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The Principle of the Topical Localization
of Symbols and the Meaning of the
'Ultimate Meaning': A Contribution from
the Human Behavioral and Social Sciences

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1. INTRODUCTION

There is a well-established tradition in structural semiotics to stress two levels of meaning: a *surface level* and a *deep-structural level*. At the *surface level*, semanticisms are dealt with in terms of distinct 'meanings'. The latter may show affinities with each other and combine into larger semantic constructions, but they are basically handled as separate units which can be considered in isolation from each other. For instance, the meanings of 'believing' and 'knowing' appear at the surface level as two distinct contents that are available to the thinking and communicating subject in the way building-stones are available to the mason.

Although surface-level models of meaning can be useful – e.g., in lexicography – they do not satisfy the scientifically oriented semioticist who aspires for a universal theory on the fundamental design features of meaning. This aspiration has led semioticists to stress a deep-structural level of meaning which underlies the surface level. The present paper focuses on this semantic deep structure.

2. THE DEEP STRUCTURE OF MEANING

At the *deep-structural level*, semanticisms are dealt with as dynamic fields rather than as conglomerates of pre-established semantic building–stones. In the semiotic theory of Greimas (1970, 1983; Greimas and Courtés, 1982) these fields are articulated in elementary structures which unfold binary oppositions. The dynamic aspect is defined by elementary syntagmatic and paradigmatic (or taxonomic) axes. For instance, the apparently discrete meanings of the terms 'believing' and 'knowing' are related to a single underlying field of signification of which the two terms form a binary opposition which unfolds into the following scheme:
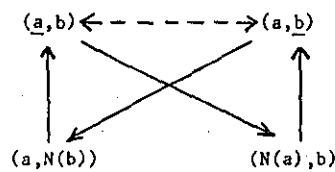

FIGURE 1   The Semiotic Square.

2.1 /believing/ → /not-believing/ → /knowing/
The basic units of the scheme, which are the primitives of Greimas's theory, are not terms like believing, not-believing, etc., but relations which correspond to the arrows between the terms. The use of diagrams with arrows between terms, however, may be misleading because it suggests that the terms and the relations constitute distinct semantic units that are combined a posteriori like substantives and verbs in sentences. This is the way meanings may be organized at the surface level. At the deep-structural level, however, relations are not 'between' pre-established terms, but the meanings of the terms derive from the relations, terms being conceived, in agreement with Hjelmslev (1968) as intersections of relations. In the above example, the first arrow represents a relation of *contradiction* which, however, is primarily not a logical contradiction. Indeed the negative term 'not-believing' is not to be regarded as a logical negation but as a more elementary Hegelian dialectic opposition referred to as *denegation* (Nef, 1976). Logical negation may be only one of many realisations of denegation which includes also notions like absence, disregard, distancing, etc. The second arrow represents a relation of *complementarity* specified as *'implication of Greimas'*. It is not a logical but rather 'psychological' or 'cognitive' implication making that 'not-believing' involves the assertion of 'knowing'. In order to be complete, still a third relation should be mentioned. It derives from the two previous ones and may be represented by an arrow from knowing to believing indicating that the term 'knowing' presupposes the term 'believing'. An important point is that the taxonomy of 'believing' and 'knowing' is determined by syntagmatics. Indeed, the relations, represented by the arrows, constitute a syntagmatic trajectory which makes, for instance, that the assertion of 'knowing' is syntagmatically preceded by the denegation of 'believing'.

The above scheme of contradiction/denegation and complementarity/implication can be completed by an analogous schema starting from 'knowing':

