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UN CONTO APERTO. IL NEOCULTURALISMO DOPO LA SVOLTA COGNITIVA (A CURA DI ERICA COSENTINO)

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Language, culture, vision: some ideas for a critical approach

Federico Montanari

University of Bozen, University of Bologna
federico.mont@gmail.com

Abstract This paper would like to explore the return of a new “culturalist approach” to language, particularly in relation to visual representation and the spatial dimension. First, we will present the concepts of vision and space as recently described by cognitive linguistics (eg Lakoff, Johnson, with the idea of “embodiment”, or Talmy). Secondly, we will investigate the links between this cognitive linguistic trend and the “culturalist” point of view, especially in its recent versions (for example, Palmer). Comparisons have been proposed with some models that come from the neuro-mathematics of perception and visual cognition (these investigations are linked to a return to Merleau-Ponty’s phenomenology; an influence that is also relevant inside cognitive linguistics). Finally we will try to highlight some possible convergence points of these studies.

Keywords: Vision, spatial categories, cultural linguistics, semiotics, embodiment

1. Language, vision, space: an open issue.

The aim of this paper is to consider some aspects of the relationship between language, space and vision, emphasizing, however, the return of a “culturalist” hypothesis. It is possible that the concept of “vision” may sound too general, or not directly related to issues relevant to the study of language. It is important to clarify this issue: how can we think about vision from the point of view of language? Firstly, today we can think about vision in relation to the bodily dimension and its relation with space. This is the common response from linguistics, semiotics and cognitive studies, particularly in recent decades (see, for example, even through different approaches, VARELA, THOMPSON, ROSCH 1991); JACKENDOFF 1996; LEVINSON 1996; LAKOFF, JOHNSON 1999; FONTANILLE 2004; VIOLI 1997). Indubitably, during last decades, the concept of “embodiment” has gradually and increasingly broadened in its various meanings.

In particular (this point which is important for us here) the study of the connections between neuro-physiological mechanisms and perceptual categories is an increasingly relevant field of research for cognitive and linguistic studies. The main purpose of this line of research is to try to understand not only in which way the neural correlates interact with “high level” perceptual mechanisms (that is to say, not only the recognition of contours, colors, objects, etc.) but also with abstract categories and concepts (see, LIUZZA 2011). We would also like to formulate a hypothesis regarding how these sensorial systems are linked to cognitive schemas

organizations. These schemas, concerning the lines of research we are referring to, are built up starting from the perception we have of our own body, within an environment (see, among others, LAKOFF 1987; LAKOFF, JOHNSON 1980; 1999; VARELA, THOMPSON, ROSCH 1991)¹.

2. An intersection between the Cultural, Phenomenological, and Experientialist Turn.

As is well known, one of the theories central to this research started with renewal of interest in Merleau-Ponty's phenomenology (LAKOFF, JOHNSON 1999; VARELA, THOMPSON, ROSCH, op. cit.; see also, CARMAN, HANSEN 2005). There seem to be two main moments of this “rediscovery”. Firstly, the famous idea that was defined as “body *chiasm*” by Merleau-Ponty (1945) in his re-discussion of Husserl's thought. That is, that perception begins through and by our ability to see ourselves in this world, but also stems from our being and feeling ourselves as a body and through this bodily dimension.

What was taken from Merleau-Ponty is a line of studies in which the bodily dimension acquires a central role in cognition. As well known, this new approach has been proposed (with intersections, and reciprocal references) both by linguists and philosophers such as Lakoff and Johnson (and, more broadly, in linguistics and cognitive studies, from the early '80s, with the work of Talmy (e.g., 2000)) and a biologist, neuroscientist and epistemologist such as Varela. The body is no longer just a “medium” (the idealist and internalistic position) or a conglomeration of “sensors” (the behaviorist and empiricist position) with a “central processing unit data” (the computationalist and symbolic position), but becomes an active locus for the production of “figures”, to be considered primarily as “image-schemas”, according, for instance, to Lakoff (1987) and Lakoff and Johnson (1999): recurrent patterns by which we represent (interpreting and making sense) relationship between our body and recurrent situations. According to this reasoning, figures (produced by the body and embodied processes) play a constructive role in building perception and cognition. Figures of the body (at the same time developed by bodily dimension) work as “active filters” in matching, constructing, shaping the world's reality (see also, FONTANILLE 2004). While we cannot further develop this point here, it is interesting to remember that there seem to be some similarities between this version of “vision” and other constructivist philosophies, such as Goodman's philosophical conception, as well as with some developments of the European school of structural and narrative semiotics, notably with Greimas².

