitutes the axioms of the system, while many of derived beliefs will constitute their theorems.

Example 11.1: In the same sense as Christianity or Islam, Judaism, cannot be credited with the possession of Articles of Faith. Many attempts have indeed been made at

systematizing and reducing to a fixed phraseology and sequence the contents of the Jewish religion.
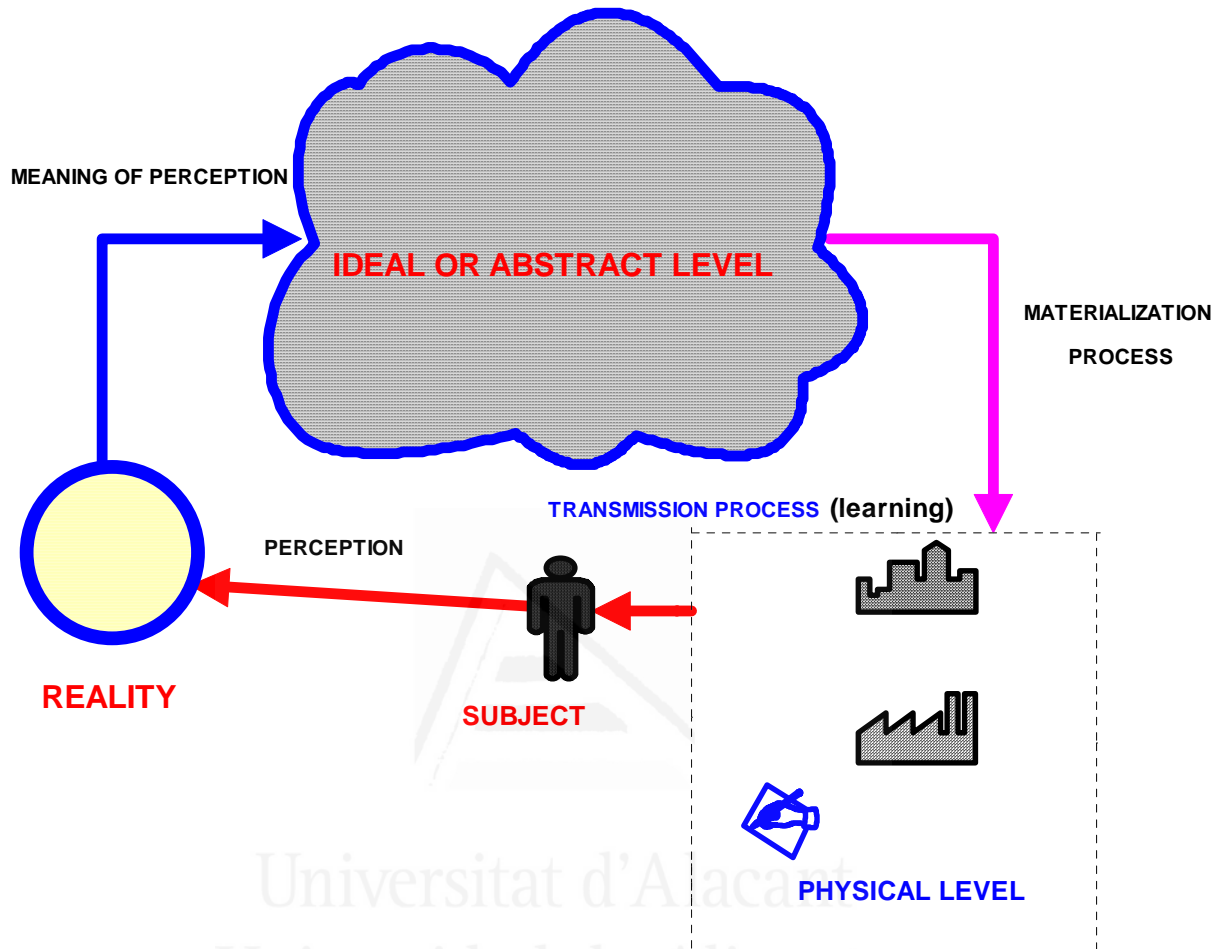

Figure 11.1.

However, these have always lacked the one essential element: authoritative sanction on the part of a supreme ecclesiastical body. In addition, for this reason they have not been recognized as final or regarded as of universally binding force. However, to a certain extent incorporated in the liturgy and utilized for purposes of instruction, these formulations of the cardinal tenets of Judaism carried no greater weight than that imparted to them by the fame and scholarship of their respective authors. None of them had a character analogous to that given in the Church to its three great formulas (the so-called *Apostles' Creed, the Nicene or Constantopolitan, and the Athanasian*), or even to the *Kalimat AsShahadat* of the Mohammedans. None of the many summaries from the pens of Jewish philosophers and rabbis has been invested with similar importance and

prominence. The reasons for this relative absence of official and obligatory creeds are easily ascertained. The most widely spread and popular of all creeds is that of *Maimonides*, embracing the thirteen articles. Why he chose this particular number has been a subject of much discussion. Some have seen in the number a reference to the thirteen attributes of G_d. Probably no meaning attaches to the choice of the number. His articles are:

s_1 **Principle I:** *To know the existence of the Creator.*

s_2 **Principle II:** *The unity of G_d.*

s_3 **Principle III:** *The denial of physicality in connection with G_d.*

s_4 **Principle IV:** *G_d's Antiquity.*

s_5 **Principle V:** *That G_d, blessed be He, is worthy that we serve Him, to glorify Him, to make known His greatness, and to do His commands.*

s_6 **Principle VI:** *Prophecy.*

s_7 **Principle VII:** *The prophetic capacity of Moses our Teacher, peace be upon him.*

s_8 **Principle VIII:** *That the Torah is from heaven [G_d].*

s_9 **Principle IX:** *The completeness of the Torah.*

s_{10} **Principle X:** *That G_d knows man's actions and does not remove His eye from them.*

s_{11}**Principle XI:** *That G_d gives reward to he who does the commandments of the Torah and punishes those that transgress its admonishments and warnings.*

s_{12} **Principle XII:** *The era of the Messiah.*

s_{13} **Principle XIII:** *Resurrection of the dead.*

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Let $S = \{s_1, s_2,..., s_n\}$ be the set of substantive beliefs and $D = \{d_1, d_2,..., d_m\}$ the set of derived beliefs, such that $BS = S \cup D = \{s_1, s_2,..., s_n, d_1, d_2,..., d_m\}$. It exists the no belief or empty belief, that we will represent by $\varnothing$. Set BS forms a *belief sequence* because it is an ordered list of objects. It contains *terms or beliefs*, and the number of terms is called the *length* of the sequence. Order matters, and the exact same terms can

appear multiple times at different positions in the belief sequence. BS forms a finite sequence with terms in the set BS because it is a function from $\{s_1, s_2, ..., s_n, d_1, d_2, ..., d_m\}$ to BS.

11.2. THE SUBSTANTIVE BELIEFS SET

Due to the complexity of the belief systems, we have thought that it is advisable to limit this approach the study of the set of substantive beliefs S, avoiding the derived beliefs D. In an initial approach phase we will distinguish two complementary aspects: the set characteristics of S and its logic-modal characteristics.

Mathematical structures of beliefs are based on Anderson (1987), Birkhoff (1967), Bourbaki (1972), Bryant (1985), Burris and Sankappanavar (1981), Kelley (1955) and Willard (1970).

11.2.1. Set characteristics

Let $S = \{s_1, s_2, .., s_i, ..., s_n\}$ be a set of substantives beliefs. Set S has the following characteristics:

1) The set S is a countable set because there exists an injective function $f : S \rightarrow N$ being N the natural numbers.
2) The set S is bounded because it has both upper and lower bounds.
3) In all set of substantive beliefs S it exists one substantive term to which we will consider like main term.

Example 11.2: *The Maimonides' Creed* has a longitude of 13.

The main term is s_1 = *To know the existence of the Creator*.

Term s_5 **Principle V:** *That G_d, blessed be He, is worthy that we serve Him, to glorify Him, to make known His greatness, and to do His commands*. can be disturbed in subsentences or subterms:

s_{51} = ε_1 = *That G_d*

s_{52} = ε_2 = *blessed be He*

s_{53} = ε_3 = *is worthy that we serve Him*

s_{54} = ε_4 = *to glorify Him*

$s_{55} = \varepsilon_5 =$ *to make known His greatness*

$s_{56} = \varepsilon_6 =$ *and to do His commands.*

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Let **L** be a language. We suppose the existence of n substantive beliefs $s_1, s_2, ..., s_n$ coexisting at a certain historical moment. Let ℶ be the set of all substantive beliefs such that $ℶ = \{s_1, s_2, ..., s_n\}$. Let ε be a sentence such that $\varepsilon \in s_i, s_i \in ℶ$.

Definition 11.2: *A set of substantive beliefs $S \subset ℶ$ is* called open, *if for each $s \in S$ there exists and $\varepsilon \neq \varnothing$ such that the interval ($s - \varepsilon$, $s + \varepsilon$) is contained in S.*

Definition 11.3: *A set S of substantive beliefs is called* closed *if the complement of S, BS \ S, is open.*

Closed sets S correspond to belief systems ideologically closed and impermeable, such as dogmatic religions or political totalitarian ideologies.

Definition 11.4: *In open S interval ($s - \varepsilon$, $s + \varepsilon$) is called a* neighborhood *of term s.*

Let $S = s_1, s_2, ..., s_n$ be a collection of substantive beliefs (*axioms*) belonging to a determined mythical dimension M_K. We define the operation $\bigwedge_{sem}$ or *semantic conjunction.* We define the following properties:

1) For the believer, each substantive belief will have a veritative value equal to 1, $v(s) = 1$.

2) It exists the absolute negation of a substantive belief $\neg s_i$ with veritative value equal to 0 $v(\neg s_i) = 0$.

3) The semantic conjunction between two or more substantive beliefs will have veritative value equal to 1 $v\left(s_1 \bigwedge_{sem} s_2 \right) = 1$.

4) Empty substantive belief exists $\varnothing$.

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The pair $\left(S, \underset{sem}{\wedge}\right)$ has the following properies:

1) **Closure**: $\forall s_1, s_2 \in S, \left(S_1 \underset{sem}{\wedge} S_2\right) \in S$

2) **Associativity:** $\forall s_1, s_2, s_3 \in S, \left(s_1 \underset{sem}{\wedge} s_2\right) \underset{sem}{\wedge} s_3 = s_1 \underset{sem}{\wedge} \left(s_2 \underset{sem}{\wedge} s_3\right)$

3) **Identity element:** $\exists \varnothing \in S / \forall s_i \in \{s_i\}, \varnothing \underset{sem}{\wedge} s_i = s_i \underset{sem}{\wedge} \varnothing = s_i$.

4) **Inverse element:** $\forall s_i \in S, \exists \neg s_i \in S / s_i \underset{sem}{\wedge} \neg s_i = \neg s_i \underset{sem}{\wedge} s_i = \varnothing$

5) **Commutativity:** $\forall s_1, s_2 \in S / s_1 \underset{sem}{\wedge} s_2 = s_2 \underset{sem}{\wedge} s_1$

Therefore $\left(S, \underset{sem}{\wedge}\right)$ is an abelian group. For the case of believer, identity element and inverse element suppose processes of conversion or abandonment of the belief respectively.

11.3. MODAL LOGIC CHARACTERISTICS

Let $\{M_i\}_{i=1,...,n}$ be a set of mythical dimensions and **L** be a language. The terms of S in this language are of the following form $s_1, s_2, ..., s_n$. The terms of D are the following form $d_1, d_2, ..., d_m$

In a set S of substantive beliefs, we have the following characteristics:

1) The terms s_n (for n= 0, 1, 2,…,n) are atomic sentences.
2) The terms d_m (for m= 0, 1, 2,…,ns) are atomic sentences.
3) The terms s and d belonging to sets S and D are beliefs sentences.
4) S is consistent just if it would be possible for them all to be true together: that is, if they are either in fact all true or could all have been true.
5) S is inconsistent just if it would be impossible for them all to be true.
6) A term $s \in S$ can also be said to be consistent if it is possible for it to be true.
7) A term $s \in S$ can also be said to be inconsistent if it is not possible.
8) An inconsistent belief is said to be *self-contradictory*, or a *contradiction*.
9) A term $s \in S$, which could not be false, is said to express a *necessary truth*.

10) A term $s \in S$, which is non inconsistent and does not express a necessary truth is said to be *contingent*.

For our intentions, we will apply concepts of Modal Logic (Chellas, 1980).

Let $\top$ be the constant for truth, $\bot$ be the constant for falsity. $\rightarrow$, $\square$, $\lozenge$ be the signs for conditionality, necessity and possibility respectively.

Definition 11.5: *A term s of the form $\square s$ is true iff s is true at all $M_k \in \{M_i\}_{i=1,\ldots,n}$.*

Definition 11.6: *A term s of the form $\lozenge s$ is true iff $\exists M_K \in \{M_i\}_{i=1,\ldots,n}$ where s is true.*

The set $\{M_i\}_{i=1,\ldots,n}$ collects just those mythical dimensions at which the corresponding term s_n is true.

Definition 11.7: *Term s_n is true at a mythical dimension M_K iff M_K is in $\{M_i\}_{i=1,\ldots,n}$.*

Definition 11.8: *A* belief system שב *is a pair* $\langle \{M_i\}_{i=1,\ldots,n}, M \rangle$ *in which* $\{M_i\}_{i=1,\ldots,n}$ *is a set of mythical dimensions and* M *abbreviates a finite sequence* $M_1, M_2, \ldots, M_n$ *of subsets of* $\{M_i\}_{i=1,\ldots,n}$.

Let s be a term and M_k be a mythical dimension in a belief system שב $= \langle \{M_i\}_{i=1,\ldots,n}, M \rangle$. We use the symbolism $\models^{שב}_{MK} (s)$ as short for s is true in שב. The following axioms are stated:

Axiom 11.1: $\models^{שב}_{MK} (s_n)$ *iff* $\exists M_K \in M$ **for n = 0, 1, 2,…,n.**

Axiom 11.2: $\models^{שב}_{MK} \top.$

Axiom 11.3: *Not* $\models^{שב}_{MK} \bot.$

Axiom 11.4: $\models^{שב}_{MK} (\neg s_n)$ *iff not* $\models^{שב}_{MK} (s_n).$

Axiom 11.5: $\models^{שב}_{MK} \left(s_i \wedge s_j \right)$ *iff both* $\models^{שב}_{MK} (s_i)$ *and* $\models^{שב}_{MK} (s_j)$.

Axiom 11.6: $\models^{שב}_{MK} \left(s_i \vee s_j \right)$ *iff either* $\models^{שב}_{MK} (s_i)$ *or* $\models^{שב}_{MK} (s_j)$, *or both.*

Axiom 11.7: $\models^{שב}_{MK} (\square s_n)$ *iff for every M_L in* **M,** $\models^{שב}_{ML} (s_n)$.

Axiom 11.8: $\models^{שב}_{MK} (\lozenge s_n)$ *iff for some M_L in* **M,** $\models^{שב}_{ML} (s_n)$.

Axiom 11.9: $\models^{שב}_{MK} s \rightarrow s'$ *iff* $\models^{שב}_{MK} s$ *then* $\models^{שב}_{MK} s'$.

We write $\models s$ to mean that belief s is valid.

Definition 11.9: *A belief s is* valid $\models s$ *iff for every belief system שב and every mythical dimension M_K in שב,* $\models^{שב}_{MK} s$.

Theorem 11.1: $\square s \rightarrow s$.

Proof:

It is sufficient to prove that where M_K is any mythical dimension in any belief system שב, $\models^{שב}_{MK} \square s \rightarrow s$. It is enough to show that if $\models^{שב}_{MK} \square s$ then $\models^{שב}_{MK} s$. So suppose that $\models^{שב}_{MK} \square s$. Then by axiom 11.8 this means that $\models^{שב}_{ML} s$ for every mythical dimension in שב. In particular this hold for M_K. Then $\models^{שב}_{MK} s$.

Theorem 11.2 (Principle of Distributivity): $\square \left(s \rightarrow s' \right) \rightarrow (\square s \rightarrow \square s')$.

Proof:

We suppose that M_K is a mythical dimension such that both $\models^{שב}_{MK} \square (s \rightarrow s')$ and $\models^{שב}_{MK} \square s$. For every mythical dimension M_L, both $\models^{שב}_{ML} s \rightarrow s'$ and $\models^{שב}_{ML} s$, from which it follows that for every mythical dimension M_L, $\models^{שב}_{ML} s'$. Thus $\models^{שב}_{MK} \square s'$.

Theorem 11.3 (Rule of Necessitation): *If $\models s$ then $\models \Box s$.*

Proof:

For suppose that $\models s$, i.e. that $\models^{\scriptsize \Im w}_{MK} s$ for every mythical dimension. Then $\models^{\scriptsize \Im w}_{MK} \Box s$, which is to say that $\models \Box s$.

Let S_B a believer subject. In according to Pietroski (1993) the binary analysis is applied by means of the following requirements:

R1) S_B believes that term s is true exactly when S_B believes the sentence denoted by *that s*.

R2) *Property of omnidoxasticity*: If S_B believes terms $s_1, s_2, ..., s_n$, and $\{s_1, ..., s_n\}$ entails $d \in D$, then S_B also believes d.

R3) *That s* denotes a set of mythical dimensions $M_k \in \{M_i\}_{i=1,...,n}$ where is true *that s*.

R4) There is some true sentence ζ, which is similar to s.

R5) The truth of any s requires S_B to have an appropriate metalinguistic belief.

R6) In mythical dimensions $\{M_i\}_{i=1,...,n}$, requirement R5 is dropped by omitting requirement R4.

R7) In abnormal contexts, such as ideological beliefs are attributed, requirement R5 is dropped omitting requirement R3.

Note 11.1: *If S_B believes that s is true, it follows that S_B believes {M_K: s is true in M_K}.*

Example 11.3: We suppose the following two belief sentences:

a) S_B believes that *a circle can become a square*.
b) S_B believes that *God is omnipotent*.

Belief sentences a and b have different truth-conditions, since their that-clauses denote distinct belief sentences c and d respectively:

    c) $\{M_K:$ something similar to "*a circle can become a square*" is true in $M_k\}$

    d) $\{M_K:$ something similar to "*God is omnipotent*" is true in $M_k\}$

Let **L** be the S_B's language. We suppose other language **L'**. We consider that S_B is told that *God is non-omnipotent* is a true **L'** term, but he has no idea what it means. S_B still believes that *God is omnipotent*, but taking his other term in **L'** to be trustworthy, he comes to acquire the new belief that *God is non-omnipotent* is true. So he now believes that set P=$\{M_K:$ *God is non-omnipotent* is true in $M_K\}$. Consider the term "*S_B believes that God is non-omnipotent",* which intuitively is false. If we suppose that this in a mythical dimension where R4 does not apply, then the that-clause denotes the necessarily true term, of which set P is a subset. Since S_B believes P, for the Property of omnidoxasticity (R2), he also believes the necessarily true term, and so the term s true. On the other hand, if we adopt the other mythical reading which drops R3, then the that-clause in both cases would denote the same metalinguistic proposition R = $\{M_K:$ something similar to *God is non-omnipotent* is true in $M_K\}$, and so $P \subset R$. As S_B believes P by R2 again he believes R. The conclusion is that all-admissible interpretations, "S_B believes that *God is non-omnipotent*" is true. Then we have a contradiction.

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11.4. THE SYNCRETIC OPERATION

Syncretism is the process by which elements of one belief system are assimilated into another belief system resulting in a change in the fundamental tenets or nature of those religions (Visser 't Hooft, 1963). It is the union of two or more opposite beliefs, so that the synthesized form is a new thing. It is not always a total fusion, but may be a combination of separate segments that remain identifiable compartments. It is the attempt to reconcile disparate, even opposing, beliefs and to meld practices of various schools of thought. It is especially associated with the attempt to merge and analogize several originally discrete traditions, especially in the theology and mythology of religion, and thus assert an underlying unity. Syncretism is also common in literature, music, the representational arts and other expressions of culture. There also exist syncretic politics, although in political classification the term has a somewhat different meaning.

Example 11.4: Nascent Christianity appears to have incorporated many European Pagan cultural elements, "baptizing" or "Christianizing" them to conform with Christian belief and principles, at least partially through discarding theologically and morally incompatible elements. Syncretism of the Christian Gospel occurs when critical or basic elements of the Gospel are replaced by religious elements from the host culture. It often results from a tendency or attempt to undermine the uniqueness of the Gospel as found in the Scriptures or the incarnate Son of God. The NT was born in a melee as rulers sought to blend cultures through syncretistic monotheism, all forms of the same God. All the gods of Egypt, Persia, and Babylon became Greek. The influence of Mani spread from Africa to China. Esoteric knowledge vied with unique, historical revelation. Rome harbored all cults and mystery religions. Antioch, Ephesus, and Corinth each boasted syncretistic gods seeking to absorb the church. NT confrontations include Simon Magus, the Jerusalem Council, the Epistle to the Colossians, combating Jewish thought mixed with early Gnosticism, and the rebuke of the church at Pergamum. Other example of this is the strong reliance of St. Augustine on pagan Greek Plato and St. Thomas Aquinas's many quotations of "The Philosopher", Aristotle. Christianity by the 3rd and 4th centuries had incorporated Greek Philosophy into its understanding of God. Against these forces, the church developed its creeds, canon, and celebrations. The Christmas celebration date was set over against the festival of the birth of the sun god, *Sol Invictus*, in protest against a major attempt to create a syncretistic imperial religion. The communication of the Gospel involves the transmission of a message with supra - cultural elements between a variety of cultures. This includes the disembodiment of the message from one cultural context and the reembodiment of it in a different cultural context. Cross - cultural communication of the Gospel always involves at least three cultural contexts. The Gospel message was originally given in a specific context. The receiver/sender assigns meaning to that message in terms of its own context. The receptor seeks to understand the message within a third context. The problem of syncretism will be encountered with each new outreach of the church and as the culture changes around an established church.

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Syncretic operation is a mixed operation of union and intersection of sets. Let S' and S'' be two sets of substantive beliefs. We may to establish two synchronize operations:

A)Intersection: $S' \bigcap S'' = S_a$.

B) Union: Let X be a subset of S' such that $X \subseteq S' / \forall s \in X, s \notin S_a$ and Y be a subset of S'' such that $Y \subseteq S'' / \forall s' \in Y, s' \notin S_a$ Then $X \bigcup Y = S_b$

■■

Definition 11.10: *The* syncretic operation *between S' and S'' is the algebraic operation* S Җ S'= S *so that* $\quad S = S_a \bigcup S_b$.

We may to generalize this definition. Let s', S'',…,S^n be sets of different substantive beliefs and $X' \subseteq S', X'' \subseteq S'',..., X^n \subseteq S^n$ be subsets of S', S'',…, S^n respectively. Then

$$X' \bigcup X'' = X_{12}, X' \bigcup X''' = X_{13},..., X' \bigcup X^n = X_{1n}, X'' \bigcup X''' = X_{23},..., X' \bigcup X^n = X_{2n},...,$$
$$X^{n-1} \bigcup X^n = X_{n-1n}$$

We establish the following intersections:

$$S' \bigcap S'' = S_{12}, S' \bigcap S''' = S_{13},..., S' \bigcap S^n = S_{1n}, S'' \bigcap S''' = S_{23},..., S'' \bigcap S^n = S_{2n},....,$$
$$S^{n-1} \bigcap S^n = S_{n-1n}$$

The syncretic operation S'ҖS'' ҖS''' Җ… ҖS^n = S is:

$$\left[X_{12} \bigcup X_{13} \bigcup ... \bigcup X_{n-1n} \right] \bigcup \left[S_{12} \bigcup S_{13} \bigcup ... \bigcup S_{n-1n} \right] = S$$

Let $S_\varnothing$ be the empty substantive belief set The subset of $S_\varnothing$ is an empty set, then $S' \bigcap S_\varnothing = S_\varnothing$. Then $\left[X_{12} \bigcup X_{13} \bigcup ... \bigcup X_{n-1n} \right] \bigcup S_\varnothing = X_{12} \bigcup X_{13} \bigcup ... \bigcup X_{n-1n}$.

. The algebraic properties of syncretic operation are the following:

1) *Idempotency*: S ҖS = S.
2) *Conmutativity: S Җ S'= S' Җ*S.
3) *Asociativity: S Җ (S' ҖS'') = (S ҖS') Җ*S''.
4) *Identity element: S Җ* $S_\varnothing$ = $S_\varnothing$ ҖS = S.

11.5. ELEMENTARY STRUCTURES OF BELIEFS

In the section are exposed the main elementary mathematical structures.

11.5.1. The belief poset

In a set of substantive beliefs S exist a partial order relation $\geq$ or "*priority relation*" which is:

1) *Reflexive*: $s_1 \geq s_1$.

2) *Antisymmetric*: If $s_1 \geq s_2$ and $s_2 \geq s_1$ then $s_1 = s_2$.

3) *Transitive*: If $s_1 \geq s_2$ and $s_2 \geq s_3$ then $s_1 \geq s_3$.

4) *Totality*: $\forall s_1, s_2 \in S, s_1 \geq s_2 \vee s_2 \geq s_1$

In other words, a priority order over S is an *antisymmetric preorder*, having the following characteristics:

1) The number of terms of S is finite. Therefore is $(S, \geq)$ a *finite partial order relation* or *belief poset*.

2) Let s_1, s_2, s_3 be three terms of $(S, \geq)$ such that $s_1 \geq s_2 \geq s_3$. The element s_1 is the *belief term join, supremum belief* or *least upper belief bound* of S if the following conditions are satisfied:

    a) $s_1 \geq s_2$ and $s_2 \geq s_3$.

    b) $\forall s_i, s_j, s_l \in S$ such that $s_1 \geq s_i$ and $s_1 \geq s_j$ we have $s_1 \geq s_l$.

Consequence 11.1: *The set S is* a directed set *because it has together with a reflexive and transitive binary relation $\geq$, with the additional property that every pair of elements has an upper bound.*

Note 11.2: *The supremum belief is the main term of the set of substantive beliefs.*

Note 11.3: *The supremum belief is the greatest element of the belief poset.*

Condition 11.1: $(S, \geq)$ *has always a belief term join or supremum belief.*

11.5.2. The belief term join-semilattice

As the belief term join does always exist, it is denoted $s_i \vee s_j$. If all pairs of terms of S have belief term joins, then indeed the belief term join is a binary operation on S, and it is easy to see that this operation fulfils the following three conditions: For any terms s_1, s_2, s_3 in S:

A1) *Commutativity:* $s_1 \vee s_2 = s_2 \vee s_1$.

A2) *Associativity:* $s_1 \vee (s_2 \vee s_2) = (s_1 \vee s_2) \vee s_3$.

A3) *Idempotency:* $s_1 \vee s_1 = s_1$.

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In a set of substantive beliefs S with a partial order priority relation (belief poset), the belief term join is unique. We suppose that s_1, s_1^* are both belief term joins of S. Then $s_1 \geq s_1^* \geq s_1$ whence indeed $s_1 = s_1^*$. And a set S of substantive beliefs is a closed set, not allowing the existence of more terms. If another term as s_1^* existed would be a different substantive belief set, which is not allowed by the same definition of substantive belief set.

Definition 11.11: *The binary priority operation $\geq$ on a substantive belief set S is a belief term join, if it satisfies the three conditions A1, A2, and A3 supra and the pair $(S, \geq)$ then is a belief join-semilattice.*

11.5.3. The belief term meet-semilattice

Let S be a substantive belief set with a partial priority order $\geq$, and let s_i and s_j be two terms in S. A term s_n of S is the *belief term meet* or *infimum belief* of s_i and s_j, if the following two conditions are satisfied:

1) $s_i \geq s_n$ and $s_j \geq s_n$.

2) for any s_{n+1} in S, such that $s_i \geq s_{n+1}$ and we have $s_j \geq s_{n+1}$.

A belief term meet of s_i and s_j is unique, since if both s_n and s_n' are greatest lower bounds of s_i and s_j, then $s_n \geq s_n' \geq s_n$, whence indeed $s_n = s_n'$.

Note 11.4: *A belief term meet not always will exist in a belief poset.*

If the belief term meet does exist, it is denoted $s_i \wedge s_j$. If all pairs of terms have belief term meets, then indeed the belief term meet is a binary operation on *S*. For any elements $s_1, s_2, s_3 \in S$ this operation fulfils the following three conditions:

B1) *Commutativity:* $s_1 \wedge s_2 = s_2 \wedge s_1$.

B2) $s_2 \geq s_1$ *Associativity:* $s_1 \wedge (s_2 \wedge s_2) = (s_1 \wedge s_2) \wedge s_3$.