2.2 /knowing/ → /not-knowing/ → /believing/
The combined schemes 1 and 2 form a circular trajectory that, according to Greimas and his school, constitutes the basic unit of meaning-structure referred to as the *semiotic square*. It is represented in fig. 1 using a symbolisation which is not the most common one but which was selected in view of the topologisation presented in subsequent sections. The symbols a and b are connected with two semantic terms which, at the surface level, may appear as two distinct meanings such as 'believing' and 'knowing' handled independent of each other. However, at the deep-structural level represented in fig. 1, both terms are mutually presupposing each other. This

mutual presupposition is indicated by the bidirectional dotted arrow. Full arrows indicate the circular syntagmatic trajectory underlying the mutual presupposition. Diagonal and vertical arrows represent respectively *denegations* and *implications of Greimas*. When one term presupposes another, then both terms are present, but the presupposing term is *accentuated* and the presupposed one not. This is indicated by underlining the accentuated term. E.g.: (a, b) indicates that a is accentuated and b is not. If a refers to 'believing' and b to 'knowing', then (a,b) indicates that 'believing' is accentuated and 'knowing' presupposed. N(a) and N(b) represent respectively the denegation of a and b. When proceeding from (a,b), *a* is denegated, then the non-accentuated b is left, resulting in the term (N(a),b). Thus the four terms involved are all defined referring to a and b whereby a and b can be either accentuated, or non-accentuated, or denegated.

The search for schemes at the deep level meets quite some difficulties. One major obstacle is created by the way our cognitive apparatus functions. At least in Western culture, the mind shows an amazing propensity to transform the syntagmatic axis into the paradigmatic axis which is subsequently conceived at a logical level concealing the original semiotic nature of the terms involved. Actually as soon as some taxonomy is established, it is caught in the network of logical operations. In this way, denegations such as the one mediating between believing and knowing in the above example, are transformed into logical negations in agreement with propositional logics.

A possible way out was suggested by Petitot (1977) who proposed the construction of a metalanguage dealing with relations and sequences of relations in topological terms. However, a main difficulty in the mathematisation of any theory is the finding of an anchorage to hold on. For example in classical mechanics the mathematics developed by Newton starts from the three fundamental laws. In this way, failures in, for instance, the application of 'catastrophe theory' to various areas in human sciences may almost certainly be attributed to the lack of well-determined structural primitives from which predictions can be derived using purely formal operations. Indeed, the lack of a starting point comparable with the laws of Newton may turn the topological models into mere pictorial substitutions for the fundamental structures. Similar pictorial approaches are very seductive and were observed to infiltrate attempts of formalisation (Guckenheimer, 1978; Sussmann & Zahler 1978). It may be evident that the present objection applies a fortiori to possible applications of topological theories to fundamental philosophical problems. Hence we agree with C.P. Poole (1984) and T.L. Gilbert (quoted by the journal editor in a prefatory note to Poole's article, same issue pp. 250–251) who argued by the same rationale that catastrophe theory may be an elegant descriptive tool but without deep significance of ultimate reality and meaning.

Thus in order to have more than a descriptive instrument, an anchorage is required, and according to Petitot (1977, 1985) a similar anchorage may be found in the principle of the topological localisation of symbols. This principle, which may have biological roots in the idea that thinking has evolved from locomotion, stresses the topological notions of *localisation* and *colocalisation* as semiotic primitives. Proceed-

ing from this principle, a topological theory of the structure of meaning at the deep level has been developed (Dhooghe, 1988). The unfolding of the topological structure was guided by the stability assumption similar to those determined in mathematical singularity theory (Bruter 1974, 1976; Thom 1974, 1975).

In the subsequent sections we shall present a rather rough outline of this topological theory. Thereby we shall not enter into details of the mathematical analysis but focus on some outcomes and their application in philosophy. It may be worthwhile to consider that even if the present theory would lack any mathematical foundation, still it might be used as one of those intuitive theories of which the validity may be questionable but which have at least heuristic value.

3. TOPOLOGY OF ELEMENTARY SEMIOTIC SCHEMES

The formal construction of the elementary structure of signification starts off with two formal symbols (a and b), both situated on a formal axis S which expresses that both symbols are considered within the same context and in relation to each other. In order to enable the topologisation of the location of a and b, the axis S is identified with the set of real numbers. This implies a topology and a well defined differentiable structure on S. In agreement with Petitot (1977), a topological inscription of the formal symbols is obtained by means of real valued smooth functions on S. A symbol (e.g., a) is called 'present (respectively absent) in the inscription' or simply 'present' (respectively 'absent') if the located symbol is identified with a minimum (respectively the absence of a minimum) of the inscription function. This inscription of a located symbol in a minium or in the absence of a minimum is called the *localisation* of the symbol or of its absence. Given two symbols, a and b, we have the following possibilities:

1. Each symbol may be *absent* or *present* in the topological inscription (depending on whether the minimum the symbol is identified with is absent or present).