Starting from the acting and being of the body (and, at the same time, its perceiving) in the world, schemas (image, sensory-motor) are created; but, according to this

¹ For an overview of this discussion, we would like also refer to: BORGHI, MONTANARI, SARTI 2008.

² See, GOODMAN 1954. According to Greimas and the scholars of structural semiotics (see GREIMAS 1983; GREIMAS, COURTÉS 1979; see also, FONTANILLE 1999; 2004), there were some basic common points of departure between “generative Semantics” (the 1970s seminal proposal by Lakoff and other Chomsky's former students debating with Chomsky about the idea of deep structure) and, later, some issues of cognitive linguistics, and structural semiotics: particularly concerning the multi level and compositional structure of production of meanings and contents. It is interesting to notice that structural semantics and semiotics have developed some similar ideas about “figures” seen as sets, configurations of “proprioceptive”, “exteroceptive” and “interoceptive” semantic basic components (see, GREIMAS, COURTÉS, op. cit.).

hypothesis, these same schemas serve as models and “filters” for perception. The second element that these studies take from Merleau-Ponty is related to the problem of what we could define as the generalization of the inherently *synaesthetic* perception. Of course, the theme of synesthesia is a much older and wider issue (see, e.g., MAZZEO 2005), however, what is affirmed in this “revival” of phenomenology (in what Lakoff and Johnson define as the field of metaphorical patterns) is to conceive cognitive dimension (as well as perceptual one) as governed by these general patterns: underneath specific percepts. For Merleau-Ponty, the body (in finding itself “touching” and sensitive to itself) is seen while acting, and it acts as it observes itself. There is a close linkage, as Merleau-Ponty says, between vision and movement.

Hence the interest once again in Merleau-Ponty’s thought, even by the researchers who developed the hypothesis (very “fashionable”, also, today, in its public opinion narrative) of “mirror neurons”³. But beyond this specific point, in rediscovering of Merleau-Ponty, there is this idea concerning the formation of deep perceptual and sensory-motor patterns.

For instance, Lakoff and Johnson “*container schema*”, proposed in several occasions (see especially LAKOFF AND JOHNSON 1999), is a classic example of a “schema”. Lakoff and Johnson state (1999: 380): «Containers are image schemas with logical constraints built into their very structure [...] they are [...] conceptualizations that we impose upon space.»

This idea concerns the building up of general schemas from basic metaphorical patterns and images. However, once again, this process is “embodied” because patterns are developed from features and relationships regarding our bodily dimension. Let us take a very common example, related to the fact that I can claim to be “in” or “out” in relation to a space, as well as more or less close to a spacial boundary. At the same time, I could use this schema as a more general metaphor related to being, for instance, “out of the game”, or even “crazy.” (in italian: “fuori di testa”, “off one’s head”).

Beyond these simplifications (and beyond the specific example of the *container*, or containment, *schema*), for Lakoff and Johnson, these kinds of patterns (image schemas as regularities produced from typical bodily’s situations) are fundamental because they constitute the bases not only for specific utterances but also possibly for entire cultural traditions, such as, for example, the western civilization⁴. But, are those schemas⁵ located in a “given culture”?

³ Given the vast number of publications and research on this topic, we refer in particular to: RIZZOLATTI, FOGASSI, WELSH 2006; RIZZOLATTI, SINIGAGLIA 2006. See also a recent PhD thesis of Psychology, in cognitive neuroscience, which reviews the status of this research, in particular as regards the issue of social behavior in the relationship between attention and social and spatial effects of resonance and sensory-motor effects (LIUZZA 2011).

⁴ Indeed, according to Lakoff and Johnson (ib.) the same Aristotelian logic, the categories and the rules of logical inference, would be based on conceptual-spatial schema such as the “*Container*”. We prefer to suspend the discussion concerning this idea because it would lead us too far, touching topics such as historical and cultural relativism, the forms of a given culture and mentality, etc. Of course, these are precisely the fundamental themes of “culturalism”, but they merit to be treated in a more systematic and detailed way.

