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Field and Dynamic Nature of Sensemaking. Theoretical and Methodological Implications

SERGIO SALVATORE

University of Salento

CLAUDIA VENULEO

University of Salento

In this paper a dynamic and semiotic model of meaning (DSMM) is presented. According to it: a) meaning is the emergent product of a field dynamics; b) meaning consists of the way signs iteratively combine with each other in the local circumstances of communication; c) meaning is bivalent, i.e. it emerges from the iterative mutually constitutive tension between two components: an observable side, the Significance in Praesentia (SIP), namely the portion of the world used as sign, and a latent side, the Significance in Absentia (SIA), namely the pertinent gestalt of linkages among signs defining the condition of interpretability of the former. In the second part of the work some methodological implications of DSMM for the study of meaning are highlighted. In particular, emphasis is given to the wisdom of adopting a methodology being able to model the contingency and situativity of socio-symbolic phenomena.

Keywords: Cultural psychology, Semiotics, Dynamic and Semiotic Model of Meaning, Social Representations, Significance in Absentia.

Correspondence should be addressed to Sergio Salvatore via Luigi De Simone, 22, 73100 Lecce, Italy (email:sergio.salvatore@unisalento.it / claudia.venuleo@unisalento.it)

How meanings (social representations, cultural models, values, shared beliefs) are organized and shared, how they are communicated and what kind of relationship they hold with social praxis as well as with functional and structural aspects of the social environment, how and in what they change and keep themselves invariant – these and other issues find different ways of being addressed, depending on which epistemological framework one adopts for thinking of phenomena related to meaning.

The traditional epistemological conception assumes that meaning is an autonomous entity, pre-existing its private and/or public representation. According to this assumption, individuals have a given content in their mind (a concept, an image, a representation – a significance) and this is why they can express it (Salvatore, 2012). However, the idea of the autonomy of meaning has been subjected to a major revision in the last three decades as a result of the increasing interest in the work of authors like Wittgenstein, Peirce, Bakhtin, accompanying the linguistic and semiotic turnaround in psychology (e.g. Gergen, 1999; Harre & Gillet, 1994; Kirshner, 2010; Lepper, 2012; Linell, 2009). As a result of these innovations there has emerged a pragmatic, contextual conception of meaning and sensemaking that has played a major role in the growth of several areas of psychology (Salvatore & Freda, 2011; Salvatore, Forges Davanzati, Potì & Ruggiero, 2009; Valsiner, 2009).

Our purpose in this paper is to present a dynamic and semiotic model of meaning (DSMM) grounded on this pragmatic and contextual view, and to highlight some basic theoretical and methodological implications that can be drawn in the study of meaning. According to this dynamic and semiotic model, meaning is the emergent product of a field dynamics (sensemaking). From a theoretical point of view, this means that the meaning has to be conceived of as a field phenomenon. From a methodological standpoint, this leads to an emphasis on the wisdom of adopting a methodology being able to model the contingency and situativity of socio-symbolic phenomena.

This article is divided into two parts. In the first (paragraph 1), the semiotic and dialogical view of meaning is presented. In the second (paragraph 2 and 3), the methodological

consequences of such a view are discussed.

OUTLINES OF A DYNAMIC AND SEMIOTIC VIEW OF MEANING

Semiosis as Action

Wittgenstein and Peirce's theories of meaning provide the conceptual tools for a fully dynamic and semiotic model of meaning. According to Wittgenstein (1953/1958), the meaning of a word (more in general, the meaning of any sign) consists of how it is used. From this it follows that meaning is not something that stands before the action (i.e. the use of signs) and motivates/regulates it; rather, meaning is the product of action and, as such, it is part and parcel of the world of actions. The latter point is highlighted clearly in relation to the meaning of statements referring to emotions. Accordingly to Wittgenstein, to refer to emotional states is not a description of a (inner) fact; rather it is a statement that produces an effect on the interlocutor and this is what makes up its meaning. For instance, take a certain person saying to his or her son "I am very angry now". This statement has a series of pragmatic consequences: it leads the person to act in a certain way (e.g. not to talk to the son), and the son to perform a certain act as the right answer to the parent's action of proffering the statement (e.g. to apologise; to avoid the parent, to challenge her). All of these pragmatic consequences are not the effect of the anger as such; rather they are produced by the language game implemented by the statement on the specific form of life underlying the parent-child relationship. In sum, Wittgenstein enables us to see how a) action (sensemaking) comes before and produces meaning; b) meaning is made up of action - it is action that comes after action – action affecting following action.