B3) *Idempotency:* $s_1 \wedge s_1 = s_1$.

We then may define a binary priority relation on S, by stating that $s_1 \geq s_2$ iff $s_2 \vee s_1 = s_1$. In fact, this relation is a partial order on S. Indeed, for any elements s_1, s_2, s_3 in S:

C1) $s_1 \geq s_1$, since $s_1 \vee s_1 = s_1$ by A3.

C2) If $s_1 \geq s_2$ and $s_2 \geq s_1$, then $s_1 = s_2 \vee s_1 = s_1 \vee s_2 = s_2$ by A1.

C3)If $s_2 \geq s_3$ and $s_1 \geq s_2$ then $s_1 \geq s_3$, since then $s_3 \vee s_1 = s_3 \vee (s_2 \vee s_1) = (s_3 \vee s_2) \vee s_1 = s_2 \vee s_1 = s_1$ by A2.

Definition 11.12: *The binary priority operation $\geq$ on a substantive belief set S is a belief term meet, if it satisfies the three conditions C1, C2, and C3 supra and the pair $(S, \geq)$ then is a belief meet-semilattice.*

11.5.4. The belief term complete lattice

For our intentions we will establish the following condition:

Condition 11.2: *The set S will be a finite set.*

Consequence 11.2: *Set S has a supremum belief s_1 and an infimum belief s_n.*

Consequence 11.3: *All subset of S also will be finite and has a supremum and an infimum belief.*

Let s_i and s_j be two terms of $(S, \geq)$ and S' a subset of S.

Definition 11.13: *If for all elements s_i and s_j, if s_i is more than or equal to s_j and s_j is an element of S', then s_1 is also in S':* $\forall s_i \forall s_j \left[s_i \geq s_j \wedge s_j \in S' \Rightarrow s_i \in S' \right]$ *then S' is the* lower belief set *or belief downward closed.*

Let $s_i, s_j, s_l \in S$ be three terms of a belief poset $(S, \geq)$ and so that $S' = \left\{ s_i, s_j, s_l \right\} \subset S$.

Definition 11.14: The subset *S' of a belief poset* $(S, \geq)$ *is called a* directed belief subset *if S'is not the empty set, and for any s_j and s_l in S' there exists a s_i in S' with $s_i \geq s_j$ and $s_j \geq s_l$.*

Consequence 11.4: *All belief subset S' is directed.*

Definition 11.15: *The belief subset S' is a* proper belief ideal, *if the following conditions hold:*

5) *S' is a lower belief set:* $\forall s_i \in S', s_i \geq s_j \Rightarrow s_j \in S'$.

6) *S' is a directed belief set.*

Definition 11.16: *A belief ideal is* a complet belief ideal *if it is equal to the whole belief substantive set S.*

Definition 11.17: *The smallest belief ideal containing the supremum belief s_1 is a* principal belief ideal *and s_1 is said to be a* principal term *of the belief ideal in this situation. The principal belief ideal for a principal term s_1 is just given by the set* $\left\{ s_i \in S \middle| s_1 \geq s_i \right\}$.

Definition 11.18: *A non-empty belief subset S'' of a belief poset* $(S, \geq)$ *is a* proper belief filter *if the following conditions hold:*

1) *S'' is a belief filter base:* For every s_i, s_j in *S''*, there is some element s_l in *S''*, such that $s_i \geq s_l$ and $s_j \geq s_l$.

2) *S'' is a belief upper set:* For every s_i in *S''* and s_j in *S*, $s_j \geq s_i$ implies that s_j is in *S''*.

Definition 11.19: *A belief filter is* a complet belief filter *if it is equal to the whole belief substantive set S.*

Definition 11.20: *The smallest belief filter that contains an infimum belief s_n is a* principal belief filter *and s_n is a* principal term *in this situation. The principal belief filter for s_n is just given by the set* $\{x_j \in S | s_j \geq s_n\}$.

Definition 11.21: *A belief poset* $(S, \geq)$ *is* a complete poset *because each of its beliefs subsests are directed (consequence 8) and has a belief supremum and a belief infimum.*

An order in which all finite sets have both a supremum and an infimum is a lattice. In our case it will be a *belief lattice*.

Let us suppose a subset S' of the belief poset $(S, \geq)$ of substantive beliefs with a priority relation. An *belief join* of *S'* is a term of *S* which is greater than or equal to every element of *S'*. Formally, the *belief meet* of a subset *S'* of the belief poset is an element s_n of *S* such that

1) $\forall s_i \in S', s_1 \geq s_n$.

2) $\forall s_j \in S$ if $\forall s_i \in S', s_i \geq s_j$, then $s_i \geq s_n$.

Definition 11.22: *A belief subset S' of a belief lattice $(S, \geq)$ is* a belief ideal *iff it is a lower belief set that is closed under finite belief joins.*

Definition 11.23: *A belief subset S' of a belief lattice $(S, \geq)$ is* a belief filter, *iff it is an upper belief set that is closed under finite belief meets.*

S is said to satisfy the descending chain condition because every descending chain $s_1 \geq s_2 \geq s_3 \geq ... \geq s_n$ of elements of S there exists a positive integer n such that $s_n = s_{n+1} = s_{n+2} = ...$,there is *no infinite descending chain*.

Minimal condition: *Every nonempty belief subset of S has a minimal term.*

All chains has also a supremum belief. Therefore the belief lattice $(S, \geq)$ will be ω-complete.

Consequence 11.5: *Belief lattice $(S, \geq)$ is a complete lattice.*

Consequence 11.6: *Belief lattice $(S, \geq)$ fulfills the conditions of strong completeness.*

11.5.5. Belief uniformity

Let $S = \{s_1, s_2, ..., s_n\}$ be the set of substantive beliefs and $S \, X \, S$ be its Cartesian product. Let Θ be a nonempty family of subsets of the Cartesian product $\Theta \subseteq S \, X \, S$ called the *uniform structure* or *belief uniformity* of S and let U be a set so that $U \in \Theta$.

Definition 11.24: *The elements of Θ are called* b-entourages *satisfying the following axioms:*

1) *Axiom 11.10: If U is in Θ, then U contains the diagonal $\Delta = \{(s_i, s_i) : s_i \in S\}$. Each term is U-close to itself for each b-entourage U.*

2) *Axiom11.11: If U is in Θ and V is a subset of $S \, X \, S$ which contains U, then V is in Θ.*

3) *Axiom 11.12: If U and V are in Θ, then $U \cap V$ is in Θ. Being both U-close and V-close is also a closeness relation in the uniformity.*

4) *Axiom 11.13: If U is in Θ, then there exists V in Θ such that, whenever $(s_1, s_2), (s_2, s_3)$ are in V, then (s_1, s_3) is in U. For each b-entourage U there is a b-entourage V which is half as large.*

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5) **Axiom 11.14: If U is in** Θ, **then** $U^{-1} = \left\{ (s_2, s_1) : (s_1, s_2) \ in \ U \right\}$ **is also in** Θ.

   It states the essentially symmetric property "closeness" with respect to a uniform structure.

It is easy to verify that the space (S, Θ) fulfills the previous axioms.

Definition 11.25: *We define* s_1, s_2 *as* U-close *if* $(s_1, s_2) \in U$.

The b-entourage U is *symmetric* because $(s_1, s_2) \in U$ and $(s_2, s_1) \in U$. Every uniform belief space has a fundamental system of b-entourages consisting of symmetric b-entourages.

Let

$$\{\varnothing\}, \{s_1\}, \{s_2\}, ..., \{s_n\}, \{\varnothing, s_1\}, ..., \{s_1, s_2\}, ..., \{s_{n-1}, s_n\}, ..., \{s_1, s_2, ..., s_n\} =$$
$$S_o, S_1, S_2, ..., S_n, S_{01}, ..., S_{12}, ..., S_{(n-1)n}, ..., S$$

be a collection of sets whose elements are substantive beliefs.

Definition 11.26: *As* $S \subset \bigcup_{\alpha \in A} S_\alpha$ *we says that* $C = \{S_\alpha : \alpha \in A\}$ *is a belief cover of* S.

Let C and D be two belief covers of S. If every set in D is contained in some set in D we say that cover D is a refinement of belief cover C.

Definition 11.27: $D = V_{j \in J}$ *is a refinement of* $C = U_{i \in I}$ *if* $\forall j \exists i$ *so that* $V_j \subseteq U_i$.

11.6. THE METRIC BELIEF SPACE

Let $S = \{s_1, s_2, ..., s_n\}$ be the set of substantive beliefs. A metric on a set S is a function called the *belief distance* and so that $\delta : SxS \to \Re$ where $\Re$ is the set of real numbers.

Note 11.5: *Belief distance* δ *is subjective and it depends of the believer.*

Therefore metric δ will be a belief metric (b-metric).

For all s_1, s_2, s_3 in S, this function is required to satisfy the following conditions:

1) *Non-negativity:* $\delta(s_1, s_2) \geq 0$

2) *Identity of indiscernibles:* $\delta(s_1, s_2) = 0$ iff $s_1 = s_2$

3) *Symmetry:* $\delta(s_1, s_2) = \delta(s_2, s_1)$

4) *Triangle inequality:* $\delta(s_1, s_3) \leq \delta(s_1, s_2) + \delta(s_2, s_3)$

Therefore, We may define S like a metric belief space iff the believer subject defines a belief distance which will be always subjective.

Definition 11.28: *The ordered pair* $\Sigma = (S, \delta)$ *is a* metric belief space.

1) $\forall s_i, s_2 \in S, \delta(s_1, s_2) = 0$ iff $s_1 = s_2$

2) $\forall s_i, s_2, s_3 \in S, \delta(s_1, s_3) \leq \delta(s_1, s_2) + \delta(s_2, s_3)$

In a metric belief space

$$
\begin{cases}
\delta(s_i, s_j) = 0 & \text{if } s_i = s_j \\
\\
\delta(s_i, s_j) = 1 & \text{otherwise}
\end{cases}
$$

Therefore, metric belief space $\Sigma = (S, \delta)$ has a discrete b-metric.

This, in particular, shows that for any substantive belief set S, there is always a metric belief space associated to it. Using this b-metric, any term is an open ball, and therefore every substantive belief subset $S_i \subseteq S$ is open and the metric belief space (S, δ) has a discrete belief topology.

Let s_1, s_2 be two terms so that $s_1, s_2 \in S$ and let r be a radius so that $r \in \Re, r > 0$. We define

Definition 11.29: *We define an* open ball of radius $r > 0$ centered *at a term* s_2 in S,

to $B_r(s_2) \overset{\nabla}{=} \{s_1 \in M | \delta(s_1, s_2) < r\}$

Definition 11.30: *We define a* closed ball of radius *r > 0 centered at a term s_2 in S,*

$$to\ B_r(s_2) \overset{\nabla}{=} \{s_1 \in M | \delta(s_1, s_2) \leq r\}$$

Note 11.6: *In any set of substantive beliefs S any subject can make or construct as much open as closed balls.*

Note 11.7: *By the peculiar characteristics of S, the balls always they will be referred to term s_1 considered like main term or supremum belief.*

Let S' be a subset of a metric belief space $\Sigma = (S, \delta)$ such that $S' \subseteq S$ and E be a size.

Definition 11.31: *We say that* S' *is* bounded *if there exists s_1 in S and r > 0 such that for all s_i in S_Σ, we have $\delta(s_1, s_i) < r$..*

Σ is a *bounded metric belief space* because Σ is bounded as a subset of itself.

Definition 11.32: *A subset S' of a metric belief space Σ is a totally bounded set iff given size E, there exists a natural number n and a family S_1, S_2, ..., S_n of subsets of S, such that S_Σ is contained in the union of the family, and such that each set S_i in the family is of size E.*

$$\forall E, \exists n, \exists S_1, S_2, ..., S_n \subseteq S \left(S' \subseteq \bigcup_{i=1}^{n} S_i \wedge \forall i = 1, ..., n \quad size(S_i) \leq E \right)$$

Note 11.8: *The metric belief space Σ is a totally bounded belief space iff it is a totally bounded belief set when considered as a subset of itself $S \subseteq S$.*

Note 11.9: *S is totally bounded if, given any positive radius r > 0, it is covered by finitely many balls of that radius r.*

The absolute value $\lfloor s_i - s_j \rfloor$ can be replaced by the *belief distance* $\delta(s_i, s_j)$ between s_i and s_j. It will allow us to establish Cauchy sequences in the metric belief space Σ.

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Given a metric belief space $\Sigma = (S, \delta)$, a belief sequence is Cauchy, if exists a positive real $\varepsilon > 0$ there is a positive integer N such that for all natural numbers $i, j > N$, the belief distance $\delta(s_i, s_j)$ is less than ε. The terms of the belief sequence are getting closer and closer together in a way that suggests that the belief sequence ought to have a limit in S.

In a metric belief space $\Sigma = (S, \delta)$, the sets $U_a = \{(s_1, s_2) \in S \ X \ S | \delta(s_1, s_2) < a\}$ where a > 0 form a fundamental system of b-entourages for the standard uniform structure of S. Then s_1 and s_2 are U_a-close precisely when the distance between s_1 and s_2 is at most a.

Definition 11.33: *In a metric belief space* $\Sigma = (S, \delta)$, *a set V is an* uniform belief neighbourhood *of a term p if there exists an open ball with centre s and radius r, such that* $B_r(p) = \{s \in S | d(s, p) < r\} \subset V$.

We may see in figure 11.2.
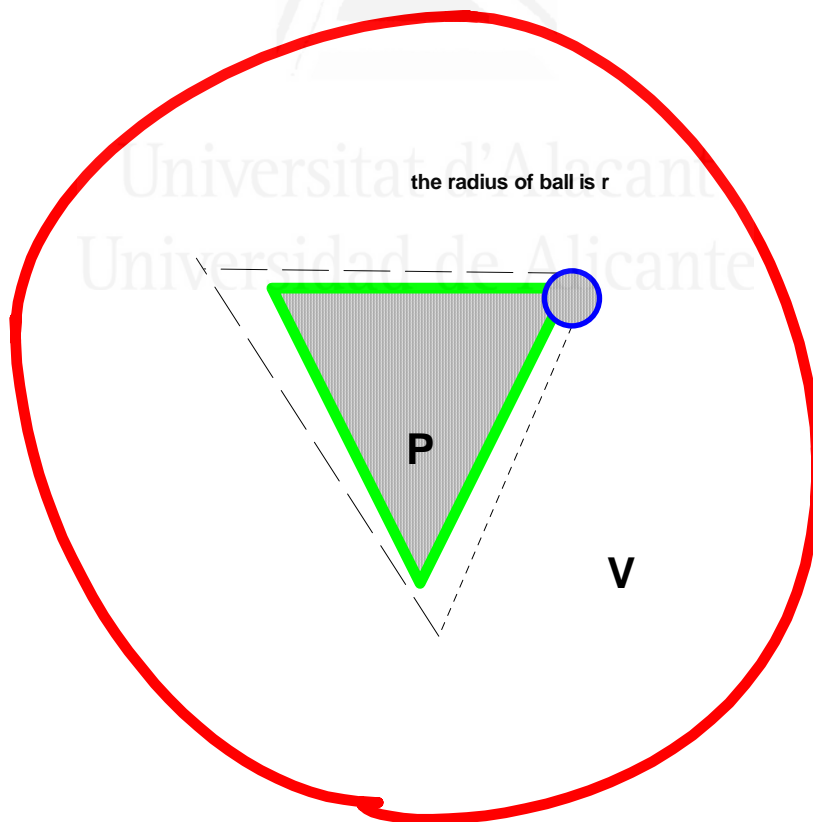
Figure 11.2.

Definition 11.34: *Term s_i is a* term of closure *of S' if for every r > 0, there is a term s_j in S' such that the distance* $\delta(s_i, s_j) < r$.

Term s_i is a term of closure of S' if the distance $\delta(s_i, S') = \inf\{\delta(s_i, s_j)\}$

The closure of the set of sbstantive beliefs S and we denote cl(S is the set of all terms of closure of S and has the following properties.

1) cl(S) is a closed superset of S.
2) cl(S) is the intersection of all closed sets containing S.
3) cl(S) is the smallest closed set containing S.
4) The set S is closed iff S = cl(S).
5) If $S' \subset S$ then $cl(S') \subset cl(S)$.
6) If S is a closed set, then S contains S' iff S contains cl(S').

For the Theorem of Stone, the metric belief space is paracompact (Rudin, 1969) and therefore every open belief cover admits an open locally finite refinement.

11.6.1. Pseudometrics belief space

For the believing subject a belief will always exist distances between substantive beliefs. Nevertheless, for the nonbelieving subject will not exist distance between the substantive beliefs. We were in the case of a pseudometric. ***Belief pseudometrics are the metrics of the nonbelieving subject***.

Definition 11.35: A pseudometric belief space (S, δ) *is a set S of substantive beliefs together with a non-negative real-valued function* $\delta; S \ X \ S \to \Re$ *such that, for every*

$s_1, s_2, s_3 \in S$,

1) $\delta(s_1, s_1) = 0$

2) $\delta(s_1, s_2) = \delta(s_2, s_1) = 0$

3) $\delta(s_1, s_3) \leq \delta(s_1, s_2) + \delta(s_2, s_3)$

It exists a metric identification, that converts the pseudometric belief space into a full-fledged metric belief space by defining $s_1 \tilde{\ } s_2$ if $\delta(s_1, s_2) = 0$. Let $S^* = S / \tilde{\ }$ and let $\delta^*([s_1], [s_2]) = \delta(s_1, s_2)$. Then δ^* is a belief metric on S^* and (S^*, δ^*) is a well-defined metric belief space. Let $f : S \times S \to \Re$ be a belief pseudometrics ona a set of substantive beliefs S. For a *family* (f_i) of belief pseudometrics on *S*, the uniform structure defined by the family is the *least upper belief bound* of the uniform belief structures defined by the individual belief pseudometrics f_i. The family of belief pseudometrics is *finite* and it can be seen that the same belief uniform structure it is defined by a *single* belief pseudometric, namely the *upper belief envelope* (sup f_i) of the family.

11.7. THE TOPOLOGICAL BELIEF SPACE

The open balls of a metric belief space S form a basis for the topological belief space, whose open sets are all possible unions of open balls. This space is called the belief topology induced by the metric *d*.

Let S be a set of substantive beliefs and Θ be a collection of sets so that
$$\Theta = \{\varnothing, \{s_1\},..., \{s_n\}, \{s_i, s_2\},....\{s_i, s_n\},..., S\}.$$

The pair (S, Θ) will form a topological space because it fulfills the following conditions:

1) $\varnothing$ and S are in Θ.

2) The union of any collection of sets in Θ is also in Θ.

3) The intersection of any finite collection of sets in Θ is also in Θ.

Definition 11.36: *To topological space* (S, Θ) *we call* topological belief space.

Definition 11.37: *The collection* Θ *is called* a belief topology on S *and the elements of S are called* substantive beliefs o terms.

Let $P(S)$ be the power set of S and σ_1, σ_2 be two sets so that $\sigma_1, \sigma_2 \in P(S)$. We define the function $bcl : P(X) \rightarrow P(X)$ called the closure belief operator satisfying the following Kuratowski closure axioms:

1) *Extensivity:* $\sigma_1 \subseteq bcl(\sigma_1)$

2) *Idempotence:* $bcl(bcl(\sigma_1)) = bcl(\sigma_1)$

3) *Preservation of binary unions:* $bcl(\sigma_1) \cup bcl(\sigma_2) = bcl(\sigma_1 \cup \sigma_2)$

4) *Preservation of nullary unions:* $bcl(\varnothing) = \varnothing$

5) *Preservation of finitary unions:*
$bcl(\sigma_1 \cup \sigma_2 \cup ... \cup \sigma_n) = bcl(\sigma_1) \cup bcl(\sigma_2) \cup ... \cup bcl(\sigma_n)$

Then a topological belief space can be defined as (S, bcl).

Given a topological belief space (S, Θ) and a subset $S' \subset S$, the belief subspace topology on S' is defined by $\Theta_{S'} = \{S' \cap X \mid X \in \Theta\}$.

Definition 11.38: *If S' is equipped with the belief subspace topology then it is a topological belief space, and is called* a belief subspace of (S, Θ).

Let Σ' and Σ be two belief topologies on a belief set S such that $\Theta' \subseteq \Theta$, that is, every element of Θ' is also an element of Θ. Then the belief topology Θ' is a *coarser belief topology* than Θ, and Θ is said to be a *finer belief topology* than Θ'. If $\Theta' \neq \Theta$, Θ' is *strictly coarser* than Θ and Θ is *strictly finer* than Θ'.

If the set S has a collection of subsets Θ that is a topological belief space then any member of Θ is an open set. We call B to topological belief space $B = (S, \Theta) = (S, bcl)$.

Let B be a topological belief space and $s \in S$ be a term. Let us suppose that $s \in U \subseteq V$. Then the set V will be a belief neighborhood of term s and s is in the interior of V. The collection of neighborhoods of s will form a neighborhood filter $V(s)$ of term s. Let V be the neighborhood of s and let B a set such that $B \subset V$. It exists a neighborhood filter

$B(s) \subset V(s)$ such that $\forall V \in V(s), \exists B \in B(s)$. $B(s)$ is the *local belief base por the term s.*

Let S' be a subset of topological belief space B such that $S' \subset S$. The closure of S' consists in all terms (terms) which are close to S'.

Definition 11.39: *A term $s \in B$ is an* adherent term *for S' if every open set containing s contains at least one term of S' other than s.*

A term *s* is an adherent term for *S'* iff *s* is in the closure of $S' \backslash \{s\}$. A term that is not an adherent term of *S'* is said to be an isolated term of *S'*.

Definition 11.40: *Term s is a* term of closure *of S' if every neighbourhood of s contains a term of S'.*

Consequence 11.7: *Substantive beliefs have an abstract or ideal topological structure.*
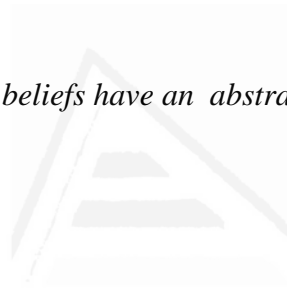
12. STRUCTURES OF MATERIALIZATION

12.1. INTRODUCTION

The sensations perceived by the man reflect a world without meaning, but due to his psychic system, he transforms them into significant and touching objects. The man uses as such objects to solve first his survival, and soon the problems referred to the transcendental sense of his person. From the senses or the memory, arrive signals translated like images being manipulated by abstract or associative routes. Abstract route is the mechanism that allows forming concepts, whereas the associative route structures the representations by similarity, contiguity or contrasts. These phenomena take place in the named *space of representation* a species of mental screen in where is projected images stimulated by the senses, memory or imagination. Due to the connections between the world of the objects and the conscience, it exists communication providing visual images, acting to way of nexuses. Therefore, it is called *image* to the internal or external representation, of sensations structured by the conscience.

The natural "embodiment" of the perceived spatial relations is culturally encoded and thereby leads to a kind of iconic link between perception, language, and the perceived world. However, the codes representing space are not merely images of the surrounding world but instructions to its individual and social construction.

We can define the *existencial space* like a relatively stable system of images of the surrounding world of the man, and that it indicates that this surrounding space is a necessary part of the existencial structure. A complete theory of the existencial space must include abstract and concrete aspects:

1) The abstract aspects talk about general schemes of topological and geometric class.

2) The concrete aspects deal with the pick up of environments like the physical elements, buildings, urban environment or rural landscape.

Between the elementary properties of the existencial space are the concepts of *center* and *place*, because the man spontaneously tends to act in spaces trims. As opposed to the center, the place indicates certain dimension, but it is necessary to distinguish between the own place, that is the space that each organism protests like own, and the abstract image of the well-known places. The existencial space, is therefore, a psychological concept, determined by the structure of environment and the psychic characters of the man.

Definition 12.1: *We defined as* materialization *the conversion by means of certain mathematical correspondences, of an abstract set whose elements are beliefs or ideas, in an impure set whose elements are material or energetics.*

In the materialization process, we will distinguish two different although intimately united processes: symbolic materialization and textual materialization. We will divide to the Primigenial Base on two parts, PB_1 containing the archetypes and PB_2 containing myths (Figure 12.1).

12.2. MAIN HYPOTHESIS

In order to establish patterns of materialization of the beliefs we are going to consider that these have defined mathematical structures. It will allow us to understand better processes of the textual, architectonic, normative, educative, etc., materialization, of an ideology we propose following initial hypotheses:

Hypothesis 12.1: *The beliefs are not product of the reason nor of the abstract and logical thought.*

Hypothesis 12.2: *In the origin of any belief system there is always a supernatural system of beliefs.*

The man, from his first forms to the present one, has inaugurated and developed the reflection, that is to say, the aptitude to translate to symbols the material reality of the surrounding world. As we happened soon of the first Antropienses to the man of

Neanderthal and to us, the testimonies that offer the utensils show the progressive maturation of technical intelligence, probably parallel to the evolution of the language.

IDEAL

Primigenial Base
PB₁: Archetypes
PB₂: Ideal Values, Myths.

MythicalSuperstructure (MS)

Ideal Structure (ISt)
Ideal Values, abstract ideology
Utopia (Goals)

inverse-MS-image

mythical superstructural image (MS-image)

last goal

inverse-MS-projection (concretion)

Ideological Doxical Superstructure (IDS)
Values in fact, Dominant Ideology,

doxical superstructural image (IDS-image).

connotative-SB- projection (symbolic materialization)

near goal

Actual Structural Base

connotative-SB- projection (textual materialization)

Desirable Structural Base

Subject

ACTUAL

Figure 12.1

The elementary property of the language consists of creating, parallelly to the outer world, an all-powerful world of symbols without which intelligence would be private of handles. The apprehension of which we considered religious had to follow the same course; the symbols formulated in the words and the actions the double feeling of fear and dominion that marks the religious conscience. The one that all extraordinary fact

was perceived explicitly, establishes a strong presumption in a conception of the supernatural thing, but not in the sense in that we conceived it some millenia ago. Some millenia of rationalism have taken to the western culture to define the ways to apprehend the universal order, by means of the mystic, magic, dogma, law, philosophy, science, technique; but in the conditions of the paleolíthical man, the anxiety to understand the well-known and the mysterious thing, they were expressed in a system, different, but equal of reasonable, that the one of the Greek philosophy or the Quantum Mechanics. A system that, for the primitive man, was the key for the operating security in all lands of the life and the death.

The man have lived in two environments: one natural and other supernatural (Swanson, 1964). The structures of both worlds varies greatly in human experience. In words of the author, toward man, the supernatural may be indifferent, spiteful, wantonly malevolent, supportive, supervisory, distant, intimate, transcendent, or inmanent. Toward the supernatural, man may be scornful, friendly, fearful, awe-struck, manipulative, indifferent, submissive, reverent, joyful, aggressive, or loving.

No procedure of empirical science allow us to determine with absolute certeinty that an event A is the cause of other event B. What one can sometimes show is that B always appears after A and that B appears only A is present. We can never be certain that A and B will have this relationship under all possible conditions because we are able to study them in nly limited number of situations. We can never be certain that it is A, as such, rather than some aspect of A or something which always accompanies X without being a part of it, which is the necessary and sufficient antecedent of B. The confidence that A is the case of B is increased by several factors:

1) A causal relation exits if we have some logically valid reasons for thinking that it should.

2) If the relationship appears under a wide variety of conditions.

3) If alternative explanations may be discarded as contrary to empirical observations.

4) If we are able to contol the appareance of antecedent conditions other than A so that A alone seems to precede B.

Although abslute empirical proof of any positive assertion about causality is out of question, absolute empirical disproof is often quite possible: B appears in the absence of

A or A is not always followed by B. It is a curious fact of human nature that we can asolutely certain that something is not true, but only more or less certain that something is true (Swanson, 1964). For explanation of origin of beliefs exist two theories:

1) The experiences and inferences of prhistoric men. Knowledge about beliefs shows that they not persist by themselves. An idea,attitude or belief must correspond to current experiences with the environment if it is to continue across the generations. As the result, we may expect that forces which produce and support current beliefs are present along with those beliefs.

2) Direct experiences with mana and spirits. By definition, these supernatural entities stand apart from the natural universe, freed of its laws and limitations and we are not able to observe them through the instruments of nature. Behind nature events lies the supernatural, that it to say, a realm of potentialities and purposes of which natural events are but concretions or expressions as human behaviors are expressions of potentialities and purposes held by the men who produces them. Mana represents the potentialities whit underlie nature and spirits represent organized clusters of the underlying purposes (Swanson, 1964).