⁵ In any case, the idea of “image schemas” is conceived by Lakoff and Johnson as the development and integration of other concepts proposed by semantics and cognitive sciences, particularly that of the “conceptual schemas” and “frames” proposed by Fillmore from the '70s, or, later, those of Langacker, Holland and Quinn, more or less during the same years in which Lakoff and Johnson, and perhaps in a wider perspective, Talmy, developed their concepts (see, PALMER, cit.: 63-66).

Can the return to a “cultural” approach and a “cultural turn” in linguistic studies play a new role? About the finding of a connection between cognitive and perception studies, linguistics, visual and cultural studies.

According to many linguistic and semiotic studies as well as in cognitive science (see, i.e., GREIMAS 1983; FONTANILLE 1999; LAKOFF, JOHNSON, cit.; TALMY 2000), the way we speak about space, including the grammar we use, has a link to the way we see and perceive the space itself (PALMER, cit.). But the issue seems to be more general.

For a discussion about the link between space and language we must refer also to LEVINSON, i.e., 1996, 2003) in which he proposes a wide and very deep review and discussion of hypothesis concerning this issue (see also JACKENDOFF 1996; BLOOM 1996). According to Levinson, discussing different hypothesis (space categories are “absolutely” embodied, or, are they strictly linked to our sensorial capacities?) anthropological and linguistic findings seem to show that spatial categories are “quite divergent” across cultures (ib.: 353-355). But how do these findings deal with the “uniqueness” of our bodily experience? According to the discussion proposed, Levinson (ib.: 357), quoting Poincaré, indicates «Absolute space is nonsense, and it is necessary for us to begin by referring space to a system of axes invariably bound to the body.» Indeed, there are “cognitive styles” through which individuals deal with space in different cultures. For Levinson there is a cross-cultural and cross-linguistic variation concerning parameters expressing position in space (for instance, in the use of deixis, Levinson stresses the fact that some languages, such as some papuasian languages, use the marking not only of horizontal distance (from speaker and addressee) but also of vertical one (not only “far away” but something like “far away below”). These variations could also be typical of different kinds of “frames of reference”, such as the systems of relative or absolute locations. For these reasons the conception of body as an “absolute center” of language and cognition could be doubtful. Thus Levinson suggests we could explore two main possible research programs: the first, language as a tool that shows “prominent” categories; the second, the effects of language and cognition in specific “sites” and cultural situations (ib.: 375).

3. Culturalist paradigm and perception.

And here we stress again the importance of a return to a culturalist “paradigm” (as we might say in a perhaps generic sense, yet useful here for this discussion). This idea, obviously, is not very far from Whorf’s idea and the so-called Sapir-Whorf hypothesis. In this respect, Palmer (1996), in his effective and anticipatory synthesis that has supported and prepared the “return” of “cultural linguistics”, remembers something that apparently sounds like a paradox: Benjamin L. Whorf, known as the “noble father” of culturalism, was very interested in the work of Gestalt Psychology. This is an important point for the questions treated here, regarding the importance of cultural categories and their relationship either to language or perception (PALMER,

Generally, and beyond the specificities and differences, they share the idea that those kinds of models are not to be thought as composed by “componential traits”, or even that they take into account the profoundly visual dimension, against an “abstract” and “nonfigurative” attitude, nor in a static way: but they are composed by basic configurations of action, in which sub-categories, connected to each other, (for instance, “trajectories”, or “paths” or “processes” and “landmarks”, and where agents are involved). Those schemas can be chained together, and can become prototypes for describing and perceiving and cognitively recognize situations of action and meaning.

ib.: 12-13). Whorf, in developing his well-known theory (often, it must be said, object of simplifications and misunderstandings, in the name of a stereotyped comparison between relativism and anti-relativism; see, about this, PALLOTTI 1998) – grammatical categories of a language are intrinsically linked to the categories of the particular cultural world to which that language belongs – considered such categories as “prisms” that allow us to observe the world from different perspectives (see also, JANDA 2006).

For Whorf, these “prismatic” categories, these semiotic-cultural filters, must be studied through concrete examples of languages in use. That is, the description of typical situations in which one recognizes the relationships between elements within schemas either semantical or grammatical. According to Whorf, the study of these relationships (for example, in one of the well known cases studied by Whorf (1956), Shawnee language and the relation between the subject of an action and its enclosing space) shows similar mechanisms, like those of “figure-background relationship” studied by Gestalt Psychology. In this way, according to Palmer, Whorf has anticipated the analysis and building of “schemas” of scholars such as Lakoff and Talmy (ib.).