2. If both symbols are present, and one of them is localised by means of the absolute minimum, then this symbol is considered as *accentuated*.

At this point, we can give a topological definition of the four terms involved in the semiotic square in fig. 1:

(a,b): a and b present, a accentuated
(a,b): a and b present, b accentuated
(a,N(b)): a present and b absent
(N(a),b): a absent and b present

The question that remains to be answered concerns the syntagmatic relations which would underlie these terms (represented in fig. 1 by the full arrows). Syntagmatics are formalized in the model by means of the modification of the inscription function.
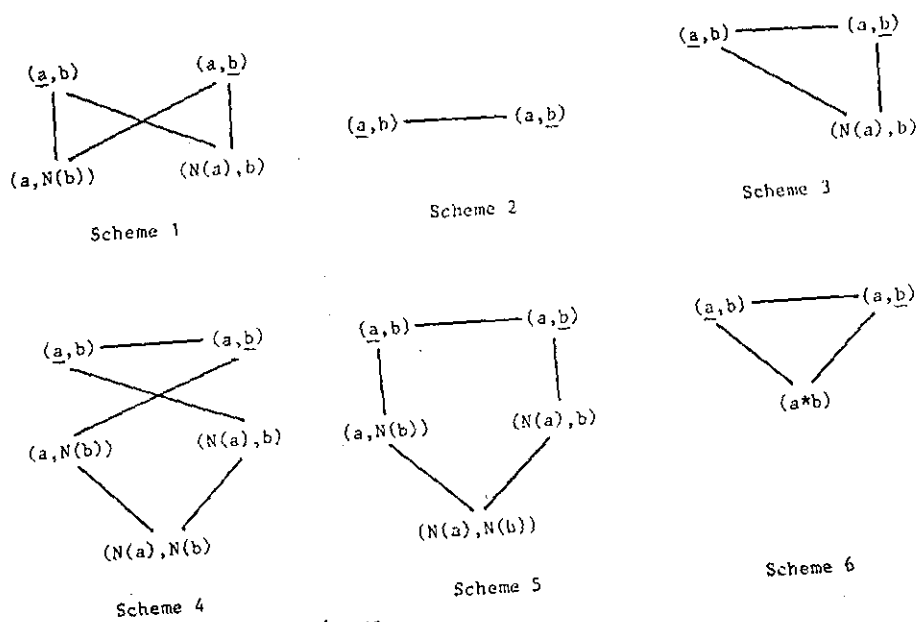
(a,b)   (a,b)

(a,N(b))   (N(a),b)

Scheme 1

(a,b) ——— (a,b)

Scheme 2

(a,b) ——— (a,b)

(N(a),b)

Scheme 3

(a,b) ——— (a,b)

(a,N(b))   (N(a),b)

(N(a),N(b))

Scheme 4

(a,b) ——— (a,b)

(a,N(b))   (N(a),b)

(N(a),N(b))

Scheme 5

(a,b) ——— (a,b)

(a*b)

Scheme 6

FIGURE 2 The elementary schemes.

Modifications of this function are controlled by a set of extra parameters determined on a space Q. In order to confirm the syntagmatic trajectory of the semiotic square in fig. 1, the systematic variation of parameters in Q should result, for instance, in the modification of an inscription function with an absolute minimum for a and another minimum for b (a,b) into a function with only a minimum for b (N(a),b), which in turn would be modified into a function with an absolute minimum for b and another minimum for (a,b).