When he is confined to the world of nature, man is unable to produce what he wants merely by having the desire to do so, by informing the natural order with his purposes. He must create changes in the material universe which, of themselves, produce yet other changes until his objective is reached. At no point do his ideas or purposes intrvene to change the environment. They must be implemented by material action in the material world orthat world remains as it was. Supernatural forces are free of these limitations imposed on natural action in the material world. Not only do supernatural force have powers not given to men, but, unless opposed by other and stronger spirit or by magic, the ends toward which those forces are directed are always accomplished.The supernatural powers are immortal. They niether die nor become impotent with age. Possibly the mystery of the death lead to the first belief: the existence of a inmortal spirit, in the man and the rest of alive beings. The nature of life, of sleep, of death, and of dreams was the stuff which inspired religious thought. Reflecting on these mysteries, man developed the distinction between the human body and the spirit dwelling within it.

With symbols Geertz (1973) meant a carrier that embodies a conception, because he saw religion and culture as systems of communication. Eliade (1978) suggests that the earliest document in the history of beliefs is located in the symbolism of stone tools, tools or make tools. For Harrod (1992) the first technological discoveries not only insured the survival and development of the human species: they also produced a universe of mythico-religious values and inspired and fed the creative imagination. Human religious thought and moral values clearly rest on a cognitive-linguistic base. It exists a fundamental of humanity, so inseparable characteristic of the technique as of the language: the common origin of religion and art. Even in the undressed less figurative works and more of religious content, the primitive artist is the creator of a message; he exerts through the forms a simbolized function that also shows in music, dances or language. This message talks about to the physics and psychic necessity to provide to the individual and the social group a point to take hold of the universe, to make the insertion of the man, by means of the symbolic apparatus, in the movable and random world that surrounds him. One suggestion has the gods representing the sun and the goddesses the moon. Another would have us see them personifying a life-force causing plants, especially the food-plants, to grow anew each spring (Walsby, 1947). These proposed explanations, and others attempting to trace the origins of the divinities in nature, do much to account for the pattern of rise, decline and renascent so common in religious myths, and for the emotion associated with religion. But although sun, moon and stars undeniably play a part, they serve less to originate the religious impulse than to furnish it with a local habitation. Cows and cats also have provided shapes for divinity to occupy, but few propose to take any impression these creatures have made as the source of religious belief. There is more to religion than these explanations can explain, and - what concerns us here - they fall short of accounting for the omnipotence credited to the supreme deities.

Hypothesis 12.3: *Derived beliefs become with the passage of time substantial beliefs, giving origin to a more or less ample body of substantive beliefs, that is to say, a religion.*

Geertz (1973) saw religion as one of the cultural systems of a society. He defined religion as a system of symbols which acts to establish powerful, pervasive and long-lasting moods and motivations in men by formulating conceptions of a general order of

existence and clothing these conceptions with such an aura of factuality that the moods and motivations seem uniquely realistic. The concept Religion is sometimes used interchangeably with belief system but it is more socially defined than personal convictions, and it entails specific behaviors, respectively. Nevertheless belief system may not necessarily refer to a religion, though a religion may be referred to as belief system. Religion is a system of human thought which usually includes a set of narratives, symbols, beliefs and practices that give meaning to the practitioner's experiences of life through reference to a higher power or ultimate truth.

It may focus on specific supernatural, metaphysical, and moral claims about Reality which may yield a set of deontical norms, values, and a particular lifestyle. Religion as we know it today is an integral part of civilisation, influential, immensely complex and deeply enmeshed in social life. Political movements turn out on examination to form a significant series and one might have expected these religions to fall into a corresponding arrangement, but they do not. Historical connections can be found. Religion symbolizes the strength and cohesiveness of society, hardly touches this issue, for no society, simple or sophisticated, provides any model for unlimited power; every society acts within limitations imposed either by the natural world or by other societies. The religious behavior, the religiosity, is not made up only of religion, but that it supposes, in block, everything a set of physiological and psychological facts that they generate an emotional field dento of which the rational explanation does not occupy the first position.

Hypothesis 12.4: *When belonging to the Ideological Doxical Superstructure (IDS), the set S of substantive beliefs will be "ideal", that is to say, merely abstract.*

Hypothesis 12.5: *Sets S and D form a graphed text having a topological structure which represents the way in which the individual organizes semantic content, concepts and propositions, belonging to his beliefs system in his cognitive structure through subsumption, differentiation and integration.*

12.3. TEXTUAL MATERIALIZATION

It exists a textual space that is a materialization of the existencial space. The textual space is also, a legacy that receives the individual, is therefore previous to him since it

reflects the existencial spaces of his predecessors. And within this textual space we will distinguish between the writ textual space and the spaces architectonic, pictorial, etc. A special and very important case is the textual space of written texts.

Structurally, natural human conversation is an acoustic phenomenon without spatial extension: it is structured as a sequence in time. However, its product is the written text, which is referred to very often in terms of spatial metaphors. Therefore, in the phonetic chain only in terms of time, it is attributed to the linearity of signs a spatial dimension: the geometry of the line. This is what Nöth (1994) calls a semiotic paradox, and he compiles an amazing number of examples for the linguistic expression of what he calls the geometry and topology of textual space. Nöth finds them especially in metaphors:

1) *First dimension*: the literal meaning of which refers to spatial structures as in points or lines.

2) *Second dimension*: a metatextual *topoi* of space, levels, or surface structures.

3) *Third dimension*: an intratextual or intertextual reference, bodily *topoi*, or metatextual organization of units such as chapters, etc.

It may suggest a static concept of writ textual space, but there are many examples of a dynamic spatial concept as well e.g., changes of (textual) space, movement within (textual) space, its limits and extension, and, of course, all the linguistic means of deictic reference. Indeed, cognitive semantics has attempted to explain the remarkable frequency of space metaphor in everyday language by the biological relevance of how humans perceive space and orient themselves within it in phases of prelinguistic language acquisition (Lakoff, 1987). All these findings open up a new perspective on the Saussurian notion of textual linearity. It exists focus on semiotic relationships between cognitive categorization of space and its textual representation in various sign systems (i.e. texts not only in the syntactical understanding of linguistics). Focusing on the problem of how to represent the complexity of three-dimensional space in the linearity of one-dimensional sign sequences (e.g., sentences), Wenz (1997) suggests that texts may develop their own (metaphorical) notion of space within which the reader will find his/her orientation during the process of reading. In other words, it is the reader who constructs 'text space' based on interpretation of sign sequences functioning as semiotic *Gestalt*. If we understand the linearity of texts as a projection of semiotic

principles structured on a kind of *ordo naturalis* of language, we may logically also argue for a cultural convention or social order of space designed through texts: it is a matter of categorizing perception through shared knowledge, or, as Lakoff (1987) put it, seeing always means "seeing as". Everything text T looks for an equilibrium. It exists a conscience of imbalance and a will of balance. Human groups (SB) operate by answers, and logically, T also does. That is to say, they respond before the perceived reality. But this perception is not the one of a harmonious reality, but a nontotalized reality. And this no-totalization of the reality is the one that mediatizes and determines the collective answers. The conscience of the imbalance, of the not-totality, in its attempt of equilibrium will respond of three different ways:

1) Raising the equilibrium harmony (*classic materialization*). It is characterized by all negation of the imbalance, in one first analysis, although in fact it does not happen thus. Classic T is able to integrate itself, to balance all negation and imbalance. Its world vision perceives ruptures as provisional and one makes an effort to indicate the way of integration.

2) Raising the perceived nonbalance (*revolutionary materialization*). It is the ruptural T. Ruptures are raised, break the styles and new forms look for before the impossibility to be satisfied, acquired, inherited, balanced or integrated. In these Ts, the obtained totalization it is less rich and coherent than classic Ts. Nevertheless, from them arise the revolutions, the jumps towards ahead.

3) Denying all balance (*playful materialization*). It is the utopic conception, playful or song and the mythical celebration of the reality. It means the negation of all cultural work, since the playful thing, to exist, would not need any type symbol, since it would have any necessity to be perpetuated.

Through these three types of ideological answers, any T has to materialize itself with certain equilibrium. Therefore, the Texts are the materialization of a peculiar world vision, a peculiar belief system and a peculiar ideology. They are simultaneously, its triumphant expression, its conservation, its transmission and its desire of eternity. In principle, collective subject world vision generates T's problematic, mediating, inspiring and producing, but these mediations find a series of resistance: in content and form. Logically, a new world vision has to transform the inherited ideological

structures, ways to do, behaviors, forms and contents. These mediations have to take place most of the times with damage of T in their total unit, affecting even their coherence. When it changes the world vision, the text lets accomplish a mission for which it had been conceived, and is left, forgotten and sometimes even destroyed, often with unusual violence, when a certain world vision has been replaced by another one with radically opposed substantive beliefs. Whole libraries burned considered heretic or blaspheme. Sanctuaries destroyed or reused changing its function. Old Gods turned demons or reused in new Gods (or saints). The forgetfulness is in the best one of the cases. History is full of multitude of cases. In this chapter, we tried to give to a logical and mathematical explanation to the materialization of a belief system through the mathematical structures that appear, as much in the belief system as in the text. For it we must formulate own previous concepts of the Text Theory.

Let WV be a determined world vision T be a text and S_A, S_B be the author and reader respectively.

Definition 12.2: *We define as* content c *of T to the materialization of a series of social relations produced in SB that take shape in a determined WV, and that uses previous materializations, considered historical, produced in previous SB and within same culture C.*

Definition 12.3: *We define as* form f *the materialization of a determined and specific WV.*

Being f a creation or social product, can appear at the same time in that it appears c. Nevertheless, knows by historical experience that f can take long periods of time (years and even centuries) in reaching a constant and unremovable structure.

Consequence 12.1: *A content c of T is in relation to an inherited form f_{t-1}, constructed in advance to the materialization of c.*

Consequence 12.2: *Content c of T must find a form f to materialize itself, and that is preexisting to the c to which it is to materialize.*

In according Ferreras (1980) a classification of forms f with respect to contents can be established:

1) *Adapted forms*: f offers minimum resistance to the materialization of c.
2) *Inadequate forms*: f offers maximum resistance to the materialization of c.

12.4. STRUCTURES OF MATERIALIZATION

In all text T we will distinguish between the Structurating Structure (SS) and the Structured Structure (sS) of all text.

Definition 12.4: *We define as* Structurating Structure (SS) *of T like the internal cause by means of which the different elements summoned in T are structured or agglutinated.*

1) SS is the self-regulating cause of the structure, since in it the exclusion principle exists.
2) SS is bound deeply with a way to do, to think, to feel; in a T, with a determined WV.
3) This WV, of collective, belonging to SB, generates a collective subject that materializes T.
4) In SS also are the organizational causes, or the self-regulating virtuality and the organizational virtuality, but these virtualities talk about a way to do, not to content.
5) SS also is deeply bound with the WV of a social group.
6) In the concrete level of the structure of T, SS is its problematic one, their reason to be.

Consequence 12.3: *It exists a continuous movement by which the information coming from Structural Base (SB) modifies codes and ideologies and it is translated in new codes and ideologies.*

SS comes from a collective or transpersonal subject, but this SS goes to face now, by means of an individual and specific action, with one sS that will be the form.

Definition 12.5: *We define* Structured Structure (sS) *as the concrete materialization in SB of Structurating Structure (SS).*

A book, a church, a castle, a picture, a symphony, etc is determined sS. Structured Structure (sS) has the following characteristics:

1) A structuring or materialization of SS is necessary condition for the T's existence.

2) sS has its own mediations. SS does not take shape automatically in sS, but that this one can even mediate in the own SS, modifying it, by means of a feedback process.

3) sS is the *primary connoted significance*. SS "will be covered" by sS, like a *secondary connoted significance*.

The existence of both structures of T: SS and sS, have two characteristics:

1) It explains T in its relation with SB (subject group). The collective subject is the creator of the SS but not necessarily the producer of sS. The mediations of the S_A are decisive. Between content c of T and S_A there is an intimate connection. The "*world of T*" is the inner world of the S_A.

2) It allows valuing the internal coherence of T.

SS is the true motor and cause of T and comes from a collective or transpersonal subject. But this SS goes to face, by means of an individual and specific action with one sS to which we will denominate *form*. Therefore, *the form f of a text T is the own one structured structure sS of this text.* A form f, or sS, is a produced social creation in SB, that is previously in the collective conscience (belonging to DS), and when the moment arrives for expressing a new c, sS already has been accepted and used. Nevertheless, sS is also a structure that has its own self-regulating internal laws that make it exist like f. While the new cs are not in contradiction with the internal laws of f, f will continue working like such f. Nevertheless, by law of historical evolution, f will be in opposition with the new cs. It will be necessary to consider not only the internal laws of SS that enters opposition, but also the existing differences between the new c and the old cs. The explanation has to be in the social evolution of SB, formed by

groups and social classes that are those that constructs f, use it and that as of certain moment, are incapable to use it without transforming or destroying it.

Example 12.1: A literary sort very well-known, the *novel*. Novel, as it forms f or sS, is a social form, one T, that has had its history, genesis and to happen. To find the group social, belonging to a certain historical SB that created the novel, means, first of all, to know a mental structure, a way to think, to be related, values in fact, beliefs system, ideologies, a peculiar WV. The form *f = novel* is of clear bourgeois origin. The man of the Renaissance was able to force and to commit himself legal and economically and is born the "modern man", and with this one, the novel was born. This new man is a hero who is lost his position in the great harmonious totality of an organized, totalized society and in the harmonic Cosmos, with a sense of the Divinity. It is a new SS that needs to materialize itself, and that when doing it, will do it of a precise and specific way. The novel arises therefore, but as it is natural, these T cannot arise from the anything; the Renaissance new man, had within the new field of his WV, two forms in which to lean: on the one hand, the memory and the conserved rest of old, Greek and Roman novels, and on the other hand, the inheritance of closed poems and national epic poems. And on these two inheritances, at least, the new novelist counted and operated. Cervantes evokes to Heliodoro, and the cavalry books to try to disacralize the closed, old world and to materialize for the first time, an individualized hero. The cavalry books represent the midpoint in which a form f resists to being used with a new WV; for that reason are closed novel forms, of impossible evolution. In the novel *Amadís de Gaula* (popular Spanish cavalry book) the protagonist is already an individualized man who is called Amadís, but his conduct is of such way fit to a well-known table of values, that no evolution is granted to him, and of no way he can stop being the Amadís besides to be Amadís. Form *f = epic* resists to materialize to the Renaissance subject that is not representative or of any table of values nationally accepted, that only imagines himself and that to materialize himself, he has to break with one of the structures or internal laws of forms *f₁ = epic* or *f₂ = poem*: that in which the hero is a collective hero, representative of a whole society. The new SS, of bourgeois origin, individualistic, fights to prevail and to materialize itself in the form that finds and that it is led by the historical mediations of its moment and space. Then it will transform this form f until turning it which at the moment we know like novel.

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We have made a brief scheme, not absolutely complete, since there would be to consider another series of reports (images and projections) that would make the scheme much more complicated. Nevertheless, there is no way to understand happening of a form (novel in example 1), if do not consider the adjustments and nonadjustments of a series of inherited forms before the necessities of materialization of a new transpersonal conscience, that is to say, of a new SS.

The sS is always necessary for the existence of the cultural unit, to avoid to turn to this one a pure conceptualization. In addition, it is necessary that sS responds to a certain coherence, or a minimum of coherence that would agree to establish. A rigorous analysis of SS of a textual structure, would also give a WV and the collective subject that mediates and inspires the analyzed T.

Consequence 12.4: *All SS is consubstantial to the collective subject of the textual structure (TS).*

The mediation of the author S_A usually is important and significant, nevertheless, the sS, usually is of collective use but also of collective formation and creation. S_A has to be related to sS by means of a personal style and of a way to do. It is the *author psychological contexture*.

Consequence 12.5: *According to we have defined previously the Structured Structure sS is the materialization of a world vision WV, is to say is the own text T. Then $T \equiv sS$.*

12.5. THE TOPOLOGICAL STRUCTURATING STRUCTURE (SS)

Let T be a text. In all text T, not concerning their material nature, certain elements exist (subtexts) containing their basic ideas. This subtext constitutes the Structurating Structure (SS). It is possible to form a subtext $SS \subseteq T$ containing others subtexts $SS = \{\tau_1, \tau_2, ..., \tau_m\}$ connoting the basic ideas of T. Topological structures are based on Anderson (1987), Birkhoff (1967), Bourbaki (1972), Bryant (1985), Burris and Sankappanavar (1981), Kelley (1955), Schechter (1997) and Willard (1970).

Hypothesis 12.6: *When belonging to Structural Base (SB), the Structurating Structure (SS) will be "material", that is to say, visual somehow as much for the believing as for the nonbelieving subjects.*

Note 12.1: *Being SS material then it will be a 3-dimensional Euclidean space R^3.*

Let $SS = \{\tau_1, \tau_2, ..., \tau_n\}$ be a set of strucutred substantive beliefs.

Definition 12.6: *We define as* Structurating Structure SS *like subtext formed by subtexts connoting the ideas or basic theses denoted by S_A. Then* $SS = \{\tau_1, \tau_2, ..., \tau_m\}$.

Note 12.2: *Subtext SS is defined as the Structurating Structure of all text T.*

Structurating Structure SS forms a finite sequence of materialized substantive or derived beliefs.

SS is a subset of Euclidean space R^3. Let τ be a point of SS.

Definition 12.7: τ *is a point of closure of SS if every open ball centered at τ contains a point of SS, being able be τ itself.*

R^3 is a metric space with metric d, τ is a point of closure of *SS* if for every $r > 0$, there is a v in *SS* such that the distance $d(\tau,v) < r$.

Definition 12.8: *We can define* an accumulation point *as a point which is the limit of this sequence.*

As well as the set substantive beliefs has one main belief, SS does not have it. Its accumulation point will be different for each materialization, depending on the own author (or authors) from this one and on the world vision in a while determined historical. What if can be observed in an ideological analysis of any text, written or another type of materialization, that exists a convergence towards an idea or certain belief. This it will be the accumulation point of text T.

Let SS' be a subset of SS.

Definition 12.9: *A* structurating cover *for SS' is the collection of sets* $SC = \{SC_i\}_{i \in I}$ *such that* $\forall SC_i \subset SS$ *and* $SS' \subset \bigcup_{i \in I} SC_i$.

A subset $SC' \subset SC$ is also a structurating cover of SS.

Definition 12.10: *A* structuring refinement *SP of SC is a structurating cover of SS such that* $\forall V \in SP, \exists U \in SC$ *such that* $V \subset U$.

The neighborhhod filter $\Phi(\tau)$ for a point τ is the collection of all neighborhhods for the point τ. The neighborhhod basis $B(\tau)$ for a point τ is a filter base of the neighborhhod filter $B(\tau) \subset \Phi(\tau)$ such that $\forall U \in \Phi(\tau), \exists B \in B(\tau), B \subset U$. The corresponding neighborhhod filter is $\Phi(\tau) = \{U \supset B : B \in B(\tau)\}$. For each point τ in SS_T exists a sequence of open neighborhhods, U_1, U_2, … of τ such that for any open neighborhhod V, of τ, there exists an integer, i, with U_i contained in V. Therefore, SS_T is a first-countable because each point has a countable neighborhhod basis.

Theorem 12.1: *SS fulfills the Heine-Borel theorem, therefore SS is a compact space.*

Proof:

1) *SS is closed.* Let τ is an accumulation point of SS, then any finite collection C of open sets, such that each open set U in the collection C is disjoint from some neighborhood V_U of τ, fails to be a structurating cover of *SS*. Indeed, the intersection of the finite family of sets V_U is a neighborhood W of τ in R^3, therefore W must contain a point η in *SS* (because τ is an accumulation point of SS) and this $\eta \in SS$ is not covered by the family C – because every U in C is disjoint from V_U, hence disjoint from W that contains η, so η is not in U. If SS is compact but not closed, then it has an accumulation point τ not in SS. Consider a collection C' consisting of an open neighborhood $N(\eta)$ for each $\eta \in SS$, chosen small enough to not intersect some neighborhood V_η of τ. Then C' is an open structurating cover of SS, but any finite subcollection of C' has the form of C discussed previously, and thus cannot be an open structurating

subcover of SS. This contradicts the compactness of SS. Hence, every accumulation point of SS is in SS, so SS is closed.

2) *SS is bounded.* Consider the open balls centered upon a common point τ, with any radius r. This can cover any set, because all points in the set are some distance away from that point τ. Any finite structurating subcover of this structurating cover must be bounded, because all balls in the structurating subcover are contained in the largest open ball within that structurating subcover. Therefore, any set covered by this structurating subcover must also be bounded.

3) *Closed subset SS' of SS is compact.* Let $C_{SS'}$ be an open structurating cover of SS'. Then $U = \mathbf{R}^3 \setminus SS'$ is an open set and $C_{SS} = C_{SS'} \cup \{U\}$ is an open structurating cover of *SS*. Since *SS* is compact, then C_{SS} has a finite subcover C'_{SS}, that also covers the smaller set *SS'*. Since *U* does not contain any point of *SS'*, the set *SS'* is already covered by $C'_{SS'} = C'_{SS} \setminus \{U\}$ that is a finite subcollection of the original collection $C_{SS'}$. It is thus possible to extract from any open structurating cover $C_{SS'}$ of *SS'* a finite structurating subcover.

Then, if SS is closed and bounded, then it is compact.

Let *SS X SS* be the cartesian product of SS. The set $\Delta = \left\{(\tau_1, \tau_2) \in SS\ X\ SS : \tau_1 = \tau_2\right\}$ is closed in the product topology of *SS X SS*.

Let $SS = \{\tau_1, \tau_2, ..., \tau_n\}$ be a set and T be a collection of subsets of SS as T $= \{\{\ \}, \{\tau_1\}, ... \{\tau_n\}, \{\tau_1, \tau_2\}, ..., \{\tau_1, ..., \tau_n\}\}$.

Note 12.3: *Subtext SS will form a topological textual space $SS_T = \{SS,.\ \mathrm{T}\}$*

Let τ_1, τ_2 be two points in SS_T. Points τ_1, τ_2 can be separated by neighborhhods since there exists a neighborhhod U of τ_1 and a neighborhhod *V* of τ_2 such that $U \cap V = \varnothing$ (Figure 12.2).

SS$_T$
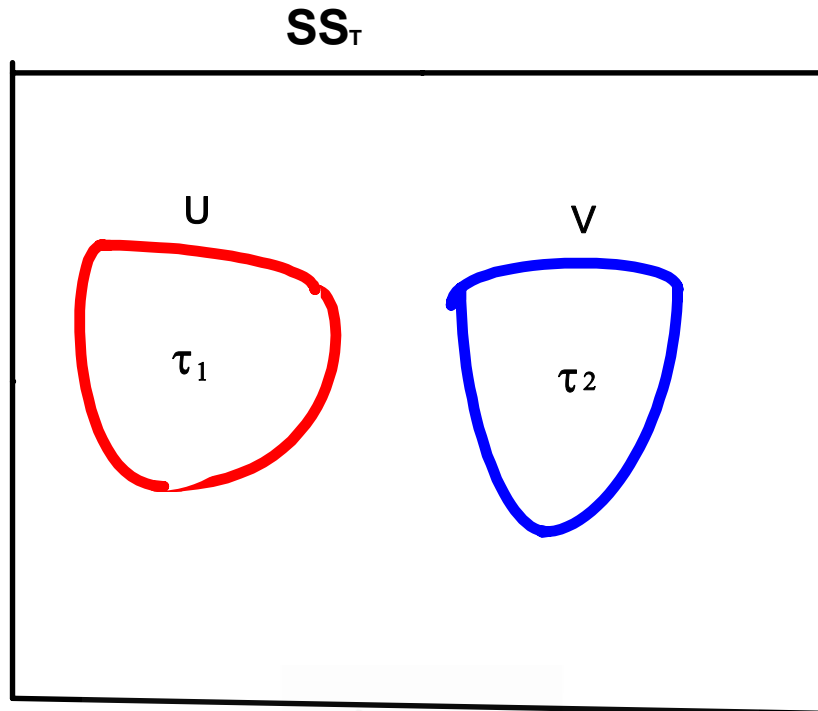
Figure 12.2.

S and SS_T are locally small categories and $\phi: S \to SS_T$ is a functor from S to SS_T. The functor ϕ induces a function $\phi_{s1,s2} : Hom_S(s_1, s_2) \to Hom_{SS}(\phi(s_1), \phi(s_2))$ for every pair of terms s_1 and s_2 in S. The functor ϕ is faithful functor because $\phi_{s1,s2}$ is injective. Therefore $\phi: S \to SS_T$ is a Top concrete category or *belief construct* because at least one of its objects (SS$_T$) has topological structure and its morphisms are functions preserving this structure.

Let SS_T' be a subset of a topological space SS_T.

Definition 12.11: *Point τ is* a point of closure *of SS$_T$' if every neighbourhood U of τ contains a point of SS$_T$'.*

Proposition 12.1: *Structurating Structure SS$_T$ is a Kolmogorov space T$_0$.*

Proof:

Two points τ_1 and τ_2 are *topologically distinguishable* because they have not exactly the same neighborhhods U and V; that is, at least one of them has a neighborhhod that

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is not a neighborhhod of the other. If x and y are topologically distinguishable points, then the intersection of singlenton sets $\{\tau_1\}$ and $\{\tau_2\}$ must be disjoint $\{\tau_1\} \bigcap \{\tau_2\} = \varnothing$.

Topological indistinguishability of points is an equivalence relation ~. We define a topology on the quotient set $SS_T/\sim$ as follows: a set of equivalence classes in $SS_T/\sim$ is open iff their union is open in SS_T. This is the quotient topology on the quotient set $SS_T/\sim$. Let $f : SS_T \rightarrow SS_T/\sim$ be the projection map which sends each element of SS_T to its equivalence class. Then the quotient topology on $SS_T/\sim$ is the finest topology for which f is continuous. The Kolmogorov quotient of SS_T $KQ(SS_T)$ under this equivalence relation ~ is always T_0. $KQ(SS_T)$ and SS_T are homeomorphic.

Proposition 12.2: *Structurating Structure SS_T is a symmetric space R_0.*

Proof:

Two points τ_1 and τ_2 are *separated* because each of them has a neighborhhod U and V that is not a neighborhhod of the other. The τ_1 and τ_2 are separated iff if their singleton sets $\{\tau_1\}$ and $\{\tau_2\}$ are separated.

Proposition 12.3: *Structurating Structure SS_T is a Frechet space T_1.*

Proof:

SS_T is T_1 because is both T_0 and R_0.

Definition 12.12: *Point τ is an* an accumulaion point *iff every open neighbourhood U of τ contains a point of SS_T other than τ itself.*

Proposition 12.4: *Structurating Structure SS_T is a preregular space R_1.*

Proof:

1) The two points τ_1 and τ_2 are distinguishables.
2) The two points τ_1 and τ_2 are separed by neighborhhods U and V.
3) SS_T space is also be R_0.

Proposition 12.5: *Structurating Structure SS_T is a Hausdorff space T_2.*

Proof:

Thus, SS_T is Hausdorff because it is T_0, R_1 and T_1.

Let SS_T' be a subspace of SS_T.

Theorem 12.2: *SS_T' is a Hausdorff space*

Proof:

Let $\tau_1, \tau_2 \in SS'_T$ where $\tau_1 \neq \tau_2$. Since SS_T is Hausdorff, there are disjoint neighborhoods U of τ_1 and V of τ_2. Then $U \cap SS'_T$ is a neighborhood of τ_1 in SS_T' and $V \cap SS'_T$ is a neighborhood of τ_2 in SS_T' , and $(U \cap SS_T') \cap (V \cap SS_T') = \varnothing$. Therefore, SS_T' is Hausdorff.

And $\forall \tau \in SS$, we have

$$\{\tau\} = \bigcap \left\{ \Gamma : \Gamma \subseteq SS \quad closed, \exists \quad open \quad set \quad U \quad such \quad that \quad \tau \in U \subset \Gamma \right\}$$

Let U be a neighborhood of SS_T , let τ a point in U and let ς a point in $\overline{U}$. There exist a disjoints open neighborhoods V_1 and V_2.

Theorem 12.3: $U \subset V_1$ and $\varsigma \in V_2$.