This seems to be an interesting and important point (sometimes underestimated in the discussion about the culturalist perspective), because this apparent paradox (the search for patterns of perception by the culturalist approach) reverberates immediately in the issue we are dealing with here. In fact, a sort of “determinism” in the cultural approach has been too often emphasized in discussions. This approach, according to some critics, apparently insisting on the relativism of cultural differences and changes, could in reality bring with it in this sort of paradoxical deterministic attitude: cultural categories would explain perception, cognition, and language itself. This is an often proposed version of the so-called Sapir-Whorf hypothesis, in its so-called “weak” version (see, for a discussion, PALLOTTI, ib.; GUMPERZ, LEVINSON 1991; EVERETT 2005). The culturalist approach, perhaps, has been presented in a too deterministic, or, sometimes, a priori and dogmatic way. However, the other issue, which is again at the center of the discussion today, regarding both language that cognition, was not taken sufficient account. This issue concerns the problem of “emergence of categories”: the creation of categorial systems that allow us to connect and act in the “world-environment” in which we live.

So it might be more correct to speak of a “neo-culturalist” point of view (taking into account, of course, as we have seen, the work of cognitive and linguist science in the past decade).

As stressed above, many of the current discussions on the topic of “embodiment”, and regarding the link between perceptual categories (in particular spatial forms of perception, and representation of the body, as we have seen, either works by Varela, or, Lakoff and Johnson (ib.)) derive from Merleau-Ponty’s phenomenology. And again Merleau-Ponty, just like Whorf, considered Gestalt psychology’s results essential to his work. In this direction, regarding the emergence of categories (image schemas, figures, primary metaphors, conceptual schemes) from bodily dimension, and even on the undeniable links between it and the sensory-motor mechanism, Lakoff and Johnson (1999: 77) state:

conceptual structure arises from our sensorimotor experience and the neural structures that give rise to it. The very notion of “structure” in our conceptual system is characterized by such things as image schemas and motor schemas.

Mental structures are intrinsically meaningful by virtue of their connection to our bodies and our embodied experience. They cannot be characterized adequately by meaningless symbols.

This cognitive linguistic approach (besides the criticism of a traditional and antiquated symbolic–computational conception of the mind) is apparently far from a culturalist position. But it is precisely the issue of experience, of “experientialism”, with the question of the emergence of categories, that makes not only this “embodied” conception compatible with the culturalist idea (as long as it is used, we repeat, not in a dogmatic and aprioristic but dynamic sense) but also seems to enrich the idea of perceptual-bodily dimension (see JANDA, cit.⁶).

It could be interesting, therefore, to try to find a link to recent research regarding visual perception. In an effort to construct visual perception models, some research, conducted halfway between mathematics and neuroscience⁷, have suggested examples of models that attempt to describe the functional architecture of the visual cortex (as those described, for instance, by SARTI, CITTI, MANFREDINI 2003; see also, CITTI, SARTI 2008; SARTI, CITTI, PETITOT 2008). These models (starting also from Petitot’s studies, see PETITOT 2002; PETITOT, TONDUT 1999)⁸ hope to create a new relationship between phenomenology and theory of perception (linked to linguistic-semiotic research), and functional architecture of visual cortex.

These models seem to suggest that there are some common features and functions in different “activities” of perception such as: the vision ability to discriminate discontinuous elements from a continuous background (recognition, “lifting”); grouping and connecting discontinuous lines (completion); or even the ability to select for a given point in space, a reference system (orientation). These would be functions deal with the same geometry of the visual cortex (where, according to these assumptions, geometric-topological models would be “implemented”).

According to this hypothesis, the functional structures of the brain (e.g., visual cortex) not only “translate” the signals from the sensory systems (retina, optic nerve, etc.), but also perform the real work of “production” of perceptual results (of which well known phenomena such as the completion of contours, or recognition of the orientation and direction of lines, or, perceived overlaps between figures, would be typical examples).