By this method, which is much more complex than the present outline may show, seven elementary semiotic schemes could be generated. Six of them are presented in fig. 2. The seventh is a variant of the scheme 6 from which it is not differentiated in the present paper. Note that the syntagmatic trajectories are not represented by arrows but just by lines because the topological modellation establishes only some obstructions and absences of obstructions that define pathways without imposing the direction in which these pathways have to be taken. To put it simply, the topology of a house may imply that the only path between hall and kitchen goes through the living room without putting further restrictions on whether this path is used to walk from the hall to the kitchen or from the kitchen to the hall.

Examining the obtained schemes in detail, we recognize in scheme 1 the syntagmatic structure of the semiotic square represented higher in fig. 1. This means that the semiotic square reflects a natural basic scheme of the structure of meaning. Scheme 2 corresponds to the mutual presupposition represented by the dotted arrow in fig. 1. Consistent with the original theory of Greimas, it forms an independent elementary scheme which may be an offspring of the syntagmatic operations in

scheme 1 but without being part of the trajectory constituted by those operations. Scheme 3 combines elements from scheme 1 with scheme 2 and is further not considered. Schemes 4 and 5 and 6, however, deserve attention because they involve new terms that can be matched with some terms suggested by Greimas as possible extensions of the semiotic square but which were never clearly established. They were called respectively the *neutral term* and the *complex term*.

The *neutral term* (N(a),N(b)) is constituted by the simultaneous denegation of a and b. Schemes 4 and 5 show that it can involve two alternative trajectories, which, however, are not simply extensions of the elementary semiotic square represented in scheme 1. For instance both include the path corresponding to the mutual presupposition between a and b, which is absent in scheme 1. In the literature it is still being discussed how neutral terms should be filled in. An example suggested by Greimas and Courtés (1982) is 'falseness' as the denegation of 'being' and 'seeming' ('false' is that which does not be what it seems and does not seem what it is). Another example may be provided by the third pronominal person (he, she, it) conceived of as the 'non-person' obtained by the denegation of the 'personal' terms and 'I' and 'Thou' (Peeters, 1989).

The *complex term* (a*b), is shown in scheme 6. An asterisk is used rather than a comma because the term is not a colocalisation of a and b both accentuated, such as the neutral term could be defined as the colocalisation of a and b both denegated. Instead, the complex term appears when the modification of the inscription function leads to a minimum that identifies equally with a and with b — as if they would be confluent rivers about which it is impossible to determine whether a disembogues into b or b into a. In the literature, the interpretation of the complex term is still more controversial than that of the neutral term. The present topologisation, however, seems in agreement with Hénault (1985) interpreting the complex term as a sort of semiotic mutation: a new 'meaning' is established that transcends the original meanings associated with a and b resulting in a more subtle 'deeper' way of understanding. In this way, the concept of mass–energy established by Einstein is designated by Hénault as a complex term transcending the classic Newtonian concepts of mass and energy. An example of a complex term transcending 'knowing' and 'believing' may be found in the notion *'Je sais bien, mais quand même'* (I know well, but nevertheless), developed by the psychoanalyst O. Mannoni (1969). He illustrates this with an initiation ceremony of the Hopi Indians described in 'Soleil Hopi' by Talayesva. During the ceremony, the masked dancers take off their masks and tell the children being initiated that henceforth the real Katcina will come and dance only invisibly and inhabit the masks of the ritual dancers only in a mystic way; in this way the children *do know well* that the Katcina are no ghosts but just their parents and uncles wearing masks, *but nevertheless*, when their parents and uncles wear the masks and dance, then the Katcina are believed to be present.

The latter example illustrates the relevance of the complex term for the issue of ultimate meaning. The transformation of everyday 'knowing' and 'believing' into a 'mystic' knowing–believing may shed light on certain controversial theological issues such as the 'transubstantiation' of bread and wine into the flesh and blood of the Redeemer. If the faithful knows that the consecrated host is bread while believing that it is the living Christ in the same ordinary way as (s)he knows and believes that apples grow

on trees, then (s)he can have only two ways out. 1) if (s)he is a *fundamentalist*, (s)he may know and believe that the host is the living Christ, the bread being only a disguise. This attitude is reflected by the medieval legends on bleeding hosts and by the careful instructions, still given by some catechists in the 20th century, about how to swallow the host without making it bleed as well as by the reassurance given by other catechists that there was no real danger that it would bleed. 2) A *liberal* faithful may know and believe that a host is only bread but take this bread as an arbitrary symbol of the divine. This attitude may be illustrated by a priest who, by lack of the appropriate bread and wine in an internment camp, decides to celebrate mass using potatoes and water instead.