Proof:

$\forall \tau \in U, \exists V_{1\tau}, V_{2\tau}, V_{1\tau} \cap V_{2\tau} = \varnothing$ such that $\tau \in V_{1\tau}$ and $\varsigma \in V_{2\tau}$. Then $\{V_{1\tau}\}_{\tau \in U}$ is an open structurating cover for U. There exists a finite set $U_0 \subset U$ such that $\{V_{1\tau}\}_{\tau \in U 0}$ is a

finite open structurating cover for U. Then $V_1 = \bigcup\limits_{\tau \in U_0} V_{1\tau}$ and $V_2 = \bigcap\limits_{\tau \in U_0} V_{2\tau}$. We suppose

that $\exists \upsilon \in V_1$. Then there are satisfied the following conditions:

      a) V_1 and V_2 are open.

      b) $U \subset V_1$ and $\varsigma \in V_2$.

      c) For some $\tau \in U_0$, $z \in V_{1\tau}$

      d) $V_{1\tau} \bigcap V_{2\tau} = \varnothing$

Then $\upsilon \notin V_{2\tau}$ and $\upsilon \notin V_2$.

Proposition 12.6: *Structurating Structure SS_T is a compact space.*

Proof:

1) A compact space also be Hausdorff.

2) Let $\{SC_i\}_{i \in I}$ be an arbitrary collection of open subsets (structurating covers) of SS_T such that $\bigcup\limits_{i \in I} SC_i \supseteq SS_T$ and there is a finite subset $J \subset I$ such that $\bigcup\limits_{j \in J} SC_j \supseteq SS_T$. Then, SS_T is a compact topological space.

Let SS_T' be a subset of SS_T.

Theorem 12.4: *The following statements are equivalent:*

      a) *SS_T' is compact.*

      b) *Every open structurating cover of SS_T' has a finite structurating subcover.*

Proof:

1) Suppose SS_T' is compact, and $\{SC_i\}_{i \in I}$ is an arbitrary open structurating cover of SS_T', where SC_i are open sets in SS_T. $\{SC_i \bigcap SS_T'\}_{i \in I}$ is a collection of open sets in SS_T' with union SS_T'. Since SS_T' is compact, there is a finite subset

$J \subset I$ such that $SS'_T = \bigcup_{i \in J} (SC_i \cap SS'_T) = \left(\bigcup_{i \in J} SC_i \right) \cap SS'_T \subset \bigcup_{i \in J} SC_i$ so $\{SC_i\}_{i \in J}$

is a finite open structurating cover of SS_T'.

2) Suppose every open structurating cover of SS_T' has a finite structurating subcover, and $\{SC_i\}_{i \in I}$ is an arbitrary collection of open sets with union SS_T'. By definition of subspace topology, each SC_i is of the form $SC_i = U_i \cap SS'_T$ for some open set U_i in SS_T. Now $SC_i \subset U_i$, so $\{U_i\}_{i \in I}$ is a sructurating cover of SS_T' by open sets in SS_T. By assumption, it has a finite structurating subcover $\{U_i\}_{i \in J}$. Then $\{SC_i\}_{i \in J}$ covers SS_T', and SS_T' is compact.

12.6. STRUCTURES OF IDEOLOGICAL MATERIALIZATION

In one first meaning of ideological net as far as the genesis of T, it would mean the equality and unicity between the collective subject of T and the collective subject of the society or a determined social group. This means that the social group's WV would be the same that is materialized in T: the ways to remember, to suffer, to understand, to reason, etc., of a social group are such ways that are materialized in T. One first meaning of correlation would consist of finding the materialization of T, with a certain sublanguage L_i, of its subjects, personages, situations, aesthetic, etc., corresponding to subjects, personages, situations, aesthetic, etc., of a certain social group. It cannot be spoken of a similarity, since the relations materialized in T have not so that to correspond with exactitude more or less, with the produced one in Structural Base (SB) by a determined social group.

We propose in one first approach, three mathematical structures of materialization: the belief category, the ideological net and the continuous materialization function.

12.6.1. First Hypothesis: The Belief Category

The class concept is well known like a collection of sets or sometimes other mathematical objects which can be unambiguously defined by a property that all its members share. Every set is a class.no matter which foundation is chosen. A class that is a set is called a *small class*. If we have defined S like a direct set, therefore S is a small class.

Let $SS = \{\tau_1, \tau_2, ..., \tau_m\}$ be the Structurating Structure, $sS = \{T_1, T_2, ..., T_m\}$ be the Structurated Structure and $sS^1 = \{\Gamma_1, \Gamma_2, ..., \Gamma_m\}$ be other Structurated Structure influenced by the first sS. Let bob(B) be a class formed by $\{S, SS, sS, sS^1, ..., sS^\omega\}$. We may to stablish a morphism f so that between belief objects of the class. Each morphism f has a unique *source object s* and *target object τ* where s and τ are in bob(B). We write $f : s \rightarrow \tau$ and we write $\hom(s, \tau)$ to denote the *hom-class* of all morphisms from s to τ. For every three objects S, τ and T, it exists a binary operation $\hom(s, \tau) x \hom(\tau, T) \rightarrow \hom(s, T)$ called *composition of morphisms*; the composition of $f : s \rightarrow \tau$ and $f': \tau \rightarrow T$ is written as $f' \circ f$. Therefore

Definition 12.13: *It exists a* belief category **B** *consisting of a class bob(b) of belief objects, a class hom(B) of morphisms between the belief objects and a binary operation of composition of morphisms $f' \circ f$ such that the following axioms hold:*

1) *Associativity:* If $f : s \rightarrow \tau$, $f': \tau \rightarrow T$ *and* $f'': T \rightarrow \Gamma$ *then*

$$f'' \circ (f' \circ f) = (f'' \circ f') \circ f$$

2) *Identity:* For every belief object b, there exists a morphism $I_b : b \rightarrow b$ called the identity morphism for b, such that for every morphism $f : s \rightarrow \tau$, we have

$$I_\tau \circ f = f = f \circ I_s$$

Definition 12.14: *Morphisms* $f : s \rightarrow \tau$, $f': \tau \rightarrow T$ *and* $f'': T \rightarrow \Gamma$ *are called* function of connotation, function of materialization *and* function of influenced materialization *respectively.*

We will graphically express it in figure 12.3.

In the category of this sets, where morphisms are belief functions, two functions may be identical as sets of ordered pairs (may have the same range), while having different codomains. The two functions are distinct from the viewpoint of category theory.
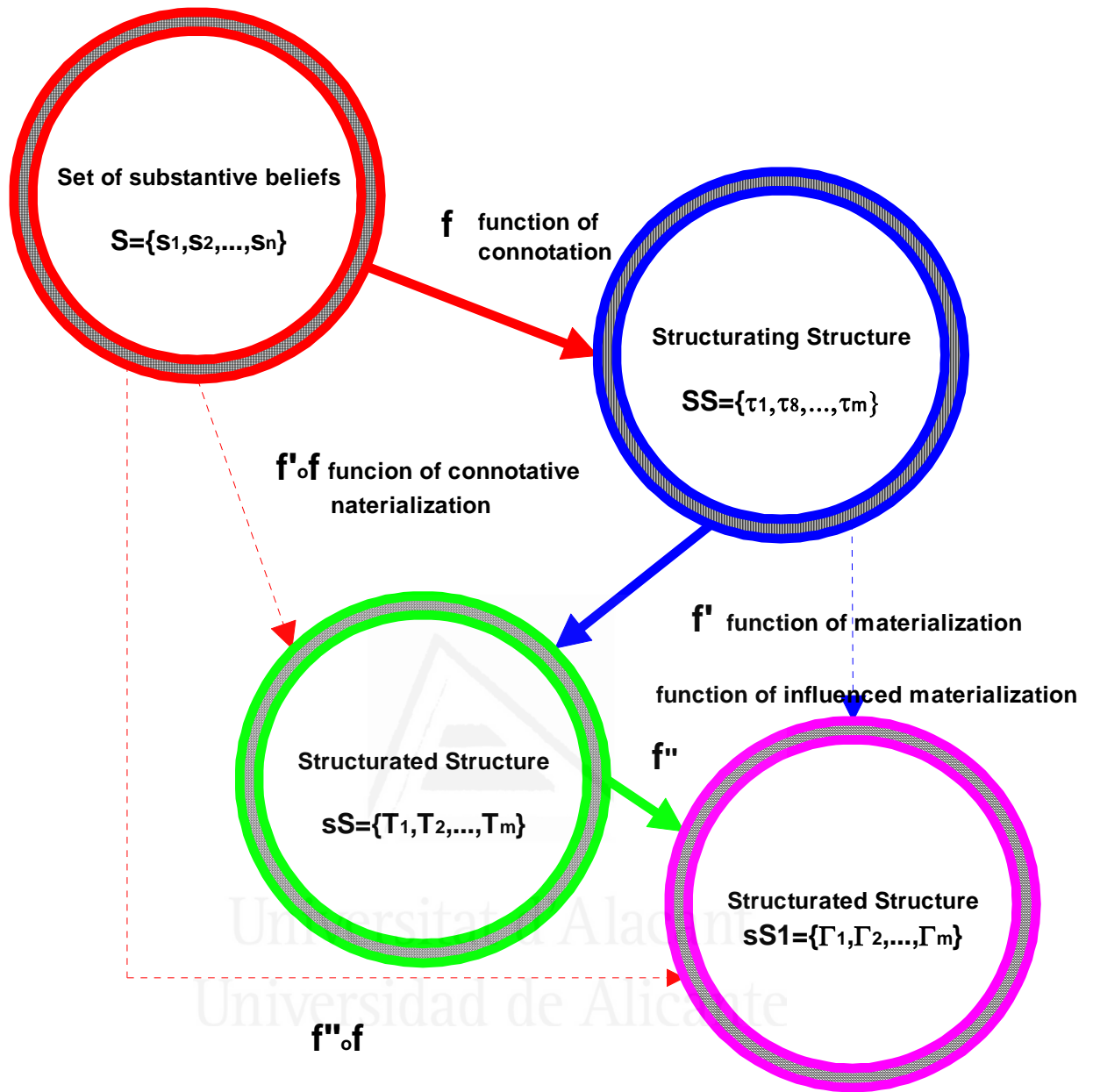
Figure 12.3.

Let hom(B') a subclass formed by the morphisms $f'': T \to \Gamma$, $f'': T \to \Gamma^1,..., f'': T \to \Gamma^{\omega}$.

Definition 12.15: *Subclass hom(B')$\subset$ hom(B) constitutes a* textual style.

Note 12.4: *Morphism $f': \tau \to T$ constitutes the process of initiation of a textual style.*

Example 12.2: In the middle of XII Century, in the monastic churches, as much in those of Cluny as Citaux, it is prevailed the gothic style. It is the abbatial church of Saint-Denis where the new style begins to form, and later are the cistercian churches those that gradually propagate the gothic style on Europe.

<div align="center">***</div>

12.6.2. Second Hypothesis: The Ideological Net

We have defined S like a direct set. We have demonstrated previously (Usó-Domènech et al., 2009) that the texts have a topological space structure. Establishing a ideological net between the SS of T and an ideology or belief system belonging to Doxical Superstructure (DS), will give one first approach to the significance of T. We are going to suppose the case limit: substantive beliefs of a belief system projects in a certain text. Let us take like material example *The Nicene Creed* in theological medieval texts or constructions like the roman or gothic cathedrals. In our theory, we will only work with substantive beliefs, but it can be extended to derived beliefs. In fact, thus it happens always. Any text reflects not only substantive beliefs but all the set of derived beliefs, many of them incorporated and accumulated during the period of existence of the belief system.

Definition 12.16: *If* SS_T *is a textual topological space and S a directed set*, an ideological net *in* SS_T *is a first materialization function ϕ from S to* SS_T, $\varphi : S \to SS_T$.

Note 12.5: *We write a net from S to SS_T in the form (τ_s), which expresses the fact that the term s in S is mapped to the subtext τ_s in SS_T.*

Let Γ be a subset of SS. Ideological nets have the following properties:

1) If (τ_s) is an ideological net from S into SS_T, and if Γ is a subset of *SS*, then we say that (τ_s) is residually in Γ if $\exists s_j \in S, \forall s_i \in S, s_i \geq s_j$, the point $\tau_{si} s$ lies in Γ.

2) If (τ_s) is an ideological net in *SS_T*, and τ is an element of *SS_T*, we say that the ideological net converges towards τ and write $\lim \tau_s = \tau$ iff for every neighborhood *U* of τ, (τ_s) is eventually in *U*.

Definition 12.17: *The ideological net φ is* cofinally in Γ *if for every s_j in S there exists some $s_i \in S, s_i \geq s_j$, so that φ(s_i) is in Γ.*

Definition 12.18: *An ideological net φ on SS_T is called* an ideological ultranet *if for every subset Γ of SS, either φ is eventually in Γ or φ is eventually in SS- Γ.*

Consequence 12.6: *Ideological nets will always be ideological ultranets.*

Literary sacred texts, literary texts of political ideology, religious sanctuaries, etc, are examples of this class of ideological ultranets.

Ideological net is the truely mediating thing, that is to say, the way to think, and not thought it or mediated. Ideological net puts in relation the WV of the collective subject with the SS of T. The idelogical net corresponds to a way to relate.

Let (τ_s) be an ideological net on SS_T based on directed set *S* and τ is a subtext of SS,

Definition 12.19: *We say that* (τ) *is* frequently in τ *if for every s_1 in S there exists some s_2 in S $s_1 \geq s_2$, so that $(\tau_s)(s_2)$ is in τ .*

For Proposition 12.6 SS_T is a compact space. Therefore every ideological net (τ_s) in SS_T has an ideological subnet with a limit in SS_T.

## 11.6.3. Third Hypothesis: The continuous second materialization function

Let B be a topological belief space $B = (S', bcl)$ such that $S' \subseteq S$ being S' subset of the set of substantive beliefs S. Let SS_T be a topological textual space $SS_T = (\tau, tcl)$ being τ a set of materialized substantive belief. SS_T is contained in B such that $SS_T \subseteq B$. That is, every element of SS_T is also an element of B. Then the topology SS_T is said to be a *coarser belief topology* than B, and B is said to be a *finer belief topology* than SS_T. Because $B \neq SS_T$ we say SS_T is *strictly coarser* than B and B is *strictly finer* than SS_T. Let $B_1, B_2, ..., B_n, B$ be topological belief subspaces such that $B_1 \subset B_2 \subset ... \subset B_n \subset B$ and $SS_T \subseteq B_1 \subseteq B_2 \subseteq ... \subseteq B_n \subseteq B$, The binary relation $\subseteq$ defines a partial ordering relation on the set of all possible topologies.

We suppose we have a function $m : B \rightarrow SS_T$.

Definition 12.20: Function $m : B \rightarrow SS_T$ *we call* second materialization function.

Definition 12.21: *We say that the materialization function $m : B \rightarrow SS_T$ is a continuous second materialization function at s for some $s \in B$ if for any neighborhood V of m(s), there is a neighborhood U of s such that $m(U) \subseteq V$.*

We will graphically express it in figure 12.4.
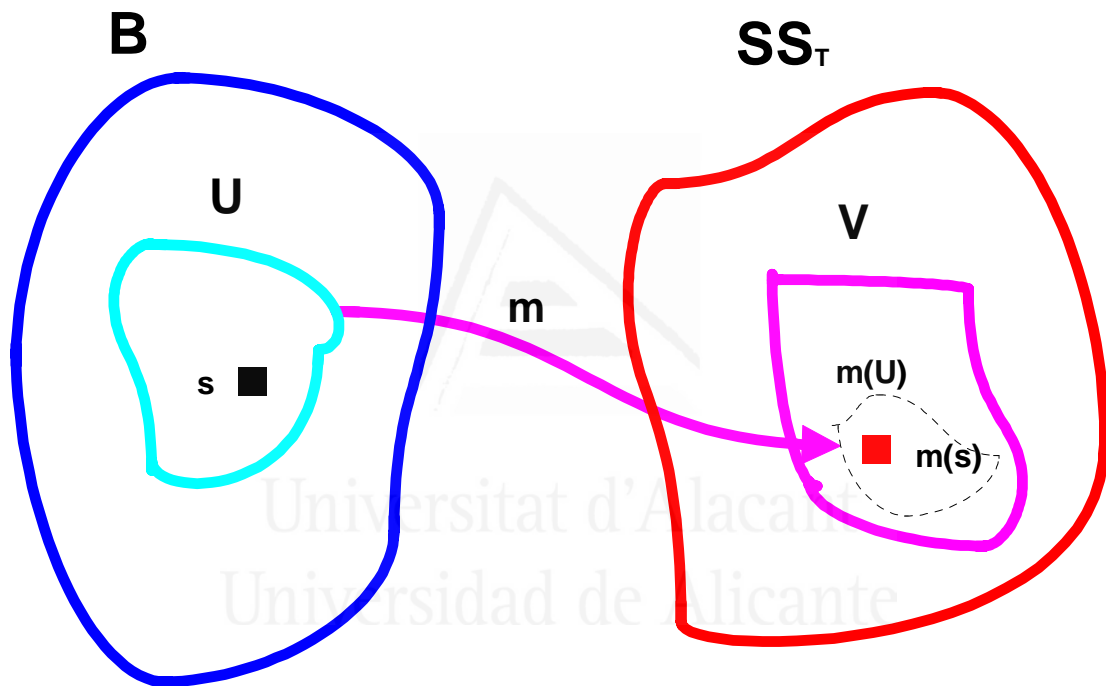
Figure 12.4

If *m* is continuous at every $s \in B$, then we simply say *m* is continuous.

First of the hypotheses it will allow us to establish a class different from materialization: *the symbolic materialization*.

12.7. ON TOPOLOGY, SEMANTICS AND PSYCHOLOGY

We have thought to demonstrate that as beliefs as their textual materialization have both topological structures. Nevertheless, where come these mathematical structures? Being structures of visual materialization the answer seems clear. However, it is not thus in the world of the beliefs, the ideas. Unless we accept the philosophy of Plato, freeing the world of the ideas out of the human being, the beliefs, as much substantive as derived has a material origin, inserted in the own human brain. This presents two aspects: psychological and linguistic:

1) Associated with the topological points is a family of open sets that cover the space, like the response fields that constitute neighborhoods of the actual neurons in the brain. The key point is that there are certain *invariants* associated with a topology that remain unchanged under the transformations. In the case of the visual field, the transformations are the distortions imposed by viewing conditions. The objects in the visual field are recognized as what they are in their own right no matter how their appearance may be distorted by viewing conditions: near or far, right-left, up-or-down in the field of view, rotated, moving, or viewed obliquely or binocularly. In addition, a tune is still recognizable even if it is shifted in key or changed in loudness, or heard binaurally. These invariances constitute the psychological constancies. Lacking the constancy invariances, you would always be moving through a surrealistic world of perpetually deforming, rubbery objects. For the visual system, it is axiomatic that an object is determined by its bounding contours, and it is the invariance of these under viewing conditions that determines constancy and form memory (Lewin, 1936). This brings us to the blessed domain of Lie transformation groups, denoted symbolically by the mapping $G \, X \, T \rightarrow G$,

where G is a mathematical group and T is a manifold (*Text*). G is also continuous and is a manifold just like spacetime. Now think of a visual contour as a path-curve generated by the transformation group action, and choose some point on it. Call this the identity element of the group. Draw a tiny tangent line to the curve at that point. This is the *infinitesimal* transformation of the *continuous* or *Lie* group. The infinitesimal transformation is embodied in a Lie derivative, which "*drags the flow along the path-curve*", the so-called "*orbi*t"--in this case the visual contour of T. If £ denotes the Lie derivative and f, the visual

contour, then invariance of the contour under the transformation group is shown by its being annulled by the action of the Lie derivative: £ f = 0, or by its being handed on as a "contact element" for further processing: £ f = g(f) . These operations characterize psychological constancy.

2) In addition, neurological processes are organized and sequenced through language; hence, language reflects the way each person perceives the world. Being a psycho-biological process, one could say that mental maps are a sort of biological path along which words travel. The mental representations of individuals depend on their experiences, culture, ideology and physiology, among other things. Language refers to the way individuals makes use of verbal expression to communicate experience, and this is done with the structure implicit in their own language.

All human experiences, as well as their expression through language, are subject to processes that may constitute evidence of failures in the world vision, failures in the form of omissions, distortions, and generalizations. According to Cobb (1997), every individual has a particular way of relating and ordering perceived sequences of events that is captured through his conversations. This is because human beings communicate through a narrative language that has a time, a space, and a logic for building relationships, all of which is reflected as coherence. In conversing, human beings express the manner in which they relate things, but also the manner in which they relate to one another. This is done through words that express meanings.

In all materialization, human beings construct a sort of text T that may be understood as an analyzable object in which different structures may be identified, ranging from concrete organizations to abstract entities (Serrano, 2001). Meaning is built up through language; hence, the semantic value of the resulting text. Diverse orders exist:

1) *Positional order:* In an effort to give meaning and significance to the texts, human beings apply a variety of organization strategies, assigning to structures defined as semantic units, a relational order. This order (De Erice, 2002), may be a positional order, where language alignment is mediated by space-time variables (*sintagmatic order*).

2) *Functional order*, of codified association, since semantic units can only take on value on related to others that may substitute it and constitute contextual

relationships (*paradigmatic order*). There exists an ordering of text production and interpretation conditions, communication phenomena that go beyond pragmatic factors to include situations of codified communication, inherited from culture, ideology and history.

3) *Referential order:* There is also included a referential order, that determines the influence of the linguistic over the non-linguistic strata in practice. In this manner, the interpretive path of a text T entails a series of operations that allow us to assign one or more meanings or senses to a linguistic series.

4) *The hermeneutic order* is the one guiding the production and interpretation of texts, that is to say, the one generating the content which is what has been defined as the text's plan, made from the set of meanings.

The interaction among different semantic units gives cohesion to a linguistic series, which is defined by its internal semantic relationships. However, the dynamic interaction also defines a coherence mediated by the relationships it establishes with its environment.

The specificity of a text T results from the intersection of a great number of structures which, when taken separately, are quite general. Nevertheless, experience shows that it is the point of view of the text, from a hermeneutic perspective, the one compelling the addition of contextual elements: without this, interpretation is incomplete, and connotative comprehension unsatisfactory. In this manner the semantic process, the discourse, which is the set of codified linguistic uses together with a certain social practice – understood as the sphere of shared mental representations – defines a sort of associative network between units of meaning, which in their interactional dynamics define the context for reinterpreting the text T.

Definition 12.22: A conceptual map *is a graphic mental representation of a network of semantic units whose interactions define a context of meanings (denotations and connotations).*

The object of conceptual maps is to represent meaningful relationships between concepts in the form of propositions. A proposition consists of two or more concepts joined by linking words to form a semantic unit, that is, a unit with meaning. For Novak & Gowin (1984), a conceptual map "*can provide a kind of visual road map showing*

some of the pathways we may take to connect meanings of concepts in propositions".
Several authors have stated that conceptual maps are networks of semantic relationships, where semantic refers to the meaning or interpretation of the meaning which individuals attribute to a given symbol, word, language or other formal representation. It is during this negotiation (which may take place with others, but also with oneself), if done conscientiously, that individuals may come to recognize the generalizations, omissions, and distortions contained in their texts, and restructure their narratives. All modification of cognitive structure reports, in the terminology of neurolinguistic theory, a new mental WV; hence, the importance of conceptual maps.

These theoretical arguments seem useful for analyzing and understanding results obtained by Miller and Cañas (2008), which indicate a relationship between the topological and semantic aspects of conceptual maps. The topological taxonomy classifies conceptual maps according to five criteria:

1) Concept recognition.
2) Presence of linking phrases.
3) Degree of ramification.
4) Depth.
5) Presence of cross-links.

These criteria consider progressively more complex topological entities, beginning with concepts, passing through propositions, beliefs, etc. and ending with a complete conceptual map. Referred our case, to see figure 12.5.

The mechanism is the following one:

1) Once beliefs (*nodes*) have been placed in a map, they are related to one another to form larger graphic structures by means of any form of symbolic representation – this is the linking phrase.
2) Ramification occurs when several relationships emanate from the same node or make use of the same linking element.
3) Hierarchical depth refers to the number of levels of beliefs nested under the root (*main*) concept of the map.
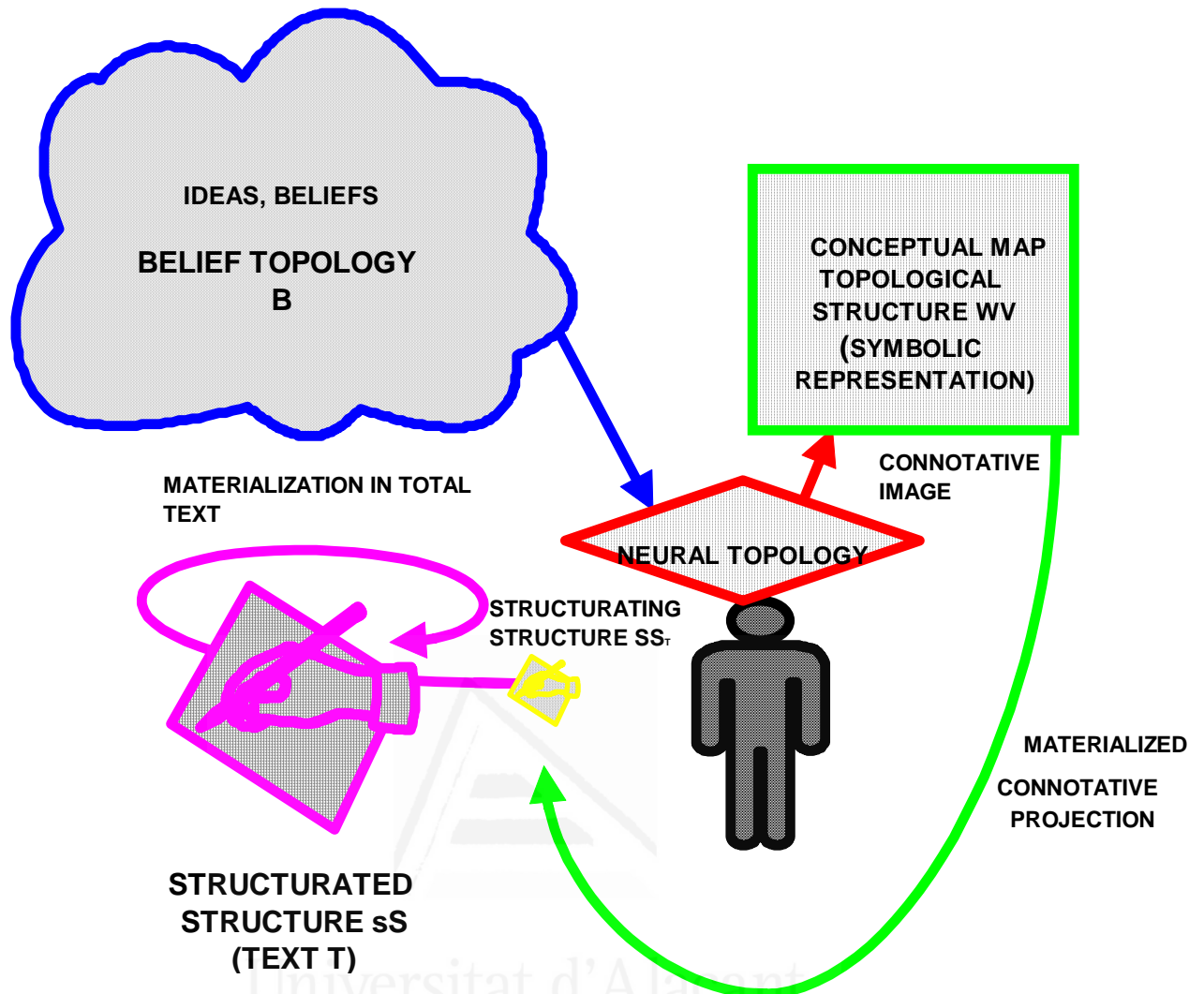
Figure 12.5.

Though this nesting may indeed be evidence of conceptual subsumption, the two are not to be confused; this topological criterion considers only the number of level, not what concepts are placed in each of them. The last criterion deals with cross-links. From the perspective of spatial organization, cross-links, when accompanied by all the other elements mentioned above, lead to topological entities of greater overall complexity.

Therefore, this would appear to be a semantic criterion. However, the ability to recognize individual concepts and beliefs is so basic to being able to build up rich, interconnected, flexible conceptual map topologies that this criterion is included among the structural criteria. In other words, the focus is not on what is actually said, but on whether the mapper is able to recognize beliefs in their original context and depict the way in which they are related to one another.