⁶ Janda says: «Linguistic output is not a direct expression of reality. There are several “prisms” through which information must pass before a speaker pronounces an utterance. Our sensory perception organs of necessity filter out some information from our observable environment, and already as information is being perceived it is conceptually categorized for storage and retrieval. Indeed the acts of perception and conception are concurrent and cannot be meaningfully separated, a fact that led Talmy (1996) to coin “ception” as an umbrella term for the per-/conceptual process. Beyond “ception”, we must recognize that any information can be subject to various construals, and furthermore that linguistic utterances present more than observations on perceived reality: they can express mental states, imagined scenes, hypotheses, and pragmatic intentions» (JANDA 2006: 3).

⁷ Research Group on “Neuro-mathematics of visual cognition”, which, among other projects, won the “University strategic project” competition 2005-2008, (Institute for Advanced Studies, ISA, University of Bologna). For references to some of the participants’ work in this group, SARTI, CITTI, MANFREDINI 2003; CITTI, SARTI 2008.

⁸ And in which Petitot refers to either classical studies on theory of forms and vision, such as those of Kanizsa, or to research on the topological and functional organization of the retina (retinotopia) and the visual cortex (for example, with the studies of Hubel and Wiesel (60s Nobel prizes), on the discovery of nerve cells sensitive to the orientation of the lines, or those of Field and Hayes on contours completion).

For semiotics and language sciences these proposals seem quite interesting, and rich, even in perspective. For instances, assumptions about the constitution and generation of meaning in semiotic research, were sometimes thought in a perhaps aprioristic way, in which category production started from a “segmentation from the continuum” (see, i.e., ZILBERBERG 1981; ECO 1984: 52-53). On the contrary, this kind of research may open a possible alternative: as we pointed out, the perceptual activity becomes a “production” of perception itself, the generation of forms accompanying their own perception through the relationship of micro levels (local, “detecting” of simple elements) to their macro-integrations (by construction of entire “scenes” and perceptive figures), up to the possible emergence of real complex configurations and therefore categories of meaning.

But, once again, what does this have to do with the question we posed in this essay, namely with the “cultural” dimension? Nothing seems further away from a culturalist approach than this kind of research. Indeed, some of these scholars are openly inclined to a “naturalization” (for example, particularly Petitot, cf., PETITOT, VARELA, ROY 1999) of the study of linguistic, perceptual and cognitive phenomena; while others seem more open to the prospect of exchange and dialogue with the culturalist approach. However, the key point is not, in our opinion, to decide on one position or another, but rather the re-evaluating the issue at stake: once more the problem of “emergence of categories”.

Let us look at if and how this bridge could be built, and to discuss how to “fill the gap” between culturalist approach and studies on perception.

4. “Filling the gap”? But which kind of “gap” between culture and perception? Identification of the reference systems and enunciation: an example.

We return to our central issue, a new culturalist approach, by looking some of Palmer’s examples (1996). The phenomenon of spatial localization in relation to reference systems, produces not only the perception of distance, location of objects, cognition of relationships, but can also give rise to the narration of events, with metaphorical and conceptual effects. Palmer (cit.: 240-243), resumes Talmy (1988, 2000) and his “*force dynamics*” model (about how forces and antagonisms are constituted and represented within language and discourse). As an example he shows how a simple sentence like “*The shed kept standing despite the gale wind blowing against it*” may produce the sense of a subject, of course, not anthropomorphic (the shed) that is facing (resisting in a position, then in a space) an antagonist (strong wind). This series of transformations introduces, firstly, the question of the observer’s perspective through which we glimpse the description of reality. The spatial categories (with the tools offered by the unfolding of languages, such as deictic, anaphoric and pronominal systems) are never isolated elements: they participate in the staging of real scenes of action, made of first and second plans, they are entities that move along the trajectories of these plans interacting with each other, according to certain points of view.

These ways of organizing action scenes, favor, as Palmer insists, the emergence and recognition of narrative organizations: where they start to build roles, functions, and, finally, action plans, scenarios, tactics and strategies that are more or less tacitly recognized and attributed to the different participants, in a given scene of action (see also, about this, GREIMAS 1983). In this sense, taken together with Lakoff and Johnson’s patterns (also quoted by Palmer), Palmer’s approach insists on the fact that

models and schemas are co-produced in concrete practices of social and cultural life, and inside talking-participants' experience.