The gradual substitution of the latter 'liberal' for the former 'fundamentalist' way has often been qualified as a process of 'desacralisation'. However, one may wonder whether the alternative 'fundamentalist' way deserves the epithet 'sacral'. Rather it may be qualified as 'magic'. Perhaps 'sacralisation' should be reserved for a third way achieved by a complex term transcending the knowledge 'This is bread' and the belief 'This is the divine person' into a higher order 'mystic' knowing-believing which may be paraphrased as 'I know that this is bread but nevertheless believe that this is the presence of God'. To get the deeper sense of this paraphrase may require a mental mutation which may be as difficult to achieve as the mental mutation to catch the matter-energy concept in physics. Maybe it requires a conversional shock that only few people reach by themselves but that may be facilitated by shock therapy-like ceremonies like the initiation rite of the Hopi's described above. In this paper we shall not go on further into possible psychological conditions that may facilitate ways of understanding corresponding to the complex term. Instead we shall examine tentatively how the further development of the topological theory may shed light on the generation of this term.

4. HIGHER-ORDER SCHEMES

The topologization can be pursued resulting in schemes of higher order showing syntagmatic trajectories between more elementary schemes such as those presented in fig. 2. In this way we could derive schemes showing 'natural' pathways leading from scheme 1, being the elementary semiotic square 'without complex term', to scheme 6, which involves the complex term. It is evident that these pathways may shed light on the generation of the complex term.

A similar endeavour by Dhooghe (1988) showed that pathways from scheme 1 to scheme 6 involve intermediary schemes such as schemes 4 and 5 which are characterized by the presence of the neutral term. This means that the simultaneous denegation of a and b forms a necessary step in the transformation of a and b into a complex term. The constructive function of this step in the genesis of the complex term may concern the realization of the unified character of this term. More especially, the unified character of the complex term would be realized through the unified character of the neutral term. Indeed, the neutral term can be regarded as 'unified' in that a and b being absent, also the opposition between a and b is absent. The generation of the complex term then may be viewed as a subsequent denegation of this unified term which reinstalls a and b while preserving the unified character acquired by the neutral

term. The preservation of the unified character, however, requires a modification of the originally opposed terms a and b which makes that the complex term is not a mere aggregate of those terms but a semiotic mutation in which the terms are transcended.

The main point of the present rationale is that the establishment of the complex term involves a double denegation of the primitives. In order to illustrate this point we shall not continue with the case of 'knowing-believing' which may be cut out for a stimulating discussion but not for a simple apprehensive illustration. Hence we proceed to another application which is the generation of abstract terms.

Abstract terms are derived from concrete terms. The distinction abstract-concrete is relative rather than absolute. For instance, 'Athenian' may be abstract relative to concrete historical Athenians such as Demosthenes, Pericles, Socrates, etc., but concrete relative to the concept 'Greek' which encompasses, in addition to 'Athenian', also Beothian, Spartan, Delphian, etc. According to the theory, the generation of abstract terms from more concrete ones involves three stages: 1) the establishment of primitive terms a, b, c, etc., 2) the establishment of a neutral term by denegation of the primitive terms, and 3) the establishment of a complex term by denegation of the neutral term.

1. *Establishment of primitive terms.* The primitive are, of course, the concrete terms which are proceeded from. There may be more than two of them on the condition that they all relate to each other as the primitives a and b of the semiotic square. This means that the given concrete terms should be in agreement with two conditions: 1) they should be opposed to each other as distinct irreducible contents, and 2) they should presuppose each other. For instance, an ancient Greek may have distinguished between Athenians, Beothians, Spartans, etc. while experiencing them as related in a way allowing, to a certain extent, to substitute the one for the other. This intersubstitutability implies mutual presupposition. E.g., when the Athenian is focused on (accentuation), then the Beothian, Spartan, etc. are presupposed as possible alternatives.