As Novak & Gowin (1984) have noted, "*Conceptual mapping has been developed specifically to tap into a learner's cognitive structure and to externalize...what the learner already knows*". Although conceptual maps certainly do not provide a "*complete representation of the relevant concepts and propositions a learner knows... [they do constitute] a workable approximation*". This is the forcing argument that evidences the relationship between topology and semantics, between graphical configuration and meaning and it imply a dynamic relationship between the topological and semantic aspects of conceptual maps, where the former may be conceived as the dependent variable, and the latter as the independent one. Being a dynamic interaction, in giving expression to a text in a conceptual map the dependent variable helps to reorganize the independent variable. This would explain why it is stated that there are no good or bad conceptual maps; it is the reason why it is said that the conceptual map represents the state of a subject's knowledge on the topic at a given moment. The topological-semantic relationship would seem to be led by semantics. In other words, changes on the semantic front give rise to changes on the topological front. Changes in topology however have little influence upon semantics, but do offer important information that can provide feedback to the subject to help produce changes in his cognitive structure, that is, to learn in a meaningful way.

From the viewpoint of the neurolinguistic model, each person said to have a mental world vision WV in which his life unfolds. This representation is called the individual's *mental world vision* (MWV), which in turn becomes expressed through texts T.

Definition 12.23: *The conceptual map is a text representing meanings, is a reflection of the person's connotation, of the way the person communicates with himself and with others.*

When that communication is to be represented graphically through a conceptual map, its physical layout or configuration reflects the way he or she arranges sequences of relationships makes differentiations and identifies or discovers integrations, all of which serve to construct meanings. However, this spatial aspect of a conceptual map depends on the content with which the subject interprets the world and its relationships.

Neurolinguistic, from its practical approach states that by generating changes in an individual's language, changes in his mental model can be achieved and a new model will generate new behaviors.

Definition 12.24: Learning process *is a change in the cognitive structure occurs, with new words, new symbols, new beliefs and new representations, with the intention of obtaining new meanings within that frameset, the consequence will be a shift in individuals' emotional state, responses and behaviors.*

Human beings utilize certain cognitive strategies to integrate coherence and cohesion into meanings. These information organization strategies are generalizations, distortion and elimination of data. For this reason, neurolinguistic theory considers it indispensable that individuals acquire the ability to recognize their generalizations, to recover the parts omitted from their model of the world, and to correct its distortions, in order to guide in a precise way the process of shifting their mental models. In that new context, mediated by new communications, underlying mental models are modified, and consequently changes are produced in semantic processes. This requires a new organization, which shows up in a conceptual map as changes in topological structure. Like consequence, we establish the following hypothesis:

Hypothesis 12.7: *Changes in the semantic structure of a conceptual map generate changes in the topological structure.*

13. TEXTUAL MATERIALIZATION

13.1. THE TEXT THEORY

A *text* is any representation of the Reality (*model $\Sigma(\beth)$*) represented by symbolic means. With this text definition, it is included from the text written to any architectonic structure, painting, musical score, or ecological models (Sastre-Vázquez et al., 1999, 2000; Usó-Domènech et al., 2001[a,b], 2002, 2004, 2006[a,b]; Villacampa-Esteve et al., 1999). A text can be from the Bible to the signal of STOP, dumb gestual signs used by deaf person or the document Braille used by blind. *Therefore, the text, that we will represent by T, anyone is their nature, is the cultural unit par excellence.* Text T usually has a name. They are exist anonymous Ts and collective Ts, but in general, they have like creator to an individual subject, an *author* S_A. Also, T has one (or infinity) interprets that, following the tradition, we will call *reader* S_R.

Villacampa-Esteve et al., (1999) proposed a *text theory* as part of the *Structural Base structure theory* (SBST). The SBST is an aspiration to a text total science, what one suppose in the last analysis as a linguistic and complete scientific explication of the Reality. It is established a *text theory* (TT) as part of of the SBST. The text linguistics includes a *textual grammar* (TG), which is the sentence set grammar and it analizes the relations in the text. The TG claims the text explication unlike the generative grammars, which only have sentence sets without having reference to the own text. It is difficult to start gnerating the sentences if we are situated in a broader context of the interpreter component. The TG should explain why a text is not a simple component (sentences) alination. It is necessary to analyze both the text and a difference unit of the sentence. All conduces to postulate three operations of the text analysis:

1) The first will be the integration in a *semantic doxical superstructure* (DS).
2) The second would take into account the compability between is proposed and realized. That is established between the TG and the *pragmatic grammar*

(Carnap, 1942). It is about the relation of the signs with the interpreters or the pragmatic dimension of the semiosis.

3) The third would establish the relations for the text coherence comprension. It is concerned with the TG relations with a particular language L.

The TT is a scheme which permits us to treat ideologic problems so that two components are considered: *the cotextual and the contextual*:

1) The grammatical structure problems belong to the *cotextual component*. That operates in the analysis level with its own internal information and with that taken from the text T that is analyzed, and it operates in the synthesis level applying the information which can be deduced from the structures carried out alredy.

2) The *contextual component* is made up of the text T production and reception which is the semantic problem.
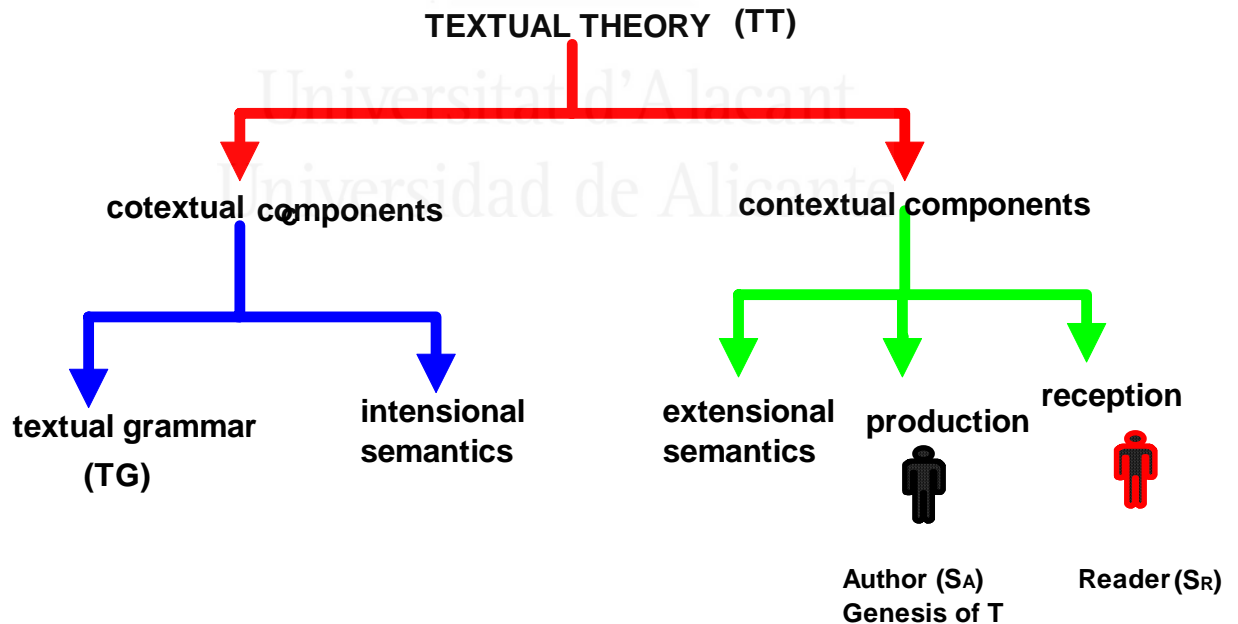
We are going to draw this fact in Figure 13.1.

Figure 13.1.

Let there be a language L and a text T_i, if the analysis applied from T_i is origined as a *textual basis* (TB), being possible to obtain every textual basis. Let α be an analysis. $TB_{i\alpha}$ will be obtained exactly. Two components can be considered in t:

1) TB has two aspects:
   a) The sucession of the elemental textual units or the predicates in sentences.
   b) The sentence organization in larger textual units.

2) The *text semantic representation* (TSR) represents the intensity structure of the modeled reality and explains the contextual relations, which can be confirmed between the predicates (elemental textual units) and the informer block $T\Omega$. Its internal structure is formed by the next elements:

   a) The description list of the objects treated in T.
   b) The predicates relatives to the objects, disposed in special nets.
   c) The diagram where the objects between which the predicates established a relation are showed.
   d) The predicate order in the nets, distint by the argument or the hypothesis. T is developed in a third level of significance in the elemental units and the sentence level.
   e) The temporary (sometimes) relation order between the predicate content.

The basis of a text T are very pertinet operational aspects. Let us supose any parcel of reality of which a text T_i has been obtained. T_i is analized and we obtain in this way $T_{i\alpha}$ or analitycal base. Text TB_j is obtained by a synthesis operation that is the textual base of a text T_j,, which is reached from TB_j by a new synthesis. The operation for comparing or confronting is realized in the text level between T_i and T_j, and the basis level between $T_{i\alpha}$ (analytical) and TB_j (synthetic). The text is not compared with ontic basis, but the relation between the text and the basis only is from analysis or synthesis.

The transition from the TG components to the SBS component is the text interpretation. Every extensional interpretation results from the double operation of acceptance and modification. A value is assigned when the objects that makes up the textualized world T is combined with the extensional semantic predicates. Let σ be either an object or

any process: $\exists \sigma \in SB \vee \exists \sigma \notin SB$. A value (+ or -) of its existence predication will be assignated. It will also be assigned a value when the object or processes in T are combined with the extensional semantic predicates (true in SB_i, false in SB_i). The *modification* is a double operation of modification of the semantic structure of T-adjunction and change. The *adjunction* supposes the semantic representation of a part of T or *subtext* τ_i. The *change* is the substitution of the TSR of a part of the T of another part of the T. Every T admits several extensional semantic interpretations, which make up its ontic basis. If any SBB_i is chosen, one can observe that is made up of two different elements: an informant part $SB\Phi_i$, which points to the modifications and may be empty, that is, without modifications and a semantic representation of the ontic (SB) reality SBR_i, which is a TSR which has been assigned some values and that eventually has suffering certain modifications.

13.2. MEDIATION, FUNCTION AND INTERPRETATION

We have defined previously relation and deontical relations. If we took two elements x_1, x_2 belonging to a Deontical Impure System and say that they are in relation, we make a contact of any type between both differentiated elements. The relation between x_1, x_2 can be or only happen explanatory if it admits that all report has an effective virtuality.

Definition 13.1: *We define as* effective virtuality *to the mediating action possibility between two elements* x_1, x_2 *that are in relation.*

Distinction, in the conceptual level, between relation and mediation seems decisive at the time of studying a text (T), because although the relation it can make advance in the study of the work, only the mediation can give the explanation of the same one. Is more, without a great meaning, the relation usually falls in the tautology or analogy.

1) The effectiveness of a relation consists of its mediating, determining or nondetermining force.
2) All relation is virtually mediating because it has the effective virtuality.

3) Mediation is not only one influence, concept that locks up the causality concept.

4) Mediation or a relation with virtual effectiveness is the concept that tries to recover, for its possible explanation, to specificity of both abstract elements constituting all relation.

5) The effectiveness of a relation can be given or no, be happened or no, because all effectiveness is historical. That is to say, two elements x_1, x_2 can be in relation during certain time and a certain space, without mediation between both exists; nevertheless, as of a certain historical constituted.

Thus, we may say "*It exists mediating circumstances in such text (legal, literary, scientific, artistic, architectonic, etc.)*", which does not mean that these circumstances determined T, but that were gathered by the same one, perhaps in opposition to the same ones. To find the mediations of a T does not mean to look for the explanatory causality of the same one, but to establish the greater number of possible relations between the delimited T for the analysis and the circumstances that surround it and that, therefore, mediate.

If the potentiality of the relations can be determining or nondetermining, this distinction does not imply either the recognition of any causality, for the simple reason that all effectiveness of the relations is always historical, happens and can disappear. It is possible that an element x_1 can have in an historical period all the determining effectiveness with respect to the second element x_2. But also can be thought that this effectiveness can change of pole, and that the first element x_1 with determining effectiveness is their time the receptive pole of the other element x_2 that at this second historical moment has reached the determining effectiveness.

13.2.1. Author and Reader

All text T works from the communication because it communicates with the *individual reader* S_R, with the *public* $\{S_R\}$, or sector of the society, etc. According the rules of the linguistic science, the codified message is decodified by *receiver* S_R. The message is codified in a textual structure (TS) that, in principle, usually has its own internal laws, that is to say, its own grammar (TG). The message, text T, and before the disappearance

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of the emitting *author* S_A, are a cultural unit to which all synchrony no longer can reach. For that reason, of the issuer-message-receiver triada, the message-receiver pair can only be studied, that is to say, Text-Reader (T-S_R). At linguistic level this means that S_R manages to decodify entirely the message. At social level, this decoding, that is diachronic, has to start off of the connotative significance and not of the denotative significance. Text T is eminently connotative.

Let WV be a world vision of a determined society in a historical period and T be the transmitter or text (literary, architectonic, scientific, philosophic, etc.). Let WV_A and WV_R be the author and reader world vision respectively. Let c-s be the connotative significance.

The information transmitted from S_A to S_R is the total amount of information available in S_R, $I(S_R)$, except an amount ε or *equivocity* of the information generated in S_A that a is not transmitted to S_R being expressed like:

$$I_{S_A}(S_R) = I(S_R) - \varepsilon$$

.

The information generated in S_A is divided in two parts:

1) Part $\left\lfloor I_{S_A}(S_R) \right\rfloor$ that is transmitted to S_R

2) Part ε that is not transmitted or equivocity.

Simultaneously, the information that is in S_R can divide of similar way in two parts:

1) Part $\left\lfloor I_{S_A}(S_R) \right\rfloor$ represents the information received from S_A.

2) The part surplus whose source is not S_A, or noise N. An increase of N causes that a part of the sign is hidden for S_R, and of this form $\left\lfloor I_{S_A}(S_R) \right\rfloor$ will decrease by means of an increase of equivocity ε.

T exists (it works) as soon as is understood, used and consumed by S_R. T exists by means of a relation between S_A and S_R habitually called *communication*. Therefore, communication is equivalent to equality or approach between T problematic and S_R problematic. That is to say, is also an understanding (more or less ample), between T

and S_R. Textual structure (TS) socially exists as soon as it works and it communicates with the society (SB). Reader S_{R1} decodifies only part of the message contained in T, that is to say, the message that can understand. Another reader S_{R2} decodifies the part nonunderstood by S_{R1}, but simultaneously, S_{R2} does not understand part of which first he has understood, etc. We suppose a text T, an author S_A and all the possible readers $\{S_R\}_{i=1,\dots,n} = S_{R1}, S_{R2}, \dots, R_{Rn}$. Then:

$$I_{S_A}(S_{R1}) = I(S_{R1}) - \varepsilon_1$$

$$I_{S_A}(S_{R2}) = I(S_{R2}) - \varepsilon_2$$

$$\dots\dots\dots\dots\dots\dots\dots\dots\dots$$

$$I_{S_A}(S_{Rn}) = I(S_{Rn}) - \varepsilon_n$$

Therefore, the transmitted total information of the text T will be

$$I_{S_A}\left(\{S_R\}_{i=1,\dots,n}\right) = \bigcup_{i=1}^{n}\left(I(\{S_R\}_i) - \{\varepsilon\}_i\right) = \bigcup_{i=1}^{n}\left(I\{S_R\}_i\right) - \bigcup_{i=1}^{n}\{\varepsilon\}_i$$

The following cases may be displayed:

1) *If* $WV_{S_A} = WS_{S_R}$ *then* $\varepsilon = 0$ *and* $I_{S_A}(S_R) = I(S_R)$

2) *If* $WV_{S_A} \cong WS_{S_R}$ *then* $\varepsilon \cong 0$ *and* $I_{S_A}(S_R) \cong I(S_R)$

3) *If* $WV_{S_A} \neq WS_{S_R}$ *then* $\varepsilon \neq 0$ *and* $I_{S_A}(S_R) = I(S_R) - \varepsilon$ *being as much greater* ε *as the inequality being WV_{SA} and WV_{SB} is greater.*

4) *If* $I(S_R) = \varepsilon$ *then* $I_{S_A}(S_R) = 0$.

Therefore

$$\lim_{\varepsilon \to 0} I(S_R) = I(S_A)$$

Let T be a text and $\tau_1, \tau_2, \dots, \tau_n$ be the subtexts so that $T = \bigcup_{i=1}^{n} \tau_i$. For a reading S_R each one of subtexts has one connotative significance, so that $\forall \tau_i, \exists c - s_i(\tau_i); i = 1, \dots, n.$.

Definition 13.2: *We define as* connotative significance of a text T *and we denote as* $\{c-s\}(T)$ *the union of all connotative significances of each one of its subtexts, so that* $\{c-s\}(T) = \bigcup_{i=1}^{n} c - s_i(\tau_i)$.

Case 1 means the *complete communication*. The mediating WV_T is also the world vision of the reader WV_{SR}. It is a complete communication so that exists complete equality between the connotative significances of S_A and S_R. Everything is communicated because everything is comprehensible. It could solely exist in the more rigorous synchronous level. Case 2 is *relative communication*. Reader's world vision (WS_R) does not manage to unravel all the connotations of T ($\{c-s\}(T)$), but T obtains through a series of shared correlations, to transmit its problematic one. It could solely exist in relative synchronous level. Case 3 is *incomplete communication*. T does not manage to transmit its original problematic and for that reason it goes towards its extinction like T. T becomes *document*. Therefore, document is all text whose connotative significance $\{c-s\}(T)$ has changed for S_R, because their WV_n is not the same one that the existing one (WV_i) when the text was conceived.

Consequence 13.1: *The connotative significance* $\{c-s\}(T)$ *of all text T always is in the synchronous level.*

Case 4 *is null communication*. This case would happen solely when both world visions is completely antagonistic or totally incomprehensible for the reader. The case of Etruscan texts is a clear example and in smaller degree, the texts of medieval alchemists.

Cases 1 and 4 are two ideal ends. Real state moves in cases 2 and 3.

13.2.2. The textual function

Nevertheless, this identification between both world visions (in spite of the diachronic barrier), encounters almost immediately over the set of connotative significances. More or less delimitable polisemies in WV_{S_A}, has to be reached about S_R, their WV_{S_R}. Then we must introduce the concept of *function of a text*.

Definition 13.3: *We define as* function of a Text *and we represented it like F(T) to its diachronic component, that is to say, its historical and social happen.*

Then T can:

1) To change of function: $F(T)_0 \rightarrow F(T)_1 \rightarrow ... \rightarrow F(T)_n$.

2) Not to work like T: $F(T) = 0$.

Possibility of a pure reading of T could be raised; this one would only take care of the WV of S_A, but as this WV is unattainable due to passing of the time (due to the loss of the connotative significances); the possible reading would be the purely literary one (or pictorial, musicological, etc.); with which the problem becomes aesthetic. The exchanges of text function certain obey, as it is natural, to new WVs, appeared in SB. In this one scope the new readings, new identifications arise. But it is necessary to consider that these exchanges of function, that this new reading comes half-full by the necessities that the new reading scope feels, and not of the same T, the message already codified that apparently follows sound through time and space.

We can affirm that *the appearance of a new social function in T means the appearance of a new WS in SB*.

Example 13.1: *Don Quixote* had the initial function $F(T)_0$ to make laugh Spaniard people during a long period of time (centuries) and later other function $F(T)_1$ to make cry (Maravall, 2005). It means that to the first Spain only decodified the easy humorism of text, and second, the one that cried, decodified the sad and the heartrendering hidden humorism (Figure 10.2).

Exchanges of F(T) are not everything in this paradoxical life of T. It exists the nonfunction of T like so, and its function as another thing (ideological object: politician, religious, philosophical, etc.). The causes of function of T as something not specifically textual obey to a social change in SB, to the appearance of a manipulating necessity (we did not discuss legitimacies).
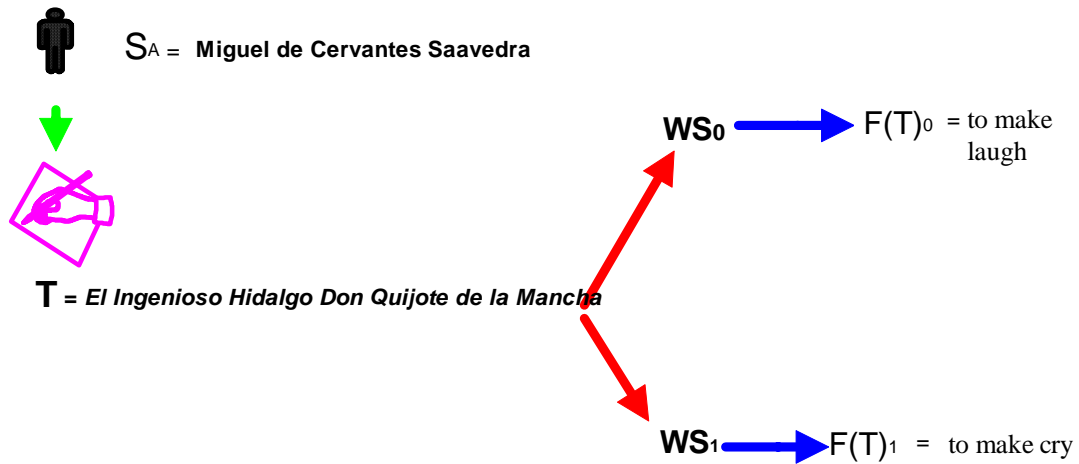
$S_A =$ **Miguel de Cervantes Saavedra**

T *= El Ingenioso Hidalgo Don Quijote de la Mancha*

WS$_0$ $\longrightarrow$ F(T)$_0$ = to make laugh

WS$_1$ $\longrightarrow$ F(T)$_1$ = to make cry

Figure 13.2

***

Each social group must fight in all battlefields and it takes control of T whenever they can be interpreted in favor of ideological interests. We have exposed recently as rigorously scientists texts referring to the Ecology and Sustainable Development are being appropriate by ideological associations and manipulated in favor of their projects of society (Usó-Domènech et al, 2009[a,b]). Exchanges of F(T) mean that they are obtained or are possibilities of obtaining to identifications between different world visions.

Let (Id) be the operation of identification, and WV_1, WV_2, WV_3 be three world visions and so that:

1) *Reflexivity property:* $WS_1(Id)WS_2$

2) *Antiymmetrical property:* $WS_1(Id)WS_2 \neg(\Rightarrow)WS_2(Id)WS_1$

3) *Nontransitive property:* $(WS_1(Id)WS_2) \wedge (WS_2(Id)WS_3) \Rightarrow WS_1(\neg Id)WS_3$

13.2.3. The Interpretation

In the context of Peirce's theory (Peirce, 1933-1948) of the limitless semiosis:

1) All expression must be interpreted by another expression, and thus until infinity.

2) The same activity of interpretation is the only way to define contents of the expressions.

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3) During this process, the socially recognized significance of the expressions grows by means of the interpretations submissive different contexts and historical circumstances.

4) The meaning of a sign is the historical chronicle of the pragmatic work that has accompanied each one by its historical appearances.

5) To interpret a sign means to anticipate all the possible contexts in that it can be introduced.

6) Semantic representation of a term is transformed into a potential text and each sememe is a rudimentary argument.

Consequence 13.2: *Sememe is a virtual text and a text is the expansion of sememe.*

Transition from the TG component to the *Structural Base structure* (SBS) component is the *text interpretation* (TI). Every extension interpretation results from the double operation of acceptance and modification. Both give the different ontic basis for the determinate texts.

Let S_A, S_R be the Issuer (author) and Receiver (reader) Subjects respectively belonging to a Structural Bases SB such as $I \in SB_1 \wedge R \in SB_2 ; (SB_1 = SB_2) \vee (SB_1 \neq SB_2)$ (Figure 10.3). Structural Bases SB_1, SB_2 can belong to different cultures or the same culture in different historical periods.
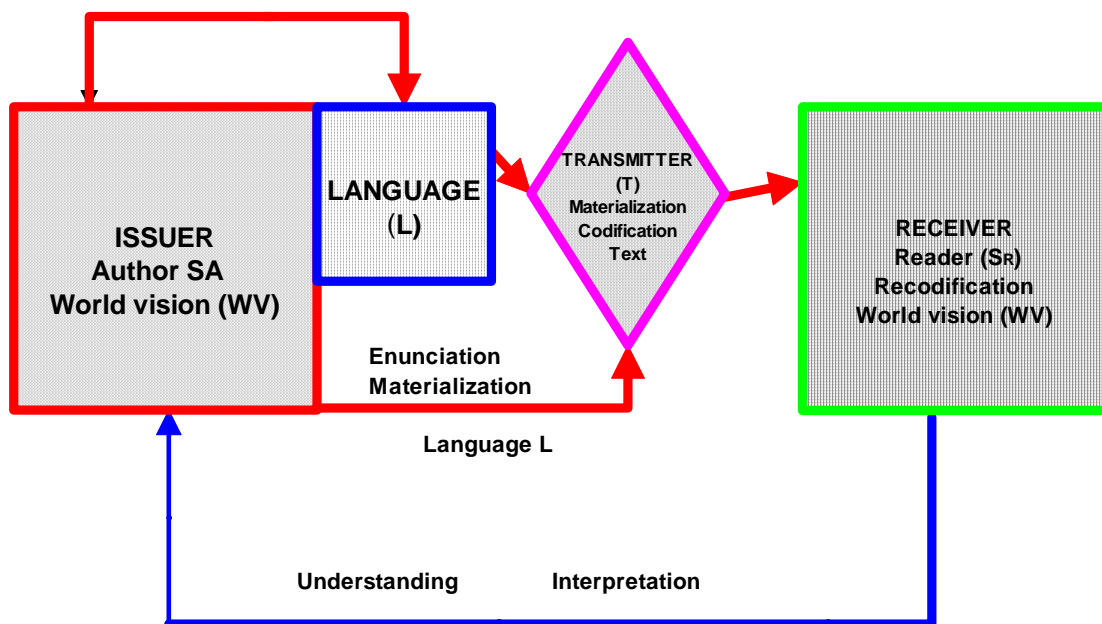
Figure 13.3.

Note 13.1: *WV completely explains neither produced T nor the formal structure of the own work can completely explain the specificity of the materialization.*

Theoretically, it is possible to be maintained that all WV can be materialized at different levels from reality. It can be materialized in the level of representation, the level of conceptualization; diverse restored levels of the social and economic behavior in Structural Base (SB). They exist the same explanatory mediations in R, iff R has the same WV that S_A.

Definition 13.4: *We define as* explanatory mediations *if S_A is mediates by WV and L.*

All new world vision looks for materialization immediately, since its own existence in the society has to be under materialization.

Consequence 13.3: *If S_A and S_R have the same WV, exists communication between both.*

Consequence 13.4: *If S_R changes his WV, the communication changes its connotative significance. L and S_R are dynamics.*

Consequence 13.5: *If L evolves, S_R also does.*

Consequence 13.6: *S_A and T are static.*

Connotative projections of the DS on the structural base (SB) "justify" for the Subject actions within the structure, its extensions and substitutions or disappearance of determined world vision or, and in extreme case, the substitution of the structure by another different one.

Often, the text T, like any other message, contains its own codes. The present reader of European medieval novels extracts such amount of slight knowledge of the denotative significances, on the way to think, to dress, to eat, to love, to fight, of the people of those centuries, who can perfectly reconstruct its systems of rhetorical and ideological expectations. In the own work are the keys to discover these immersed systems in the historical atmosphere where it arose. Keys to relate the message to the original codes,

and it is reconstructed in a process of contextual interpretation. The same we may say for another type of messages that use iconic codes (architecture, painting, sculpture, etc.) or auditory codes (music). The interpretation is developed with a continuous oscillation (Eco, 1968), which goes from the discovery of the original codes to an attempt of faithful interpretation (*reading*). And, from here, to a return to the present codes and lexicons to experience them in the message. It is not only come to a continuous confrontation and integration of all the keys of reading, enjoying the work by this same ambiguity that is born, by the informative use of significants with respect to the original code, but by the informative use of significants related to the present codes. Each interpretation of the work, filling with meaning new the form of the original message, physically unalterable during centuries, gives to origin to new significances, that enter and enrich the present codes and ideologies, reconstructing them and preparing to the reading reversions for a new interpretative situation. It is a cybernetic movement of second order, always renewed and continuous, but that cannot of any way to anticipate the concrete forms that it will adopt (Eco, 1962).

According to Eco (1992) a tricotomy articulates between:

1) Interpretation like search of the *intentio auctoris* (intention of the author).
2) Interpretación like search of the *intentio operis* (intention of the text).
3) Interpretation like imposition of the *intentio lectoris* (intention of the reader).