We are faced with a set of phenomena that are usually defined in linguistics and semiotics as enunciation and discourse production (DUCROT 1983; GREIMAS, COURTÉS 1979; FONTANILLE 1999). Differentiation, allocation of roles, grouping of functions, are all operations, that therefore produce discourses and practices, and concrete ways of organizing meaning and sense.

Could we then find possible homologies, with regard to these processes and operations, or correlations to the "micro" process levels of perception building as reconstructed by neuro-mathematical models of vision? Maybe. Some scholars (such as Lakoff and Johnson themselves) seem to go in this direction. Others, like Palmer (and generally the field of cultural linguistics and anthropology, see also, on space orientation, HAVILAND, i.e., 1996) are inclined to believe that categorial forms and patterns are set up by socio-cultural practices. Our impression is that new dialogue and exchange between these two fields of research is still possible. In any case, limiting the discussion to linguistic-semiotic research, we can describe discursive production modes as means of spatial category deployment, and organizations and links between semantic categories: between concepts and forms of content articulation. Researchers working on phenomena related to semantic categorization, particularly on spatial schemas are very insistent on this point: these categorial organizations are translated (as well as prototypes of concepts or models for action) even in representations of dynamic forms and forces, in "intensities" that often are extended from general schemas to concrete psychological and social situations (see Palmer, cit.). Many scholars who have studied utterance and discourse theory, from Benveniste (1966, 1974) to Ducrot (1983), have insisted on this point. Language, in its concrete speech and present discourse construction, produces "forces" (and we must remember the reference made by these authors to Austin's speech acts theory), and these same forces are constitutive of social scenes, as pointed out by Palmer and Talmy.

For instance, as it has been stressed (see Ducrot, cit.), an utterance that acts like "a promise" has to be considered as such, not because it "represents" something, but because of the fact it produces and "makes something" (between two people, for example). For similar reasons, some spatial organizations and language categories are also clearly constitutive of socio-cultural and psychological constraints. In which way can we find a link between this dimension of enunciation forces, their translation in dynamic relationships, and the problem of visual perception (or even the recognition of objects and boundaries)? Here the issue concerns the wider idea of "vision" and its essential connection with the question of categorial constructions.

De Certeau (1990), as a scholar at the frontier of semiotics, anthropology, history and linguistics, is among those who have insisted on the indissoluble links between socio-cultural and psycho-cultural relationships, and spatial categorial organizations. Grammatical, semantic and pragmatic elements participate to these relationships, with their linkage capability. The creation of spatial meanings cannot be easily separated from more general cultural categories. The problem is not "just" purely spatial but also "vectorial", in the sense of understanding orientation and the relationship of actions (as we have seen with the example taken from Palmer). What we perceive is spatial categories that are closely associated with mechanisms of social and psychological significance; the spatial forms take on the cultural. When language becomes discourse, a game of ideological positions is deployed within the incapsulation of scenes and different frames. This recalls De Certeau's "theatrical

dimension” of concrete forms of utterance and speech production. Discourse is an arena, a space where subjects play and interpret dramatic interchanges and negotiations.

5. Conclusions.

Emergence, completion, recognition of spatial reference systems are perceptual processes that (though different from each other) seem also to be involved in enunciation practices. But such practices include spatiality forms that are not just “empty boxes”, or abstract models, but are “inhabited” by agents/actors (see TYLEN 2007). These actors interact with each other in roles (such as observers or points of view), or in activities of exchange which are at once physical, perceptual and semiotic.

Although this idea may seem risky, especially if placed in relation to neuro-mathematical models of spatial perception, we are proposing a combined hypothesis. This proposal would hold together the different ways of constructing meanings from spatial categories through several layers that gradually overlap from level to level. Among these layers, of course, there may be discontinuities and jumps. However if we refer to Hjelmslev’s “*La stratification du langage*” (HJELMSLEV 1953), the hypothesis is that sense and meaning are given by levels that overlap, translate and chase each other on, from the level of “collective appreciation” layers (to quote Hjelmslev’s words, *ib.*), up to psycho-physical or biological processes, thus belonging to neuro-perceptual domain and mechanisms. An antireductionist model, which would provide continuous feedback effects between the different levels; a model of production of sense that would have the form, as it has been said, of a sort of “millefeuille cake”: where the different levels and layers would be compounds of mechanisms and production processes of visual and sensorial perception, gradually until to their re-translation in dynamical forms of psychological, cultural and social significance.

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