2. *Establishment of the neutral term.* Our ancient Greek may meet certain people who are clearly neither Athenians, nor Beothians, nor Spartans, etc. and who are not experienced as intersubstitutable with them. Their language, manners and, in some cases, physical appearances are not those of Athenians, Beothians, Spartans, etc. In this way a negative category is created. It may display a huge internal variety including Mongolians, Nubians, Parthians, and many others. However, all of them have in common that they are neither Athenians, nor Beothians, nor Spartans, etc. In this respect they form a unified category that is the realization of the semiotic 'neutral term'. Once this term was established, it could get a label such as the ancient 'barbarian'.

3. *Establishment of the complex term.* When the neutral term 'barbarian' is denegated, a new semiotic term is created which stresses the unity of the original Athenian, Beothian, Spartan, etc. and which may be labelled "Greek". Notice that in order to have the status of complex term, "Greek" should not be dealt with as a mere collective noun for a set of which the primitives (Athenians, Beothians, Spartans, etc.)

are the elements. In addition, 'Greek' should designate an 'essence' which transcends the original set of primitives. It follows that the extension of the term is not limited to the finite set of primitives from which it was derived but becomes in principle unlimited. The essence of 'Greek' does not only apply to the whole range of past, present and future Greeks, but also the class of imaginary Greeks which can be expanded infinitely. When this essence is established, philosophers, historians, popular leaders, and others may try to go beyond the negative definition of 'Greek' as 'non-barbarian' proposing positive features such as speaking the Greek language, worshipping Zeus, having ancestors in the Aegean Sea area, etc.

By the same syntagmatic sequence, prototypical hues (red, green, yellow, etc.) – which are culture-bound perceptual categories presupposing each other as possible alternatives – are denegated into a neutral term 'colorless'. The latter is in turn denegated into a complex term 'color' which does not simply refer to the set of initial hues, but constitutes an 'essence' connected with the notion of 'spectrum' allowing for the realization of an unlimited range of real and imaginary 'colors' including possible hues invisible for humans and even inexistent ones only visible for inexistent mythological beings.

A final example is about 'shapes'. In concrete experience, perceived shapes are assimilated with prototypical forms (spheric, triangular, pear-shaped, etc.) which, like the prototypical hues, are distinct categories presupposing each other as possible alternatives. The denegation of them generates a neutral term 'amorphous' which, denegated in turn, results into a notion of 'good form' for which, as far as we know, no specific name is available in current English and which is referred to by psychologists using the German term 'Prägnanz.'

5. APPLICATION TO ULTIMATE MEANING

It may be evident that the present semiotic theory can shed light on a good number of specific mythic, philosophical and theological categories. For an illustration we refer to the analysis of 'believing and knowing' in section 2. In addition, there are also more general applications. In the following paragraphs we shall focus on one of them.

The topological analysis of the structure of meaning, however preliminary it may be, has led to at least one interesting result: it has shown the crucial role of denegation in the establishment of meaning. The elementary scheme of the semiotic square involves the denegation of primitive terms as a necessary syntagmatic step towards the integration of the terms into a field of signification. The higher-order schemes stress denegation as a necessary step in the syntagmatic process that leads from actual understanding towards a higher level of understanding.

Especially the latter point may have implications regarding the 'ultimate understanding' associated with 'ultimate meaning'. Given the limitations connected with human nature, one could wonder how far the mind, in search for ultimate meaning, could reach. A widely accepted view is that the ultimate understanding is unattainable. In terms of the present theory, it means that the complex term that constitutes ultimate

meaning is beyond understanding. However, the theory tells also that the complex term is preceded by a neutral term. The neutral term is achieved by the denegation of contents belonging to a lower level of understanding. Thus, the highest level of understanding we reach can always be subjected to the operation of denegation. It follows that the furthest point we can reach in our search for the ultimate meaning may have the character of a 'neutral term.' This means that the ultimate would be dealt with using negative terms.

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