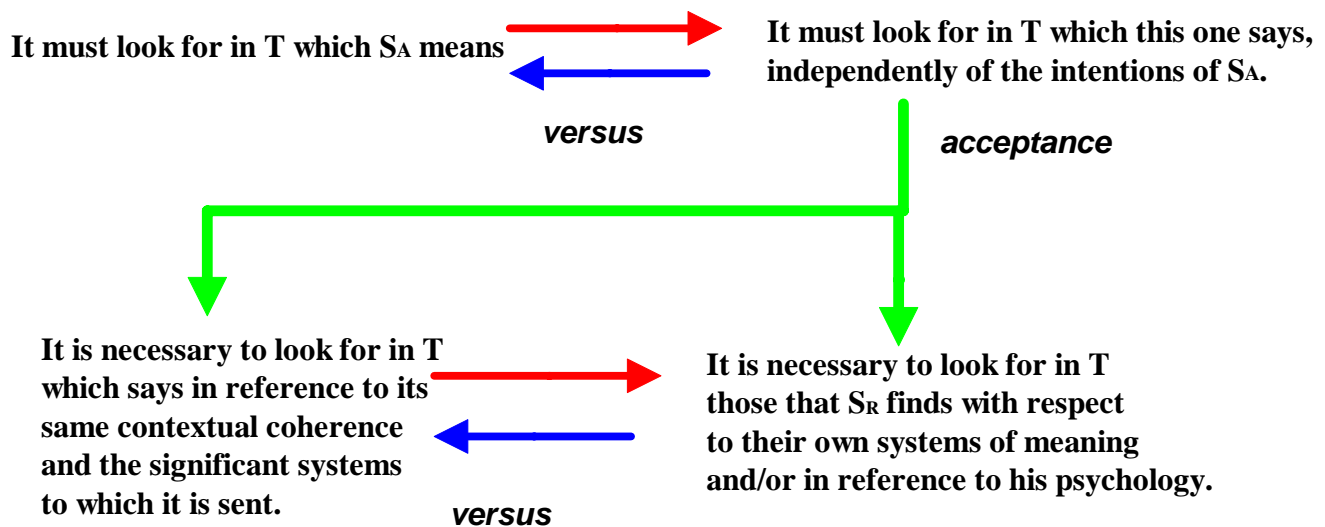The classic debate articulates in oppositions (Figure 13.4):

Figure 13.4.

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A hermeneutic-symbolic reading of T can become according to two modalities:

1) Looking for the infinity of senses that S_A has installed in T.
2) Looking for the infinity of senses that S_A ignored (*Mythical lecture*).

However, saying that T has infinite interpretations it cannot say that this infinity is depending on *intentio auctoris*, *intentio operis* or *intentio lectoris*.

The significance gives sense to all the elements organized in T, since it is the understanding of T.

Let $\{c-s\}(T_i)$ be the connotative significance of subtext τ_i. Each individual reader will have one connotative significance of text, so that:

$$\{c-s\}(\tau_i)_{SR1}$$
$$\{c-s\}(\tau_i)_{SR2}$$
$$............$$
$$\{c-s\}(\tau_i)_{SRn}$$

then

$$\{c-s\}(T) = \bigcup_{j=1}^{n} \left(\{c-s\}(\tau_i)\right)_{SRj}$$

Property 13.1: *The total connotative significance of a* $T, \{c-s\}(T)$ *will be the totalization of all the possible interpretative senses of T.*

A concrete problem appears: a new world vision not only can create new forms and new formal structures in its materialization, using the existing formal structures to materialize itself. It is not possible to speak of a formal structure without falling in a deep abstraction, since there is no form without contained content or without form. A net separation between formal structure is not possible and the content of the same one that is, in this case, the new world vision. The notion of applied internal laws to the formal structure of the human societies and the works that are by produced them (its

cultural consequences) is inadequate due to the complexity of the treated problem. However, of some way we will have to sift the self-regulating movement of a structure, which is structure because it has its own laws or internal rules, generally deontical rules. Nevertheless, although theoretically the discovery and possession of the internal laws of a formal structure must provide the same structure, does not exist way to separate exactly forms and content, formal structure and world vision. So that this reproduction occurred, it would be necessary to also know the internal rules the new world vision. Let us suppose that it was to us present the internal laws the formal structure and the new world vision. Even so, we could not reproduce the materialization, that is study object, when not sharing the world vision that inspired the materialization.

We suposse a temporal chain of world visions $WV_1 \rightarrow WV_2 \rightarrow ... \rightarrow WV_n$

Definition 13.5: *We define as* nonexplanatory mediations *if WS_1 has been transformed into WS_2 or in WS_n.*

The mediations are not explanatory in the level of T's function (Figure 13.5).
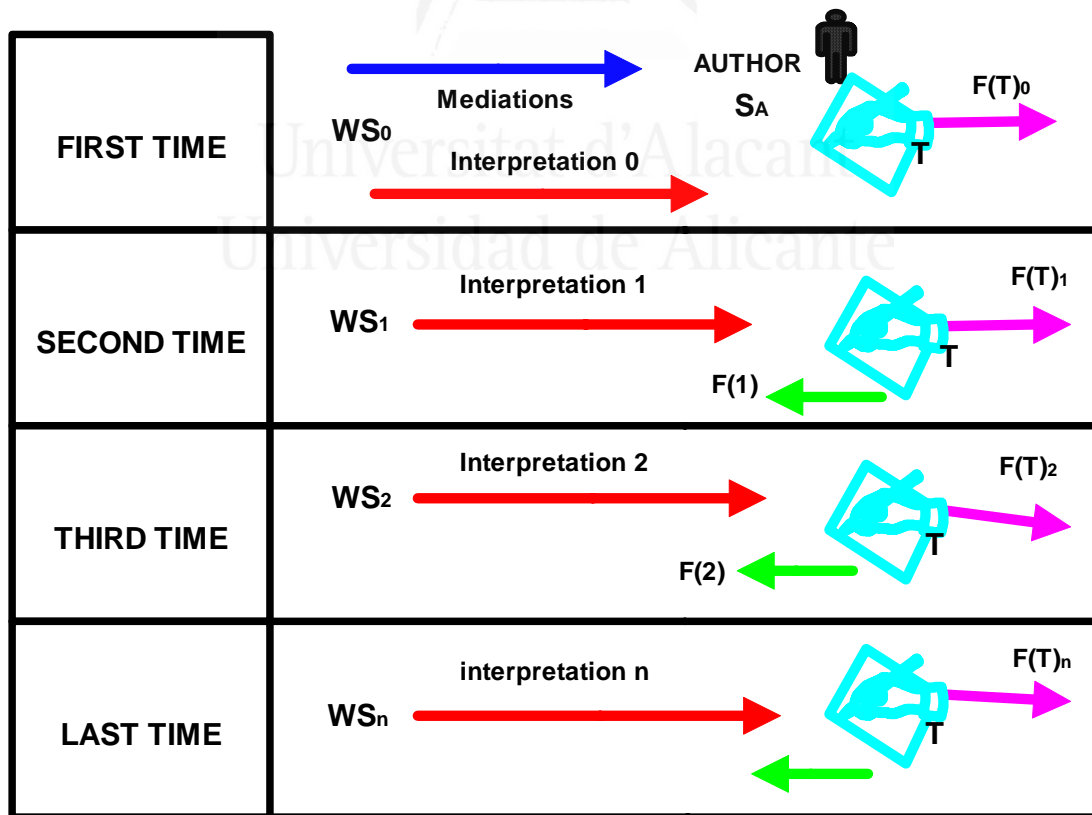
Figure 13.5.

First time: Genesis of T. Mediations SB-S-T. Function $F(T)_0$.

Second time: Exchange of SB. T changes of function $F(T)_1$. It has to have a correspondence that explains and includes: $WW_1 - F(T)_1$.

Third time: Exchanges of interpretations in WV_1 and WV_2, and correlative exchanges of function $F(T)_2$: $WW_2 - F(T)_2$.

If WV_0 can arrive at WV_n, T remains immobile.

T is lost its function $F(T)_n = 0$. Nevertheless, WV_n continues interpreting T historically.

Process of documentalization, or development of the understanding and interpretation of T comes given in figure 13.6.
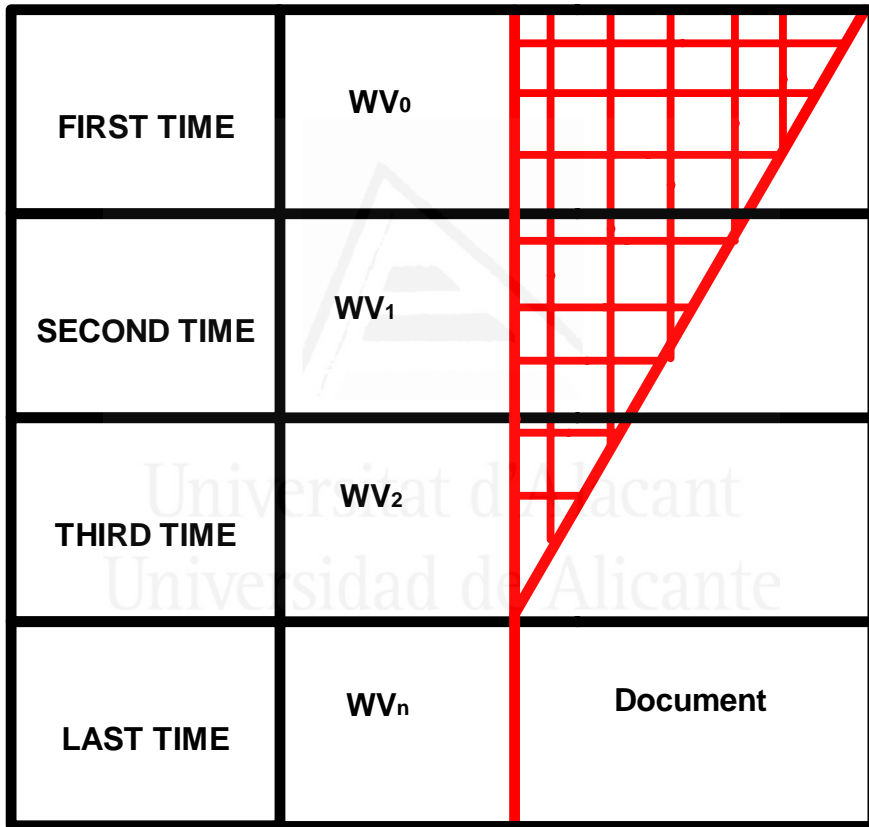
Figure 13.6.

The process of exchange of the value of T comes given in figure 13.7:
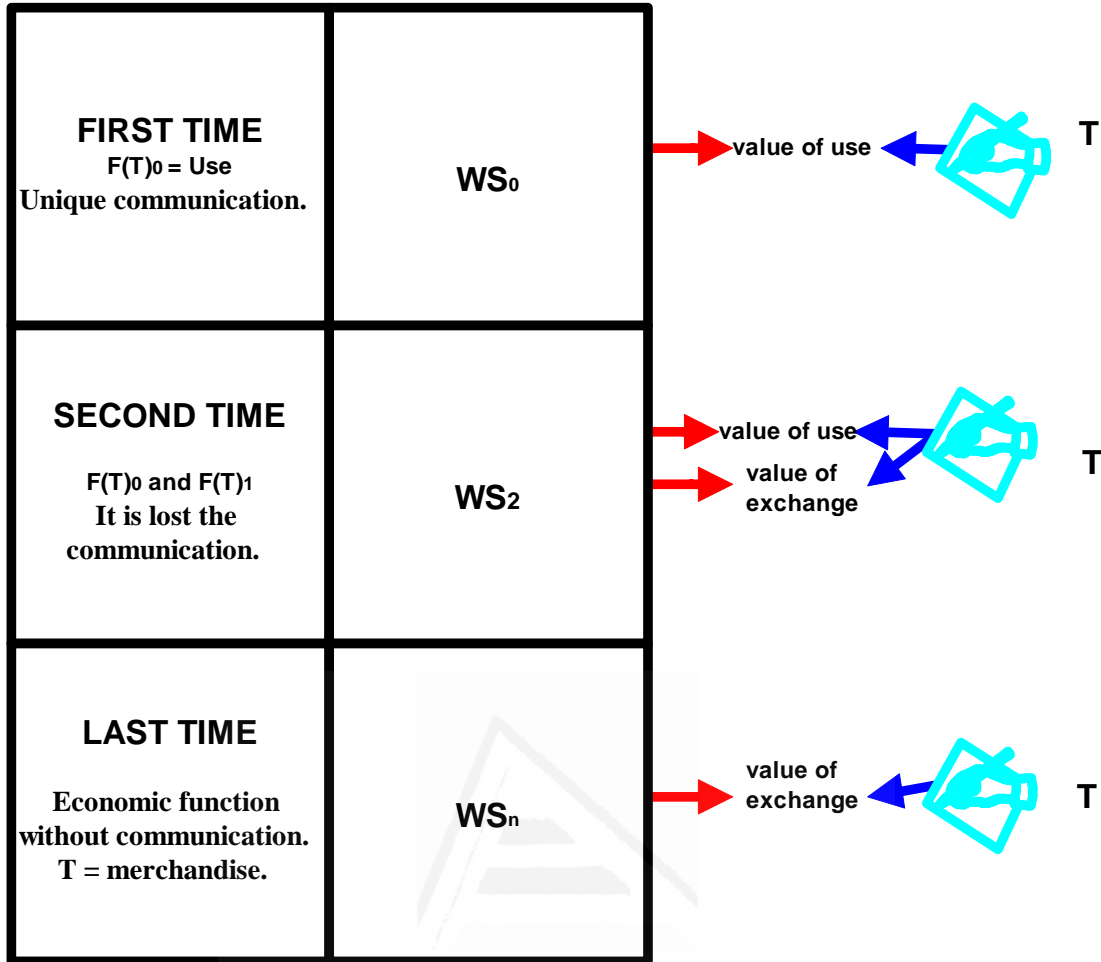
Figure 13.7.

It is necessary to admit that all T is born, grows, reproduces (or not) and finally dies; and this mortal life, as all human work, we can be found with exchanges of function, manipulations, etc., and to the fine one, inevitably, with a death, that can be sad and lamentable, but, in other cases, it can console. Little people, we believe, can lament the death of some texts like *Mein Kampf* or buildings of the Inquisition.

Consequence 13.7: *Second Law of Thermodynamic (Entropy) operates in text T, as much at physical level (deterioration or destruction) like a informative level (loss of its connotative significance).*

13.3. TEXTUAL STRUCTURES

In all text T we can observe diverse mathematical structures.

13.3.1. The Metric Textual Space

Let τ be a set of subtexts $\tau = \{\tau_1, \tau_2, ..., \tau_n\}$ and $\varnothing$ be the empty text. Let d be a metric on T, that is, a function d: TxT→ R such that for any $\tau_1, \tau_2, \tau_3 \in T$. The function *d* is also called *distance textual function* or simply *textual distance*. We establish the following properties:

1. *Non-negativity:* $d(\tau_1, \tau_2) \geq 0$.
2. *Identity of indiscernibles:* $d(\tau_1, \tau_2) = 0$ iff $\tau_1 = \tau_2$.
3. *Symmetry:* $d(\tau_1, \tau_2) = d(\tau_2, \tau_1)$.
4. *Triangle inequality:* $d(\tau_1, \tau_3) \leq d(\tau_1, \tau_2) + d(\tau_2, \tau_3)$.
5. The first condition follows from the other three, since: $2d(\tau_1, \tau_2) = d(\tau_1, \tau_2) + d(\tau_2, \tau_1) \geq d(\tau_1, \tau_1)$.

Property 13.2: *The ordered pair (T, d) forms a metric space that we will denominate* metric textual space (MTS).

Definition 13.6: *A subset τ of MTS (T, d) is called* open *if, given any textual point $x_1 \in \tau$, there exists a real number $\varepsilon > 0$ such that, given an textual point $x_2 \in T$ with $d(x_1, x_2) < \varepsilon$, $x_w \in \tau$.*

Equivalently, τ is open if every textual point in τ has a neighbourhood contained in τ. Let $T = \{\tau_1, \tau_2, ..., \tau_n\}$ be a set and $\mathscr{T}$ be a collection of subsets of T as $\mathscr{T} = \{\{ \}, \{\tau_1\}, ... \{\tau_n\}, \{\tau_1, \tau_2\}, ..., \{\tau_1, ..., \tau_n\}\}$.

Note 13.2: *Subsets τ_i will be defined as subtexts.*

13.3.2. The Textual Topology

Different authors formulate the hypothesis that all text has topological properties (Bredon, 1997; Munkres, 1999; Willard, 2004).

Definition 13.7: *The collection $\mathscr{T}$ is called a* textual topology (TP) *on T.*

Definition 13.8: *We define a* topological textual space (TTS) *as a set T together with a collection 𝒯 of subtexts of T satisfying the following axioms:*

Axiom 13.1: $\varnothing \in \mathcal{T}$ *and* $T \in \mathcal{T}$.

Axiom 13.2: *The union* $\bigcup$ *of any pair of subtexts* $(\tau_i, \tau_j) \in \mathcal{T}$ *is also in* $\mathcal{T}$. *It is to say* $\tau_i \bigcup \tau_j \in \mathcal{T}$

Axiom 13.3: *The intersection of any finite collection of subtexts* $\tau_1, \tau_2, ..., \tau_n \in \mathcal{T}$ *is also in* $\mathcal{T}$. *It is to say* $\tau_1 \bigcap \tau_2 \bigcap ... \bigcap \tau_n \in \mathcal{T}$

Under this definition, the sets in the textual topology $\mathcal{T}$ are the *closed subtexts*, and their complements in *T* are the *open subtexts*.

Definition 13.9: *Using the Kuratowski closure axioms* a TTS (T, cl) *is a set* $T\,cl : P(T) \to T$ *where* $P(T)$ *is the power set of T and with a function cl called* closure textual operator *satisfying the following properties:*

1) *Extensivity:* $\tau_1 \subseteq cl(\tau_1)$
2) *Idempotence:* $cl(cl(\tau_1)) = cl(\tau_1)$
3) *Preservation of binary unions:* $cl(\tau_1) \bigcup cl(\tau_2) = cl(\tau_1 \bigcup \tau_2)$
4) *Preservation of nullary unions:* $cl(\varnothing) = \varnothing$
5) *Preservation of finitary unions:* $cl(\tau_1 \bigcup \tau_2 \bigcup ... \bigcup \tau_n) = cl(\tau_1) \bigcup cl(\tau_2) \bigcup ... \bigcup cl(\tau_n)$

Let τ be a subtext and $x \in \tau$ be a textual point.

Definition 13.10: *A textual point* $x \in \tau$ *is called* closed *in* (T, cl) *iff* $x \in cl(\tau)$

Definition 13.11: *A subtext* τ *is called* closed subtext *in* (T, cl) *iff* $\tau = cl(\tau)$

Definition 13.12: *We define* a textual cover *C of T as the collection of subtexts U_α of T whose union is the whole textual space T. It is to say $T = \bigcup U_\alpha$. In this case we say that C textually covers T, or that the subtexts U_α cover T.*

If τ is a subtext of T, then a textual cover of τ is a collection of subtexts of T whose union contains τ , i.e., C is a textual cover of τ if $\tau \subseteq \bigcup U_\alpha$.

Definition 13.13: *We define* a textual subcover Θ of C as a subtext of C that still textually covers T.*

Definition 13.14: *We say that C is* an open textual cover *if each of its members is an open subtext, i.e. each U_α is contained in $\mathscr{T}$, where $\mathscr{T}$ is the textual topology on T.*

Let x be a textual point in T.

Definition 13.15: *We define* the interior of a text T *and is denoted int(T) as the set of all interior textual points of T.*

The interior of a text has the following properties.

1) $\text{int}(T)$ is an open subtext of T.
2) $\text{int}(T)$ is the union of all open subtexts contained in T.
3) $\text{int}(T)$ is the largest open set contained in *T*.
4) A text *T* is open iff $T = \text{int}(T)$.
5) Idempotence: $\text{int}(\text{int}(T)) = \text{int}(T)$.
6) If τ is a subtext of *T*, then int(τ) is a subtext of int(*T*).
7) If τ is an open subtext, then τ is a subtext of *T* iff τ is a subtext of int(*T*).

Definition 13.16: *We define as* the exterior *of a subtext τ of a topological textual space T, denoted ext(τ), is the interior $\text{int}(T / \tau)$ of its relative complement.*

Defnition 13.17: *We define as $T \backslash \tau^-$, the complement of the closure of T.*

Properties are the following:

1) $ext(\tau)$ is an open subtext that is disjoint with τ .

2) $ext(\tau)$ is the union of all open subtexts that are disjoint with T.

3) $ext(\tau)$ is the largest open subtext that is disjoint with T.

4) If τ' is a subtext of τ , then $ext(\tau')$ is a supertext of $ext(\tau)$.

5) $ext(ext(\tau))$ is a supertext of $int(\tau)$.

Definition 13.18: *We define* a textual neighbourhood of x *as a subtext τ , which contains an open subtext υ containing x,* $x \in \upsilon \subseteq \tau$.

Definition 13.18 is also equivalent to $x \in T$ being in the interior of τ .Note that the textual neighbourhood need not be an open subtext itself. If is open it is called an *open textual neighbourhood.*

A subtext which is a textual neighbourhood of each of its textual points is open since it can be expressed as the union of open subtexts containing each of its textual points.

Defnition 13.19: *We define as* textual neighbourhood filter *Φ(x) for a textual point x the collection of all textual neighbourhoods for the textual point x.*

Definition 13.20: *The collection of all textual neighbourhoods of a textual point x is called the* textual neighbourhood system *at the textual point x.*

1) If τ is a subtext of T then a textual neighbourhood of τ is a subtext υ which contains an open subtext ω containing τ .

2) A subtex τ is a textual neighbourhood of υ iff it is a textual neighbourhood of all the points in τ .

3) υ is a textual neighbourhood of τ iff τ is a subset of the interior of υ .

Definition 13.21: *A collection of subtexts of a topological textual space T is said to be* locally finite, *if each textual point in the textual space has a textual neighbourhood that intersects only finitely many of the subexts in the collection.*

Definition 13.22: *A topological textual space T, is said to be* locally finite *if every collection of subtexts of it is locally finite.*

Theorem 13.1: *Textual topological space T is a finite space.*

Proof:

Since every locally finite collection of textual points is point finite, every collection of subtexts of T must be point-finite. The power set of T must be finite, because if it were infinite, the collection of all subtexts of T would not be locally finite since some textual point would belong to infinitely many subtexts of T. This means that T is finite.

Consequence 13.8: *T is locally finite iff it is finite.*

Definition 13.23: *Text T is a* trivial textual topology, *in which only the empty text and the whole space TTS are open.*

Every sequence and net in this textual topology T converges to every textual point of the space.

Definition 13.24: *We define* a textual base B_T *for a topological textual space T with textual topology $\mathscr{T}$ as the collection of open sets in $\mathscr{T}$ such that every open set in $\mathscr{T}$ can be written as a union of elements of B_T.*

The textual base *generates* the textual topology T. The properties of textual bases are:

Property 13.3: *The base elements cover T.*

Let B_{T1}, B_{T2} be base elements and let *I* be their intersection $I = B_{T1} \bigcap B_{T2}$.

Property 13.4: *For each x in I, there is another base element B_3 containing x and contained in I.*

If a collection $\tau = \{\tau_1, \tau_2, ..., \tau_n\}$ of subtexts of *T* fails to satisfy either of these properties, then it is not a base for *any* topology on *T*. Conversely, if τ satisfies both of the properties 3 and 4, then there is a unique textual topology on *T* for which τ is a base; it

is called the textual topology generated by τ, being this textual topology the intersection of all topologies on T containing τ.

Limit points are unique in TTS and is required to be a Hausdorff spaces.

For Property 13.4, T forms a metric textual space MTS. Every MTS can be given a metric textual topology MTT, in which the basic open textual sets are open balls defined by the textual metric TM. This is the standard topology on any normed vector textual space (NVTS. On a finite-dimensional vector space as they are TTS this topology is the same for all norms.

Let $(T_1, cl_1), (T_2, cl_2)$ be two TTSs.

Definition 13. 25: *We say that* (T_2, cl_2) *is* the interpretation *of* (T_1, cl_1) *to the continous function* $f_{int} : (T_1, cl_1) \rightarrow (T_2, cl_2)$ *where* $\forall \tau \in T \,/\, f_{int}(cl_1(\tau)) \subset cl_2(f_{int}(\tau))$

Let τ_i and τ_j be two subtexts on a text such $\tau_i \subseteq \tau_j$. That is, every element of τ_i is also an element of τ_j. Then the textual topology τ_i is said to be a *coarser textual topology* than τ_j, and τ_j is said to be a *finer textual topology* than τ_i. If $\tau_i \neq \tau_j$ we say τ_i is *strictly coarser* than τ_j and τ_j is *strictly finer* than τ_i. The binary relation $\tau_i \subseteq \tau_j$ defines a partial ordering relation on the set of all possible topologies on T. The following statements are equivalent:

1) $\tau_i \subseteq \tau_j$.
2) The identity map $id_T : (T, \tau_j) \rightarrow (T, \tau_i)$ is a continuous map.
3) The identity map $id_T : (T, \tau_i) \rightarrow (T, \tau_j)$ is closed map.

Given a topological textual space (*T* ,cl) and a subset τ of *T*, the subspace textual topology on *T* is defined by $cl_T = \{T \cap \tau \mid \tau \in cl\}$. Alternatively we can define the subspace textual topology for a subset τ of *T* as the coarsest topology for which the inclusion map $i : T \rightarrow \tau$ is continous. We suppose *i* is an injection from a set τ to a topological textual space *T*. Then the subspace textual topology on τ is defined as the coarsest topology for which *i* is continuous.

Property 13.5: *Each subtext τ_i will form as well, a topological textual subspace.*

Let τ_2 be a substext of τ_1 and let $i : \tau_2 \to \tau_1$ be the inclusion map. Then for any TTM τ_3 a map $f : \tau_3 \to \tau_2$ is continuous iff the composite map i∘f is continuous. This property is characteristic in the sense that it can be used to define the subspace topology on *Y*.

Let S τ_2 be a subtext of X τ_1.

1) If $f : \tau_1 \to \tau_3$ is continuous the restriction to τ_2 is continuous.

2) If $f : \tau_1 \to \tau_3$ is continuous then $f : \tau_1 \to f(\tau_1)$ is continuous.

3) The closed sets in τ_2 are precisely the intersections of τ_2 with closed sets in τ_1.

4) If τ_4 is a subtext of τ_2 then τ_4 is also a subtext of τ_1 with the same textual topology.

5) Suppose τ_2 is an open subtext of τ_1. Then a subtext of τ_2 is open in τ_2 iff it is open in τ_1.

6) Suppose τ_2 is a closed subtext of τ_1. Then a subtext of τ_2 is closed in τ_2 iff it is closed in τ_1.

7) If $B_{\tau 1}$ is a textual base for τ_1 then $B_{\tau 2} = \{v \bigcap \tau_2 : v \in B_T\}$ is a textual basis for τ_2.

8) The topology induced on a subset of a metric textual space MTS by restricting the textual metric TM to this subset coincides with subspace textual topology for this subset.

Let T_1, T_2 be two texts

Corollary 13.1: *A continuous map $f : T_1 \to T_2$ remains continuous if the textual topology on T_2 becomes coarser or the textual topology on T_1 finer.*

Corollary 13.2: *A closed map $f : T_1 \to T_2$ remains closed if the textual topology on T_2 becomes finer or the textual topology on T_1 coarser.*

Each subtext will be formed by other smaller subtexts. The very small one or *infimum* will be the unit containing the basic semantic unit. In texts written it will be the word

and we denote as $\inf \tau$. The greatest element of τ or *supremum* will be the own τ and we denote as $\sup \tau$.

Every subset of a TTS can be given the subspace textual

Definition 13.26: *We define the* Cartesian product of the topological textual spaces T_i, *to the product* $T = \prod_{i=1}^{n} T_i$

Let $P_i : T \rightarrow T_i$ be the canonical projections

Definition 13.27: The Tychonoff textual topology on *T is defined to be the coarsest textual topology for which all the projections P_i are continous.*

Let *U* be an open subset of T_i.

Definition 13.28: The product textual topology on *T is the textual topology generated by textua sets of the form $P_i^{-1}(U)$.*

Sets $\{P_i^{-1}(U)\}$ form a subbase for the textual topology on *T*

Let $\{\tau_1, \tau_2, ..., \tau_n\}$ be an indexed family of subtexts (toplogical textual subspaces).

Definition 13.29. *A* textual basis *consists of textual sets* $\prod_i U_i$ *, where for cofinitely or finitely many i, $U_i = T_i$, and otherwise it is a basic open set of T_i.*

For a finite product the products of base elements of the T_i gives a textual basis for the product .

Let T be a textual topological space and $\tau = \{\tau_1, \tau_2, ..., \tau_n\}$ be a set of subtexts.

Definition 13.30: *We define a* textual quotient *space if* $f : T \rightarrow \tau$ *is a surjective function, then the quotient topology on* τ *is the collection of subtexts of* τ *that have open inverse images under f.*

The textual quotient topology is the finest topology on τ for which f is continuous.

13.3.3. The Textual Lattice

Definition 13.31: *The partially ordered set* $(T, \subseteq)$ *is a* complete textual lattice *if every subset* $\tau \in T$ *has both a infimum* $\inf \tau$ *and a supremum* $\sup \tau$ *in* $(T, \subseteq)$.

Let $\{\tau_i\}$ be a collection of textual topologies (subtexts). Then:

1) The infimum of a collection of textual topologies is the interseccion of those textual topologies $\inf\{\tau_i\} = \bigcup_{i=1}^{n} \tau_i$.

2) The supremum, however, is not generally the union of those textual topologies but rather the topology generated by the union, that is to say, plaintext T.

A complete textual lattice is also a bounded lattice, which is to say that it has a greatest element being a discrete topology and least element being a trivial topology.

14. CONCLUSIONS

In 2002, Usó-Doménech, Mateu and Patten (2002[a]) said:

> *It is possible that it is needed to model in complex field, losing the meaning of the model but winning in their approach to the reality. We should also outline ourselves using the fuzzy logic and Theory of Possibility. Many are the roads to continue from the mathematical point of view.*

In agreement with these thoughts, we can extract of the exposed work, the following conclusions and reasonings:

1) Definition of the concept of s-impure set as set of perceptuales beliefs or denotative significances (*relative beings*) of material and/or energetic real objects (*absolute beings*) is important in the approach of the Deontic Systems. But not only the subject S perceives the objects O like significances, according to we have exposed in the above paragraphs, but he perceives the existing relations between these significances or, in case, he infers them. The study of these relations, conceived not like a singular relation between singular objects, but like sheaves of relations in both directions and forming relational freeways, will be studied in next work. In it, the work will approach the structure of the system, from the synchronous point of view, reason for this first approach to this class of systems.

2) The author thought that concepts as alysidal set and gnorpsic function are news. If we have introduced these mathematical abstractions, it is by the necessity to use them in this approximation to the DIS. A DIS is not more than an alysidal set formed by an only element, since we left from the supposition that all the elements of a DIS are related to each other, of a direct or indirect way.

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3) DIS defines its environment. Then we can suppose environment formed as well by different DIS'. That is to say, by an alysidal set whose elements are simultaneously systems, but that "*does not interest*" to the own DIS exception in their interchanges. These specific interchanges (stimulus-response) leave certain nodes and act on certain nodes of the alysidal sets (stimulus environment-DIS-response environment). For that reason, we have had to introduce is special coupling function of denominated gnorpsic function. In addition, gnorpsic functions can be used for algebraic operations between alysidal sets. Its application to DIS' could be used to explain absorption, cooperation, confrontation and disappearance of different societies, cultures or empires..

4) DIS will have the following properties:

   a) They are objectively diachronic, that is to say, they are born, evolve and die in a Newtonian period $[t_0, t]$.

   b) They are subjectively diachronic, that is to say, it exists an own subjective time of the system $[t_0, t]_S$, and so that $[t_0, t] \subset [t_0, t]_S$.

   c) DIS are open systems, that is to say, two exist environments, stimulus environment H' and response environment H''.

   d) Both environments are systems also, but for subjects pertaining to DIS avoid this structure, for that reason they are possible to be considered like alysidal sets.

   e) Interactions between the system and its environments exist. These interactions will be transactions and inferential relations. The transactions will be necessary, distinguishing between the ontically necessary transactions and deontically necessary transactions.

   f) Some of these transactions are contingent. Then, phenomena of fortuitous interaction of unforeseeable consequences for the DIS. take place.

5) We have used, among other tools, the modal logics (*aletic and deontic*), Neutrosophy and epistemic logic (*beliefs*). However, the subject is very far from being closed. In addition, we expose the following considerations:

    a) The permission (or the obligation) of a response depends of the relationships among the objects, the state and the knowledge about this state.

    b) The value of a certain response, not only depends on the denoted response and the meaning of allowed, but also of the moment when this response is expressed. The response will be probably allowed today, but that do not mean to be always accepted. We should still guarantee the complete formalization of this interpretation with a formal semantics such as *'possible worlds'*.

    c) It is not always necessary that a Subject S be able to say if a response is allowed or forbidden with regard to certain state of the system. A language should not be reduced to a single function of referring with regard to a factual or counterfactual world. Formalization of DIS by means of logical language demands that this last one be sufficiently expressive to reflect all the subtleties of the reality. In other words, these logical languages should be able of reflecting all the extra-referential functions of the system.

6) A semiotic theory of systems derived from the language (DIS belong to this class) would have therefore the purpose of classifying all the systems of linguistic expression: philosophy, ideology, myth, poetry, art, as much as the dream, lapsus, the free association in a pluridimensional matrix where will be interfered very diversified fields. In each one of these discourses is necessary, in effect, to consider a plurality of questions, the essence of which will only be comprehensible by the sum of all; it will be necessary to ask, in the first place, as it will be the purpose of this language, the function that fulfills, the reason by which has been constructed.

7) All solution to the problem of Ideological Doxical Superstructure (DS) depends on its constitution, because it will allow to differentiate the diverse discourses

that the man, as subject actor, maintains based on exhaustive criteria defining, of a part, each type of language, and another part, isolated the "places" where it makes contact with other spheres of the reality. Each discourse takes care of a region differentiated from the being; this diversity of object does not provide the pertinent criterion? It single, certainly no, because what characterizes to long term the elaboration, as much is not certain apparent characteristics of the reality provideding the first divisions, like the possibility of putting under objects, at first heterogenous, to similar operations. The content is identified with the division of this content in the language, that is to say, in the case of discourses nonformalized, with the use of signs provided by the own language.

8) Ideal values, myth (as residual ideology) belongs to Mythical Superstructure (MS). Its projection conforms, with the image coming from Structural Base (SB), the dominant ideology and the values in fact of the Ideological Ideological Doxical Superstructure (IDS), and this projects on the own SB in form of actions and conducts and are reflected on the Mythical Superstructure (MS) like utopia, last objective of the ideology.

9) It has in the myth utopic elements, and is precise to admit that in the utopia, there is much of myth. Not only in the sense of the false-wonderful one of the fable, but in the sense of the "*symbolic capital*" or the social ideal values, understood purely and simply like which it maintains the cohesion of human group that it sustains it. The "*symbolic descapitalization*" is equivalent then to the "*demoralization*", dissemination or atomizaton of the social group.

10) It is undeniable that the technological substructure is invested in the center of the SB in the most complex DIS. Nevertheless one refuses on the part of thinkers, many of them belonging to emergent ideologies, that technology comprises of the culture of the DIS, and is even enemy of this one and even opposite to the own human being. Nevertheless the nature of the technology cannot be denied, far from it to despise it, if is desired to control it and to avoid that it serves or it produces effects nonwished for a particular DIS. Its relation with the values in fact, dominant ideology, and normative structure is evident. Relation between

technological and normative structures, and these with the Ideological Doxical Superstructure will be analyzed elsewhere.

11) We have tried to make a logical and mathematical approach to one of the greatest problems of the humanity: the belief systems, mainly the ideological ones, their transmission and materialization. The central problem is not whether ideas are socially conditioned, but how humans come to be attached to them and how that attachment functions in social organization. The very mention of belief calls to sociology of religion to mind, but belief is a general social process, and it is no correct to restrict the study of belief to religious institutions. Because beliefs are not solely religious, but political, philosophical, popular and even scientists. We thought that this is a systemic theory of belief, not a psychology, social psychology or phenomenology of belief. With a minimum of exceptions, we maintain a sociologist frame of reference. It is, rather, an attempt to approach a fascinating empirical and theorical problem from a purely sociological framework. Thus, rather than focusing on the believer and the social supports for his beliefs, we have focused on the things believed, and their relations to social organization.

12) On the other hand, Theory of Social Environment (Social Environ Theory) supposes a systemic conception of the social reality on the part of the Observer. The social object receives and creates two environments: stimulus environment (Initial Structural Base) **H'** and response environment (Late Structural Base) **H''**, respectively. Stimuli, transitions and responses are social and physical processes reflected in the mind of the Subjects as ideological images and projections. Probability exists in many social and physical processes. At the same time, all the variables that are handled are linguistic variables in natural or symbolic languages (Grzymala-Busse, 1991; Sastre-Vázquez et al., 1999; Usó-Domènech, 2000[a, b]; Villacampa & Usó-Domènech, 1999; Villacampa et al., 1999[a, b, c]). Functions stimulus-response and state-response ideological processes are similar to the belief functions. This interpretation of the Social Environ Theory opens exciting mathematical and epistemological perspective on the social behavior and the same historical research.

13) We have tried to demonstrate that the connected beliefs have a mathematical structure, a topological structure concretely. This fact could appear like a mere academic disquisition of an abstract theory without no practical application. But in fact it is very different. The ideas, the beliefs are pronounced in written, architectonic, pictorial, musical, etc., texts. Speech of literary, architectonic, artistic styles, differentiated clearly according to historical times, corresponding to the world visions of the people who lived in those periods. These cultural products are, in fact, materializations of the belief abstract systems and nobody can deny that all of them have a geometric, topological structure. We have tried to demonstrate that the textual materializations are the existing projections between an abstract topology and a concrete topology, with the addition of an auxiliary dimension: the meaning.

14) In the ideological transmission we can draw the following conclusions:

   a) Tropos strictly are codified and each message does not do more than to repeat what the auditor already hoped and knew.

   b) Premises are accepted without discussion in most of the cases, although they are false and in addition they are not defined nor put under examination.

   c) Argumentation does not exist but *emblematic*. Argumental process are received like conventional signs based on very strict process of codification. A doctrine, an emblem, flag is exposed before which is reacted of a determined way, by mere convention.

   d) It is necessary to become the question that paper plays the persuasive argumentation and other extrasemiotic factors that escape to the semiotic analysis.

15) We become the following questions: is desired an ideology because the message has persuaded to us? Or, it has been persuaded to us because we already wished it previously? The fact of being convinced with arguments already known, makes incline by the second hypothesis. If it is certain, it would force to review many periods of history in where the ideological exchange was transcendental.

16) We thought to have demonstrated that any text has mathematical structures but, what consequences have the existence of these structures? The possibility of establishing a theory of materialization of belief systems through constructed texts. This materialization would settle down through other mathematical structures such as nets between substantive beliefs and the own text. It constitutes the goal of the next works.

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This has been thus due to the complexity of the treated subject: a systemic vision (holistic vision) of the ideological systems of the human societies. For that reason the variety of the consulted bibliography does not have to be strange to the reader.

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ANEXO A: RESUMEN

En este apartado mostramos la estructura de presente trabajo y un resumen de los contenidos y objetivos de cada uno de los capítulos del mismo.

Previamente al desarrollo de los capítulos de esta Memoria, se ofrece una introducción al objeto de estudio, los *Sistemas Deónticos Impuros* (DIS) y las hipótesis en que se basa este estudio.

Los Sistemas Deónticos Impuros son *Sistemas* porque en ellos existen objetos y relaciones entre ellos. Son *Impuros* porque estos objetos son materiales y/o energéticos. Son *Deónticos* porque entre sus relaciones existe, al menos una que cumple, al menos, una de las modalidades deónticas: *obligación, permiso, prohibición, facultad y analogía*. Estaremos hablando, por lo tanto, de sociedades humanas. No de una sociedad en particular, sino de toda sociedad en cualquier lugar y tiempo histórico.

Las sociedades se fundamentan, cohesionan, desarrollan, degeneran e incluso desaparecen basándose en sus *sistemas de creencias*. Sin embargo, estas no tienen un fundamento racional. La especie *Homo sapiens sapiens* desarrolla estos sistemas de creencias que son un conjunto de creencias reforzadas por la cultura, teología, experiencia y desarrollo tal cómo el mundo funciona, sus valores culturales, estereotipos, puntos de vista políticos, etc.

Creencias cómo convicciones: creencias religiosas, pero también científicas, políticas, filosóficas y relativas a la esfera de la vida diaria. Si se recibe un estímulo, se puede interpretar con la ayuda efectiva de los sistemas de creencias, de la misma manera que los sistemas de creencias pueden conducir a la racionalidad. Un sistema de creencias no necesita tener ninguna base real aunque provee explicaciones adecuadas. Por lo tanto podríamos definir al ser humano como *Homo religiosus.*

Para el desarrollo de este trabajo hemos formulado diez hipótesis iniciales que vamos a exponer brevemente:

PRIMERA HIPÓTESIS: *Todo sistema de creencias es de naturaleza irracional. El proceso de elaboración del universo simbólico conduce a conclusiones excitantes en la búsqueda de la seguridad emocional del ser humano.*

SEGUNDA HIPÓTESIS: *El lenguaje articulado humano ha conducido a la creación y dominio de los conceptos que han determinado el pensamiento, las visiones del mundo y la cultura.*

TERCERA HIPÓTESIS: *Los símbolos se postulan como los ejes explicativos de la realidad universal en su globalidad y en estos caminos explicativos se construyeron los mitos, formando una superestructura de todo sistema de creencias e ideología.*

CUARTA HIPÓTESIS: *Todo sistema de creencias es de naturaleza numinoso-religiosa.*

QUINTA HIPÓTESIS: *Todo sistema de creencias tiene una estructura matemática topológica.*

SEXTA HIPÓTESIS: *Toda sociedad humana es un sistema multinivel con una estructura material (la propia sociedad), una superestructura ideológica (sistemas de creencias, valores, etc.) y una supersuperestructura con dos partes bien definidas: la mítica (origen y justificación) y la utópica (objetivo final).*

SÉPTIMA HIPÓTESIS: *Existe un mecanismo de imágenes denotativos y proyecciones connotativas entre estructura y superestructuras.*

OCTAVA HIPÓTESIS: *Todo sistema de creencial produce materializaciones sobre la estructura social. Las materializaciones son de dos clases:*

1) *Monostagicales o de materialización textual (Literatura, arquitectura, pintura, etc., y ciencia y tecnología).*
2) *Bistagicales o materializaciones deónticas con dos etapas: la primera de materialización institucional y la segunda que forma relaciones normativas (legislación, usos, costumbres, etc.).*

NOVENA HIPÓTESIS: *Los sistemas sociales son abiertos y conservativos.*

DECIMA HIPÓTESIS: *Fuertes estímulos sobre el sistema social producen respuestas no deseadas sobre el propio sistema, forzándolo a su adaptación, cambio total o su desaparición. Cualquier cambio importante del sistema comporta un cambio tanto en la superestructura ideológica como en el supersuperstructura mítico-utópica y debido a él, un cambio total de la visión del mundo de los individuos y de las materializaciones.*

En esta Memoria se desarrollará profundamente las hipótesis tercera, quinta, sexta, séptima, octava, novena y décima, desde el punto de vista lógico-matemático.

Nadie ignora que las matemáticas son un lenguaje, el más racional de los lenguajes utilizado por el ser humano, en donde las proposiciones y teoremas se deducen siguiendo reglas muy estrictas formuladas por principios racionales. Sin embargo, si los sistemas de creencias tiene estructura matemática, es decir, una estructura racional, las creencias no son racionales. Por ello, esta Memoria debería tener como subtítulo *La estructura racional de lo irracional.*

Se ha dividido el trabajo en catorce capítulos. La conexión que hacemos entre los resultados teóricos obtenidos y la realidad social no será de una forma exhaustiva, sino de manera que el lector pueda comprenderla a través de ejemplos tomados de la propia sociedad en diferentes periodos históricos, debido a que es la historia el único laboratorio donde el hombre puede experimentar.

A lo largo de este trabajo se presentarán gráficos ilustrativos de las propiedades estudiadas o de las hipótesis que se vayan formulando.

Pasaremos a reseñar lo fundamental del contenido de los diferentes capítulos de esta Memoria:

PRIMERA PARTE: ESTRUCTURA DEÓNTICA

CAPÍTULO 1: PERCEPCIONES Y CONJUNTOS IMPUROS

En este capítulo se exponen los conceptos fundamentales que se irán desarrollando a lo largo de esta Memoria:

a) Diferencia entre los sistemas estáticos (*teoría sincrónica*) y los sistemas dinámicos (*teoría diacrónica*)

b) Definición de las modalidades deónticas: obligación, *prohibición, permiso, facultad y analogía*, haciendo especial hincapié en las cuatro primeras.

c) Distinción entre *objetos* y *sujetos*.

d) Definiciones de *signo, significante* y *significancia*.

e) Definición de *Filtro Dóxico* y sus dos componentes: *lenguaje* y *sistemas de creencias*. Dentro del componente lenguaje se formula como esencial el *Principio de Incompletitud Semiótica*.

f) Definición de *Sistema* como *mental constructo* o interpretación semiótica de la realidad. Se formulan once hipótesis y diez axiomas.

g) Definición de *Creencia Perceptual*.

h) Definición de *ente absoluto* y *ente relativo*.

i) Definición de *Conjunto Impuro*.

CAPÍTULO SEGUNDO: ESTRUCTURA

Se comienza con la definición de *relación* cómo nexo causal entre los objetos del sistema. El concepto básico es el de *relación binaria.*

Siendo el sistema una construcción semiótica, se hace necesario introducir dos condiciones esenciales: la de *Creencia Onfálica* y la de *Creencia de Jano*.

Se define los conceptos de *simple sistema enlace impuro* y *variable*.

Se introducen los conceptos de *haz de relaciones, conjunto de tupletes de relaciones* y *espacio de haces.* Se formulan las propiedades inherentes a un haz de relaciones.

Se definen los conceptos de *relación dextrógira y levógira, relación recíproca, haz recíproco, relación dependiente e independiente, relación generada* y *composición de haces*.

Definición de *autopista* y sus direcciones. Definición de *composición de autopistas*.

Se introduce el concepto de *cadena*, que es básico en esta teoría.

Un concepto nuevo en la Teoría de Sistemas es el de *Conjunto Alysidal* que es el conjunto cuyos elementos son cadenas formadas por entes relativos unidas por autopistas de relaciones inferenciales y/o transacciones. Se formulan las propiedades inherentes a los Conjuntos Alysidales.

En éste capítulo se inicia un *Álgebra Alysidal*, con el *acoplamiento de conjuntos Alysidales*. Se distinguen dos funciones de *acoplamiento alysidal*: *función de acoplamiento de la Teoría de Haces* y *función de acoplamiento de la Teoría de Autopistas*.

Se define el concepto de *función gnorpsica* o función de acoplamiento entre dos conjuntos Alysidales.

Se definen los siguientes conceptos: *sistema impuro multirelacional simple, sistema impuro multirelacional complejo, sistema impuro multirelacional n-complejo.*

Se establece una unión con la Teoría del Medio Ambiente (Environ Theory) de Patten, estableciendo dos medios ambientes para el Sistema Impuro: *Medio Estímulo* **H'** y *Medio Respuesta* **H''**. Se introducen los conceptos de *haz estímulo, variable de entrada, haz respuesta* y *variable de salida*.

Se termina el capítulo con la definición de *función estructural* según la teoría formulada por Lloret et al. Se deducen tres teoremas relacionados con esta teoría.

CAPÍTULO 3: COMPONENTES FENOMENOLÓGICOS Y SEMIÓTICOS DE LAS RELACIONES

Se establecerán los siguientes componentes en las relaciones de un Sistema Impuro:

1) *Componentes fenomenológicos* que no dependen del sujeto.

2) *Componentes semióticos*, dependientes del sujeto y divididos en:

   a) *Componentes neutrosóficos*.

   b) *Componentes modales*.

Entre los componentes fenomenológicos destacaremos:

1) La *intensidad* de relación, haz, autopista y cadena.

2) *La energía de conexión* de relación, haz, autopista y cadena.

3) *Volumen del Sistema Impuro.*

Los neutrosóficos son los tratados primeramente dentro de los componentes semióticos. La Neutrosofía, creada y desarrollada por Smarandache et al., parte del principio de que entre una idea A y su opuesta Anti-A existe un espectro continuo de neutralidades Neut-A, y que una idea A es %verdadera T, %indeterminada I y % falsa F. Basándose en esta moderna teoría, se introducen componentes neutrosóficos en relaciones, haces, autopistas y cadenas.

En las componentes modales distinguiremos entre las modalidades *aléticas* y las *deónticas*. Debemos distinguir claramente que los primeros son ontológicos, independientes de la existencia del sujeto: *necesidad, posibilidad, imposibilidad y contingencia*. Se establecerán las oposiciones modales aléticas entre necesidad y contingencia y entre posibilidad e imposibilidad. Se establecen ocho propiedades respecto a las modalidades aléticas de las relaciones.

Las modalidades deónticas dependen de la existencia del sujeto. Son ontológicas en tanto que el sujeto lo es por su propia existencia, pero con el componente de la subjetividad. Son: *obligación, prohibición, permiso, facultad y analogía*. Éste capítulo tratará de las cuatro primeras, por su importancia en la estructura del sistema. Se formulan los *Principios de Permiso* y de *Distribución Deóntica.*

Se establecerá las relaciones entre lo alético y lo deóntico, recalcando un principio fundamental: *la posibilidad ontológica (alética) crea las modalidades deónticas.*

Una vez definidas los componentes fenomenológicos y semióticos, estaremos en condición de definir el concepto de *Sistema Deóntico Impuro (DIS)* como un sistema impuro cuyo conjunto multirelacional contiene haces y cadenas permitidas.

CAPÍTULO CUARTO: PERMISO Y PROHIBICIÓN

El capítulo cuarto lo consideraremos el más importante de la Memoria. Se empezará estableciendo las condiciones de una aproximación diacrónica del DIS con dos teorías alternativas: *reducida y ampliada*.

1) En la *teoría ampliada*, los dos medios ambientes **H'** y **H''** tienen una estructura sistémica, formada por conjuntos alysidales, siendo *estímulos los* haces saliendo de un elemento alysidal pertenecientes a un conjunto alysidal determinado existente en **H'**. Las *respuestas* son haces que salen de un elemento alysidal perteneciente al DIS y que incide en un elemento alysidal perteneciente a un conjunto alysidal existente en **H''**. Los *estados* están formados por elementos alysidales pertenecientes al DIS.

2) En la *teoría reducida* los *estímulos* son haces que vienen de **H'** a las que el sujeto no le concede ninguna estructura definida y que incide en un elemento alysidal perteneciente a DIS. Las *respuestas* salen de un elemento alysidal perteneciente a DIS e inciden en un **H''** no estructurado. Los *estados* están formados por elementos alysidales pertenecientes a DIS.

Establecidas las condiciones de estas dos teorías ampliaremos el concepto del DIS respecto a dichas teorías. Introduciremos el concepto de *conjunto interpuesto*, necesario para poder explicar la *causalidad* en los DIS. Una nueva concepción de *estado* se extrae a partir del concepto de conjunto interpuesto: *los estados son los lazos de conexión entre el pasado (historia), el presente y el futuro del DIS*. Se definirá el *espacio de estado* desde el punto de vista de las dos teorías alternativas.

El próximo paso seguido será la introducción conceptual de las *funciones gnórpsicas especiales*: *función gnorpsica inicial de respuesta* y se establecerán las condiciones de *causalidad*, *orientación*, *funcionalidad* y *determinación* de los DIS.

Se establecerán los operadores de "*siempre*" y de "*puede ser*". Se definen *la necesidad, no-necesidad, posibilidad e imposibilidad* de las repuestas del sistema.

Una condición necesaria y suficiente en la Teoría DIS es la *Condición de Permiso* que nos indica cuando los estímulos son permitidos por el sistema.

El conjunto de respuestas puede ser considerado como prohibidos o no permitidos por el sistema. Debido a la dificultad de asignar un valor real para la prohibición entre lo permitido y lo prohibido ha sido necesario establecer las siguientes definiciones: *posiblemente forzado, siempre forzado, posiblemente permitido, siempre permitido, posiblemente prohibido y, siempre prohibido.*

A partir de estas definiciones se establecen los siguientes subconjuntos de respuestas:

   a) *Respuestas forzadas y permitidas.*
   b) *Respuestas prohibidas.*
   c) *Posiblemente forzadas y permitidas.*
   d) *Posiblemente prohibidas.*

Se formulan treinta hipótesis deónticas.

Con estas premisas se formulan tres teoremas básicos:

El primer teorema demuestra cuando un DIS es consistente.

El segundo teorema demuestra cuando un DIS es completo.

Estos teoremas conducen al principal teorema de esta teoría: El Teorema de los Efectos No-Deseados (NWET) consecuencia del Teorema de Gödel, en el cual se demuestra la Incompletitud o la inconsistencia del DIS. Se exponen dos demostraciones alternativas del mismo Teorema NWET. Este teorema es básico. Explicaría la existencia de consecuencias sociales, políticas y económicas no deseadas por el sistema, pero también, con un desarrollo más amplio, la imposibilidad de alcanzar la "sociedad ideal" o Utopía.

SEGUNDA PARTE: ESTRUCTURA DÓXICA

CAPÍTULO CINCO: EL FILTRO DÓXICO: GENERALIZACIONES

El Capítulo Cinco es el más literario de toda la Memoria. Sin embargo, en él se exponen de una manera fácilmente comprensible, conceptos necesarios para poder desarrollar esta teoría. Con él empieza la segunda parte de esta Memoria, estando dedicados ls cuatro primeros a conceptos, aunque previos no menos importantes.

En la primera parte de este capítulo se establece la estructura del DIS formada por:

1) *Base Estructural* (SB): sociedad.

2) *Superestructura*. Dividida en dos:

   a) *Superestructura Dóxica (DS)* formada por los valores de hecho, ideologías políticas y religiosas, y cultura.

   b) *Superestructura Mítica (MS)* ala vez subdivida en dos:

      I) MS_1 conteniendo los componentes míticos o base primigenia de las ideologías y culturas y los valores ideales.

      II) MS_2 conteniendo los valores ideales y las utopías como objetivo ideal e inalcanzable de los sistemas de creencias pertenecientes a DS.

   Estando centrado el trabajo en el estudio de los sistemas de creencias, se obvian las relaciones económicas, sociales, etc. de la Base Estructural, centrándose el estudio en la Superestructura. Se revierte la teoría marxiana de que las relaciones económicas determinan la superestructura y se parte del principio que es la superestructura la que determina la deóntica de la Base Estructural.

En la Superestructura se hace hincapié entre la distinción entre los *valores de hecho* y los *valores ideales*.

A continuación y por su gran importancia en el pensamiento humano, se realiza un estudio de la Superestructura Mítica, definiendo el concepto de *mito*, haciendo una especial mención a la *dimensión mítica de Weinreb*.

Las *ideologías* constituirán la parte principal del capítulo, estableciendo las bases de los capítulos posteriores. Se dan definiciones de diferentes autores extraídas de la literatura especializada. A la vez se intenta establecer una tipología de ideologías, haciendo especial hincapié en la clasificación de Walford, que es la que más se acerca a nuestros propósitos. Se toma de Gramsci las ideas de *ideologías dominante y emergente*.

Otra parte del capítulo está dedicado a los *componentes y elementos de las ideologías*. A saber: *Valores, creencias sustantivas, orientación y lenguaje.* Por su importancia, tendremos especial interés en el segundo y cuarto componente.

Formularemos una nueva definición sistémica de ideología considerada como un sistema cuyo conjunto objeto tiene como elementos creencias sustantivas y cuyo conjunto relacional estará formado por las relaciones lógicas abstractas existentes entre dichas creencias substantivas.

Se definirán índices tales como: *grado de interrelación, relevancia empírica*, *buena voluntad, tolerancia* y *compromiso.* Estos índices comprendidos en el intervalo [0, 1] permitiría saber que tipo de ideología funciona en la sociedad o en un grupo social y su mayor o menor peligrosidad para el sistema social. Se pueden elaborar estos índice por métodos estadísticos a través de trabajo de campo (encuestas). Esto sería motivo de posteriores estudios.

La última parte del capítulo está dedicada al *compromiso*, estableciendo seis proposiciones al respecto.

CAPÍTULO SEIS: LA ESTRUCTURA SOCIAL

Se definen los conceptos de *sociedad humana, grupo social, clase social y estructura social* según las hipótesis de Bunge.

Se empieza con un estudio exhaustivo de la *Base Estructural (SB).* Para ello definiremos el concepto de *significancia denotativa* (*d-significancia)* de las relaciones deónticas pertenecientes a SB. Se introducen las *propiedades aléticas* (existencia, completitud, posibilidad y necesidad) y las *propiedades deónticas* (permiso, obligatoriedad y facultad) de las relaciones deónticas.

Pasaremos al estudio de la Superestructura Dóxica, definida como *Superestructura Dóxica Ideológica (IDS)* A partir de los *objetos de Meinong* se define la *significancia superstructural dóxica (IDS-significancia)* estableciendo sus *propiedades aléticas* y *deónticas*. Se define el concepto de *imagen dóxica superestructural (IDS-imagen)* la cual es la "explicación" (para el sujeto) de la Base Estructural. Se supone que el sujeto tiene un determinado lenguaje L que contiene *predicados denotativos (d-predicados)* y la existencia de *predicado dóxico estructural (IDS-predicado)* estableciéndose sus condiciones de veracidad. Se introduce el concepto de *significancia connotativa* definida como *proyección-SB-connotativa (c-proyección)* la cual "justifica" (para el sujeto) las acciones y/o materializaciones ejercidas sobre la Base Estructural. Se formulan dos teoremas estableciendo las relaciones existentes entre imágenes y proyecciones.

La *Superestructura Mítica (MS)* constituye la siguiente parte de éste capítulo. Se define la *significancia mítica superestructural (MS-significancia)* que son los significados en la mente del sujeto de los elementos ideales contenidos en a Superestructura Mítica. Se define la *proyección-IDS-denotativa (IDS-proyección)* Su totalidad en la Superestructura Dóxica forma un subsistema del sistema de creencias. Se define *imagen mítica superestructural (MS-imagen)*. La existencia de un lenguaje mítico permite la existencia de *predicados míticos estructurales (MS-predicado)*.

Con todos estos conceptos firmemente establecidos formularemos una teoría de *Segunda Aproximación*. Para ello será necesario definir *significancia mítica de base primigenia superestructural (PBMS-significancia)* y *significancia mítica de estructura ideal superestructural (IstMS-significancia)*. A partir de la primera de define la *imagen inversa MS (PB-imagen)* o "ajustes" en las ideologías y sistemas de creencias y a partir de la segunda la *proyección inversa MS (IDS-proyección)* o concreciones de la *ideología abstracta* a *la ideología concreta o aplicada*. Las diferencias entre ambas constituyen la última parte de éste capítulo. La teoría de las relaciones entre ambas se realiza por medio de la teoría del Álgebra Alysidal expuesta en el capítulo dos.

CAPÍTULO SIETE: EL SISTEMA DOGMÁTICO

Se empieza el capítulo definiendo *asociación* cómo la estructura social que transmite y aplica una ideología, dividiéndola en dos partes: *culto* como asociación cuya razón de ser es el desarrollo y perpetuación de la ideología y *concern* a asociación en la cual la ideología es un medio más que un fin.

Se establece que toda ideología tiene un *dogma* asociado. Todo sistema social poseyendo un dogma se le denomina *Sistema Dogmático H*. Se establecen las condiciones de un Sistema Dogmático para poder formular una teoría de *Tercera Aproximación*.

La teoría de Tercera Aproximación está basada en la Environ Theory de Patten. Se considera como sistema al Sistema Dogmático H y dos medios ambientes **H'** y **H''**. Los *estímulos semióticos* son IDS-imágenes que salen del medio ambiente estímulo **H'** o SB inicial. Las respuestas semióticas son SB-proyecciones que inciden en el medio ambiente respuesta **H''** o SB-posterior. Se definen *estado de H* y la *función de proyecciones iniciales SB de categorías ideológicas*. Se establecen las condiciones de *causalidad, orientación ideológica* y *funcionalidad* del Sistema Dogmático. Se definen los conceptos de *creaón ideológico* y de *genón ideológico*.

Toda esta parte de la teoría sigue paso a paso la teoría matemática del Profesor Patten. Sin embargo, el significado de los estímulos y de las respuestas dejan de ser materiales y se convierten en abstracta (creencias).

A partir de la Definición 7.24 se introducen novedades en esta teoría. Se define el *umbral de resistencia ideológica* y una *condición de permiso de los estímulos ideológicos* incidentes sobre el Sistema Dogmático H.

La próxima etapa es la definición y desarrollo matemático de los *procesos ideológicos*. La base teórica es la teoría de procesos en ecosistemas desarrollada por Lloret et al. y por Usó-Doménech et al. Se definen el *proceso de respuesta ideológico, proceso de transición ideológica, proceso interno de transición ideológica, proceso interno de respuesta ideológica* y *espacio de procesos ideológicos*.

La teoría de *las funciones de transformación ideológica* son consecuencia de la teoría de Lloret et al., Patten et al. y Usó-Doménech et al. aplicada a ecosistemas. Distinguiremos las siguientes:

1) *Transformación ideológica IDS-imagen Creaón ideológico.*

2) *Transformación ideológica Creaón ideológico Genón ideológico.*

3) *Transformación ideológica Genón ideológico SB-proyección.*

Se define *variable interna* (abstracta o material) del Sistema Dogmático H.

Se definen las siguientes funciones:

1) *Función Sistema Dogmático IDS-imagen SB-proyección.*

2) *Transformación ideológica IDS-imagen SB-proyección asociada con un proceso ideológico.*

El *Teorema 7.1* establece la relación existente entre la función estructura función y la función IDS-imagen SB-proyección asociada con un proceso ideológico.

Acabaremos el capítulo con una propuesta de inicio de estudio de las *funciones ideológicas probabilística*.

CAPÍTULO 8: VALIDACIÓN DE LOS SISTEMAS DE CREENCIAS

Se introduce el Principio Cíclico de Validación: *una idea es válida si pasa el criterio de validación*. Se establecen las tres condiciones de validación. Formulamos el Principio Principal de Validación: *El poder de una ideología depende de su capacidad para autovalidarse frente a la razón de la duda.* Formularemos la definición de *validación consensual* y las condiciones de ésta.

La segunda parte del capítulo está dedicada a la aproximación lógico-matemática de la validación. Se parte de conceptos neutrosóficos formulándose tres axiomas y cuatro teoremas de validación.

Con respecto a la validación y la relevancia empírica se formulan seis proposiciones no demostradas.

CAPÍTULO 9: VISIÓN SEMIÓTICA DE LAS IDEOLOGÍAS

Se definen *visión del mundo (WV), Consciencia Colectiva Generalizada (GCC), Consciencia Colectiva Particularizada (PCC)* y *Consciencia Individual (IC)*, estableciéndose las relaciones entre ellas. Se establece una definición de *cultura* y su relación con la Visión del Mundo y las *unidades culturales (u)*.

Es básico en la teoría aquí expuesta la distinción entre *denotación* y *connotación*. Para ello definiremos previamente *significante, campo semántico* y *significancia (s)* como la información subjetiva. La significancia s se considera unidad de experiencia percibida *(p-significancia)*. La significancia s es una unidad cultural. Se define *denotación* como la significancia de un signo en una determinada cultura. Se define *denotatum de un lexema*. La se define como la suma de todas las unidades culturales que puede evocar institucionalmente la mente del sujeto. Se definen *A-significante* o significante de primer orden y *B-significante* o significante de segundo orden como el significante de la significancia. Es esencial el concepto de *significancia denotativa (d-s)* como la significancia de los entes absolutos. Se establece un *sistema sintáctico de unidades significantes* con la formación de *cadenas connotativas*.

La cuarta parte de éste capítulo está dedicada a una semiótica de las ideologías, estudiando *los factores del mensaje*, entre el que destacamos la *circunstancia*. A partir de la definición de *statement* (concepto o sentencia) y de circunstancia estableceremos los posibles *sentidos del statement*. Se distinguirá entre *juicio semiótico* y *juicio factual*. Se formula que una ideología es una conceptualización o materialización de una visión del mundo.

La quinta y última parte del capítulo está dedicada a *la transmisión de las ideologías*. Para ello volveremos a la teoría de imágenes y proyecciones formulada anteriormente. Acaba el capítulo con un caso ecológico.

CAPÍTULO 10: EL DISCURSO IDEOLÓGICO

Se empieza el capítulo desarrollando la idea de *unidad cultural* perteneciente a una determinada cultura a toda organización que se distingue y se define culturalmente. Semióticamente una unidad cultural es una unidad semántica insertada en el Sistema Semántico Global. Se definen las operaciones de *equivalencia semántica* y de *inclusión semántica*.

Tomaremos la definición de Peirce para el *interpretante* de un objeto como otra representación que habla del mismo objeto. Series de explicaciones semánticas se definen como *cadenas de interpretantes* conectando las unidades culturales de una sociedad y que se pronuncian en forma de significancias denotativas. La hipótesis 10.1 es de suma importancia debido a que formula que cualquier lenguaje L es autoexplicatorio. Se formulan para el interpretante las propiedades de *reflexividad, simetría* y *transitividad*.

La segunda parte del capítulo está dedicada a los *modelos semánticos de connotación*. Para ello se formulan tres hipótesis que pueden ser complementarias: *el modelo de Quillian o de semiosis limitada, el modelo de Eco o de longitud de onda* y *el modelo del estado sopa*. Éste último está basado en la Teoría de la Información.

La tercera parte del capítulo está dedicado a la *transmisión persuasiva*. El mecanismo de transmisión es la *Retórica* definida como:

1) Una técnica generativa o mecanismos argumentales permitiendo la generación de argumentos persuasivos basados en la dialéctica existente entre la información y la redundancia.

2) Un depósito de técnicas argumentales verificadas y asimiladas por el cuerpo social pertenecientes a la Base Estructural.

Definiremos las figuras más importantes de la retórica: *metonimia, metáfora, parábola* y *analogía*. Basaremos la teoría matemática en las connotaciones (unidades culturales).

a) En la *metonimia* se formulan las propiedades de *reflexividad, simetría* y *transitividad.* Se define la operación de *sustitución metonímica* con las propiedades conmutativa y asociativa y la inexistencia de elemento neutro. Se define asimismo la operación de *sustitución metonímica doble* y de *sustitución metonímica múltiple*. Se formulan cuatro teoremas.

b) En la *metáfora* con las propiedades reflexiva, antisimétrica y transitiva. Se define la operación de *sustitución metafórica.* Distinguiremos entre las *metáforas simples* con *sustituciones de antonimia primaria,*

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> *secundaria y múltiple* y *metáfora mediata.* Se demuestra la no-conmutatividad y se define la operación de *sustitución metafórica múltiple.*
>
> c) La *parábola* con las propiedades reflexiva, antisimétrica y transitiva. La relación parabólica es una relación de orden.

La *analogía* se puede considerar cómo una figura retórica pero también cómo una modalidad deóntica. Se define el *Principio de Identificación Suficiente*. Se establece la relación entre metáfora y analogía formulándose dos teoremas.

Acaba el capítulo con la relación existente entre Retórica e Ideología definiéndose esta última como una unidad cultural que utiliza fórmulas retóricas como unidad significante.

PARTE TERCERA: MATERIALIZACIÓN

CAPÍTULO 11: EL NIVEL ABSTRACTO DE LOS SISTEMAS DE CREENCIAS

Empezamos estableciendo la diferencia entre *creencias sustantivas* y *creencias derivadas*. Los primeros formarán los *axiomas del sistema de creencias.*

La primera parte del capítulo establecemos las características del conjunto de *creencias sustantivas S*. Se definen características de éste conjunto tales como *conjunto abierto* y *vecindad de un elemento creencia sustantiva.* Se define la operación de *conjunción semántica* y se deduce que el par S, conjunción semántica tiene una estructura de *grupo abeliano.*

A continuación se establecen *las características modales de S*. Para ello se supone la existencia de un *lenguaje* L y de un *conjunto de dimensiones míticas*. Se definen las condiciones de veracidad para las características modales de necesidad y posibilidad de una creencia sustantiva. Se define *sistema de creencias* en función de las dimensiones míticas. Se define el *operador de veracidad* para una creencia sustantiva en un sistema de creencias determinado. Se formulan nueve axiomas y se deducen tres teoremas. Teorema 11.2 se define como *Principio de Distributividad* y Teorema 11.3 como *Principio de Necesitación*.

La *operación de sincretismo* es definida a continuación. Ésta operación se define como una combinación simultánea de unión e intersección de conjuntos de creencias sustantivas. Se definen las propiedades de la operación de sincretismo: *Idempotencia, conmutatividad, asociatividad* y *elemento idéntico*.

La quinta parte del capítulo está dedicada a estudiar las estructuras matemáticas que se pueden deducir a partir del conjunto S. Estas son las siguientes:

a) *El poset creencia.*

b) *El join-semilattttice término creencia.*

c) *El lattice completo término creencia.*

d) *Uniformidad de creencia.* Se formulan cuatro axiomas.

En todas estas estructuras se formulan las definiciones que caracterizan sus propiedades estructurales.

La parte sexta de este capítulo está dedicada a la estructura de *espacio métrico de creencias.* Se define el concepto de *distancia de creencia* y se establece la condición de que dicha distancia depende del creyente. Las condiciones de S con la distancia de creencia son: *no negatividad, identidad de indiscernibles, simetría* e *inigualdad triangular.* Por lo tanto, el par S, distancia de creencia es un espacio métrico Σ. Se definen los conceptos de *bola cerrada y bola abierta* y se establece la condición de la apertura o cerrazón de bola depende del creyente. Se define S' como subconjunto del espacio métrico de creencias Σ y se establece que S' es un conjunto totalmente limitado. Se define el término s (creencia sustantiva) cómo *término de clausura de S'.* Se deduce que Σ es *paracompacto* debido al Teorema de Stone. Asimismo se define el *espacio pseudométrico de creencias* cómo métrica del sujeto no creyente.

La parte undécima y última del capítulo está dedicado al *espacio topológico de creencias.* Dicho espacio topológico **es un espacio ideal abstracto no material formado en la mente del sujeto creyente**. Se comprueba que dicho espacio topológico cumple los *axiomas de clausura de Kuratowski.* Se define *subespacio topológico de creencias, topología fina de creencias, topología estrictamente fina de topología* y *término creencia sustantiva adherente.*

CAPÍTULO 12: ESTRUCTURAS DE MATERIALIZACIÓN

Definimos *materialización* a la conversión por medio de determinadas correspondencias matemáticas existentes entre un conjunto abstracto cuyos elementos son creencias y otro conjunto impuro cuyos elementos son materiales y/o energéticos. Estableceremos las siguientes hipótesis:

Hipótesis 12.1: Los sistemas de creencias no son producto del pensamiento racional.

Hipótesis 12.2: En el origen de cualquier sistema de creencias hay siempre un sistema de creencias numinoso-religioso.

Hipótesis 12.3: Las creencias derivadas D se transforman con el paso del tiempo en creencias sustantivas S, dando origen a un más o menos amplio cuerpo de creencias sustantivas, es decir, una *religión o una ideología.*

Hipótesis 12.4: Al pertenecer a la Superestructura Ideológica Dóxica (IDS) el conjunto S de creencias sustantivas será "ideal", es decir, meramente abstracto.

Hipótesis 12.5: Los conjuntos S y D forman un texto que tiene una estructura topológica, la cual representa la manera en que se organiza el contenido semántico del sujeto, perteneciente a su sistema de creencias que existe en su estructura cognitiva y a través de la subsunción, diferenciación e integración.

Cuando hablamos de *texto*, nos estamos refiriendo a cualquier manifestación material: escritura, arquitectura, arte, ciencia, tecnología, urbanismo, etc. Se definen conceptos tales como *contenido y forma de una materialización.*

La parte cuarta de este capítulo está dedicada a *las estructuras de materialización* distinguiendo entre la *Estructura Estructurante (SS)* y la *Estructura Estructurada (sS).* La Estructura Estructurante SS de un texto T es la causa interna por medio de la cual los diferentes elementos de T están estructurados o aglutinados. La Estructura Estructurada (sS) es la materialización en la Base Estructural SB de la Estructura Estructurante (SS). Ahora estaremos en condiciones de formular la parte quinta: *La Estructura Estructurante Topológica.* Como condición previa se formula la

Hipótesis 12.6: Al pertenecer SS a SB, será material, es decir "visual" tanto para el sujeto creyente como para el no creyente.

SS será un espacio euclídeo tridimensional R^3. Se redefine SS como un subtexto formado por subtextos connotando las ideas o tesis básicas denotadas por el sujeto autor. SS será un subconjunto del espacio R^3. Se define *punto de clausura* y *punto de acumulación.* Se definen *cover estructurante* y *refinamiento estructurante.* El Teorema 12.1 demuestra que SS es un espacio compacto. SS forma asimismo un *espacio textual topológico.* La proposición 12.1 demuestra que SS es un espacio de Kolmogorov T_0. La proposición 12.2 demuestra que SS es un espacio simétrico R_0. La proposición 12.3. demuestra que SS es un espacio de Frechet T_1. La proposición 12.4. demuestra que SS es un espacio prerregular R_1. La proposición 12.5. demuestra que SS es un espacio de Hausdorff T_2. Se define SS' como subespacio de SS. El Teorema 12.2 demuestra que

SS' es un espacio de Hausdorff. Teoremas 12.4. y 12.5. demuestran propiedades topológicas de SS'.

La parte sexta de este capítulo está dedicado a *las estructuras de materialización ideológica.* Formularemos las siguientes hipótesis:

1) *La categoría creencia.*

2) *El net ideológico.*

3) *La segunda función continua de materialización.*

Se termina el capítulo haciendo una breve disquisición entre las relaciones existentes entre *la topología, la semántica y la psicología.* Se formula el concepto de *mapa conceptual.* Se formula la:

Hipótesis 12.7: Cambios en la estructura semántica de un mapa conceptual genera cambios en la estructura topológica.

CAPÍTULO 13: MATERIALIZACIÓN TEXTUAL

Un Texto T es un modelo de la realidad representado por medio de símbolos. Se propone una *teoría textual* como parte de una *Teoría de la estructura de la Base Estructural (SBST).* Se establece una *teoría de texto (TT) como parte de SBST.* Esta teoría incluye una *gramática textual (TG).*

La segunda parte de este capítulo está dedicada a *la mediación, función e interpretación del texto.* Se establece la diferencia entre autor y "lector" o beneficiario del texto y se establecen las condiciones de transmisión del mensaje según la Teoría de la Información. Se define la *significancia connotativa de T* que siempre actúa en el nivel sincrónico. *La función de T* actuará siempre en el nivel diacrónico. En la *interpretación de T* se introduce una teoría matemática basada en la significancia connotativa de cada subtexto de T. Cada lector individual poseerá una significancia connotativa diferente. De ello se deduce la Propiedad 13.1: La significancia connotativa total de T será la totalización de todos los sentidos posibles interpretativos de T. Se define *mediación* y se formula la evolución diacrónica de T.

La tercera parte del capítulo está dedicada a las *estructuras textuales*:

a) *El espacio métrico textual.*

b) *La Topología textual (TP).*

CAPÍTULO 14: CONCLUSIONES

Se establecen las siguientes conclusiones:

1) 1) Definición del concepto *conjunto s-impuro* o conjunto de creencias perceptuales o significancias denotativas (*ente relativos*) de los objetos reales materiales y/o energéticos (*entes absolutos)*. Esto es una aproximación importante a los *Sistemas Deónticos.* El Sujeto S no sólo percibe l0s objetos O como p-significancias sino que también percibe las relaciones existentes entre ellos, o en su caso, él los infiere.

2) Nuevos conceptos tales como *conjunto alysidal* y *función gnorpsica*. Concepto de *Sistema Deóntico Impuro (DIS)* que tal como expone la teoría es un conjunto alysidal formado por un solo elemento.

3) DIS define su medioambiente. Podemos suponer éste formado por diferentes DIS, e decir, por un conjunto alysidal cuyos elementos son simultáneamente sistemas, pero que *no interesan* al propio DIS salvo para determinados intercambios. Estos intercambios específicos (estímulo-respuestas) salen de ciertos nodos y actúan sobre ciertos nodos de los conjuntos alysidales (medioambiente estímulo-DIS-medioambiente respuesta). Por esta razón se ha introducido una función espaciadle acoplamiento llamada función gnorpsica. Además, esta función puede utilizarse para operaciones algebraicas entre los conjuntos alysidales. Su aplicación a la teoría DIS puede utilizarse para explicar fenómenos absorciones, cooperaciones, confrontaciones y desaparición de diferentes sociedades, culturas e imperios.

4) DIS tiene las siguientes propiedades:

   a) Son objetivamente diacrónicos, es decir, nacen, evolucionan y mueren durante un periodo Newtoniano $[t_0, t]$.

   b) Son subjetivamente diacrónicos, es decir, existe un tiempo subjetivo propio del sistema $[t_0, t]_S$ y al que $[t_0, t] \subset [t_0, t]_S$.

   c) DIS son sistemas abiertos, es decir, existen dos medioambientes, estímulo **H'** y respuesta **H''**.

   d) Ambos medioambientes son también sistemas, pero para los sujetos pertenecientes al DIS ignoran esta estructura, por lo cual es razonable considerarlos como conjuntos alysidales.

   e) Existen interacciones entre DIS y sus medioambientes. Estas interacciones serán transacciones y relaciones inferenciales. Las

transacciones son necesarias, distinguiéndose entre transacciones ontologicamente necesarias y transacciones deonticamente necesarias.

f) Algunas de estas transacciones son contingentes. Entonces, tienen lugar fenómenos de interacciones fortuitas de consecuencias imprevisibles y muchas veces no deseadas.

5) Entre otras herramientas conceptuales, se ha utilizado la lógica modal (*alética y deóntica*), la *Neutrosofía* y la lógica epistemológica (*creencias*). Se exponen las siguientes consideraciones:

a) El permiso (o la obligación) de una respuesta depende de las relaciones entre los objetos, el estado y el conocimiento sobre dicho estado.

b) El valor de cierta respuesta depende, no sólo de dicha respuesta y del significado de lo permitido, sino también del momento en que se epresa dicha respuesta. La respuesta puede ser hoy permitida, pero eso no significa que sea siempre aceptada.

c) No es siempre necesario que un sujeto S sea capaz de dilucidar si una respuesta está permitida o prohibida con relación a cierto estado del sistema. La formalización del DIS por medio de un lenguaje lógico demanda que éste sea lo suficiente para reflejar todas las sutilezas de la realidad. En otras palabras, estos lenguajes lógicos deberían ser capaces de reflejar todas las funciones extra-referenciales del sistema.

6) Una teoría semiótica de los sistemas derivada de la teoría lingüística debería tener como principal propósito todos los sistemas de expresión lingüística: filosofía, ideología, mito, poesía, arte, lo mismo que los sueños, lapsus, etc., por medio de una asociación libre colocada en una matriz pluridimensional donde interfieran muy diversos campos de conocimiento. En cada uno de dichos discursos es necesario, en efecto, considerar una pluralidad de cuestiones, cuya esencia únicamente será comprensible por la suma de todo. Entonces será necesario el preguntarse cual será el propósito de dicho lenguaje, que función cumple, la razón por la cual deberá ser construido.

7) Toda solución al problema de la *Superestructura Dóxica Ideológica* (IDS) depende de su constitución, debido a que permite diferenciar los discursos diversos que el ser humano, como actor sujeto, mantiene basándose en criterios exclusivos que definen, de una parte, cada tipo de lenguaje, y por otra parte, aísla "los lugares" donde contacta con las otras esferas de la realidad.

8) Los valores ideales, los mitos pertenecen a la *Superestructura Mítica*. Sus proyecciones conforman, con las imágenes procedentes de la *Base Estructural (SB)*, la ideología dominante y los valores de hecho de IDS, y esto se proyecta sobre la SB en forma de acciones y conductas, es decir, materializaciones, y a la vez se reflejan en MS como utopía, que es el ultimo objetivo de cualquier ideología.

9) Existe en el mito muchos elementos utópicos y en la utopía mucho del mito. No en el sentido del mundo fantástico de la fábula, sino del *capital simbólico* de los valores sociales ideales, concebidos pura y simplemente como aquellos que mantienen la cohesión del grupo humano que los sustentan. La *descapitalización simbólica* es equivalente a la *desmoralización*, diseminación o desintegración del grupo social.

10) No se puede negar que la subestructura tecnológica está colocada en el centro de los DIS más complejos y está profundamente relacionada con la ideología dominante, con sus valores de hecho y está profundamente interrelacionada con las subestructuras económicas y con la estructura normativa (deóntica).

11) En esta trabajo se ha tratado de formular una aproximación lógica y matemática a uno de los grandes problemas y condicionantes de la humanidad: *los sistemas de creencias*, muchos de ellos ideológicos, su transmisión y su materialización. El problema principal no es como las ideas son condicionadas socialmente sino los humanos se unen a ellos y como estas funciones de unión se transforman en organización social. Al hablar de creencia se puede pensar en sistemas de pensamiento religiosos, sin embargo, las creencias es un proceso social general, y no es correcto el restringir el estudio de las creencias a las instituciones religiosas. Porque las creencias no son solamente religiosas, sino políticas, filosóficas, populares, e incluso científicas. Pensamos que este trabajo es una teoría sistémica de la creencia, no una teoría psicológica, social o fenomenológica de las creencias. Como excepción, mantenemos una mínima referencia puramente sociológica. Entonces, más que enfocar el trabajo en el creyente y en la estructura social que soporta la creencia, se ha enfocado en la transmisión de la creencia y su relación con la organización social.

12) Por otro lado se ha formulado una Teoría del Medioambiente Social, la cual supone una concepción sistémica de la realidad social por parte del observador. El objeto social recibe y crea dos medioambientes, un medioambiente estímulo

H' (Base estructural inicial) y un medioambiente respuesta **H''** (Base estructural final). Los estímulos, transiciones y repuestas son procesos sociales y físicos reflejados en la mente del sujeto como proyecciones e imágenes ideológicas. Existe probabilidad en muchos procesos sociales y físicos. Al mismo tiempo, todas las variables son variables lingüísticas propias de lenguajes naturales o simbólicas. Las funciones estímulo-respuesta y estado-respuesta de los procesos ideológicos son similares a las funciones de creencia. Esta interpretación de la Teoría Del Medioambiente Social abre perspectivas matemáticas y epistemológicas apasionantes para la investigación social e incluso histórica.

13) Hemos tratado de demostrar y creemos hemos demostrado que las creencias conectadas tienen una estructura matemática topológica. Este resultado, que podría ser interpretado como la disquisición académica de una teoría abstracta, tiene, sin embargo aplicaciones prácticas.

14) En las transmisiones ideológicas llegamos a las siguientes conclusiones:

   a) Los tropos están codificados estrictamente y cada mensaje no hace más que repetir aquello que el auditor ya sabe y espera.
   b) Las premisas se aceptan sin discusión en la mayoría de los casos, sin embargo pueden ser falsas y en adición, no están definidas o no resisten un examen crítico.
   c) No existe argumentación sino que es emblemática. Los procesos argumentales son recibidos como signos convencionales basados en procesos muy estrictos de codificación.
   d) Es necesario estudiar más profundamente la cuestión del papel que juega en la transmisión ideológica la argumentación persuasiva y otros factores extrasemióticos que escapan al análisis semiótico.

15) Proponemos la siguiente cuestión, motivo de estudios profundos multidisciplinarios: ¿Una ideología se desea porque el mensaje nos persuade? O ¿nos persuade porque la hemos deseado previamente? El hecho de ser convencidos con argumentos bien conocidos nos inclina a decantarnos por la segunda hipótesis. Si ello es cierto, nos forzaría a la revisión de mucos periodos históricos en donde el cambio ideológico fue trascendental.

16) Creemos haber demostrado que todo texto tiene un estructura matemática, pero ¿qué consecuencias tiene la existencia de estas estructuras? La posibilidad de

establecer una teoría de la materialización de los sistemas de creencia a través de los textos construidos. Esta materialización se realizaría a través de otras estructuras matemáticas tales como nets entre las creencias sustantivas, las derivadas y el propio texto. Un desarrollo más profundo de esta cuestión es objetivo de próximos trabajos.

Reunido el Tribunal que suscribe en el día de la fecha acordó otorgar, por

_____

a la Tesis Doctoral de Don/Dña. _____ la

calificación de _____.

Alicante _____ de _____ de _____.

El Secretario,   El Presidente,

UNIVERSIDAD DE ALICANTE
CEDIP

La presente Tesis de D. _____ ha sido

registrada con el nº _____ del registro de entrada correspondiente.

Alicante ____ de _____ de _____

El Encargado del Registro,