Peirce's theory of signs provides the way of modelling the dynamic nature of meaning. According to him (Peirce, 1897/1932), semiosis is the ongoing, never-ending process of interpretation of signs through other following signs. Any sign

> …or *representamen*, is something which stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign, or perhaps a more developed sign. The sign stands for something, its object. It stands for that object, not in all respects, but in reference to a sort of idea which I have sometimes

called the ground of the representamen (Peirce, 1897/1932, vol. 2, p. 228).

Thus, the basic condition of possibility of semiosis lies on the inherent inability of the sign to represent its reference fully. Any sign stands for the reference "not in all respects" – it stands for it only "in some respect or capacity" (the ground), in the aspect that is relevant to somebody. For instance, the photo of a cake may stand for the cake in respect to its form and colours (for somebody) or in respect to the name of the person being celebrated (for somebody else); but it does not usually stand for the cake's weight or taste (actually, theoretically one cannot exclude that there may be at least one person for whom this ground is given – the exceptionality of this condition can be seen as inversely associated with the person's adhesion to the cultural norm).

Due to its "incompleteness", the standing-for relation between a sign and the object requires the interpretative intervention of another sign (which Peirce called *interpretant* too). The interpretant's interpretative intervention is a form of selection: it reduces the virtually infinite possibilities of standing-for – namely the infinite respects and capacities the previous sign could represent – to a finite set. But the interpretant is however a sign, and therefore it is open to virtually infinite standing-for options, which need to be interpreted by a subsequent interpretant; and so forth, in an infinite process of backward interpretation. Sensemaking is precisely such a flow of signs interpreting previous signs in their relation with previous signs in an infinite asymptotic tension to fulfil the hiatus between the sign and the object.

The Meaning is the Sign That Follows

The infinite semiotic flow modelled by Peirce entails a radical change to the commonsensical view of the meaning. The sign has no content; rather, it is a relationship (i.e. standing for) which, on the one hand, relates back to a previous relationship and, on the other hand, relates forward, triggering another relationship to be specified in turn. Thus, meaning is inherently pragmatic and dynamic. It is dynamic in the sense that the backward interpretative relationship between the representamen and the interpretant is a temporal relationship – *the meaning is the sign that follows*. And it is pragmatic in the sense that the sign that follows is an event, something a certain person performs according to the capacity that is relevant to him or her. In other words, any sign

does not represent/convey what is already within it (its content); rather, any sign acts inherently on the current state of the semiotic process, in the sense that it rewrites the semiotic process, selecting the relevant aspect of the previous semiotic relationship.

In sum, thanks to Wittgenstein and Peirce, the very distinction between semantics – the stable content of the sign as defined in the system of language (*langue*, in de Saussure's terminology; de Saussure, 1916/1977) – and pragmatics – the use of semantics for communicational and relational aims (*parole*, according to de Saussure), has to be questioned. Wittgenstein and Peirce make us recognize that the semantic is the effect of the pragmatic, rather than vice versa.

Meaning as the Trajectory of Signs

Peirce's theory provides the basis for building a model of meaning useful for psychological theorization and empirical investigation. From Peirce's definition of signs, meaning can be defined in the final analysis as the *domain of pertinence* of the representamen, as established (selected) by the following sign (the interpretant).

Two observations are worth adding here.

First, as is clear from the quotation reported above, Peirce speaks of the domain of pertinence (what he calls "ground") as the relation between the representamen and its object. Yet this is only the virtual starting point. Insofar as the new sign is created, as the first interpretant of the first representamen, then it is followed by a new interpretant, which performs its interpretative job on the relation between the previous interpretant and its target, namely the representamen. This means that the relation between the object and the representamen (i.e. the ground) is continuously reproduced by its re-interpretation through the flow of signs, each of them working as interpretant of the previous and at the same time as representamen of the following (cf. Figure 1).

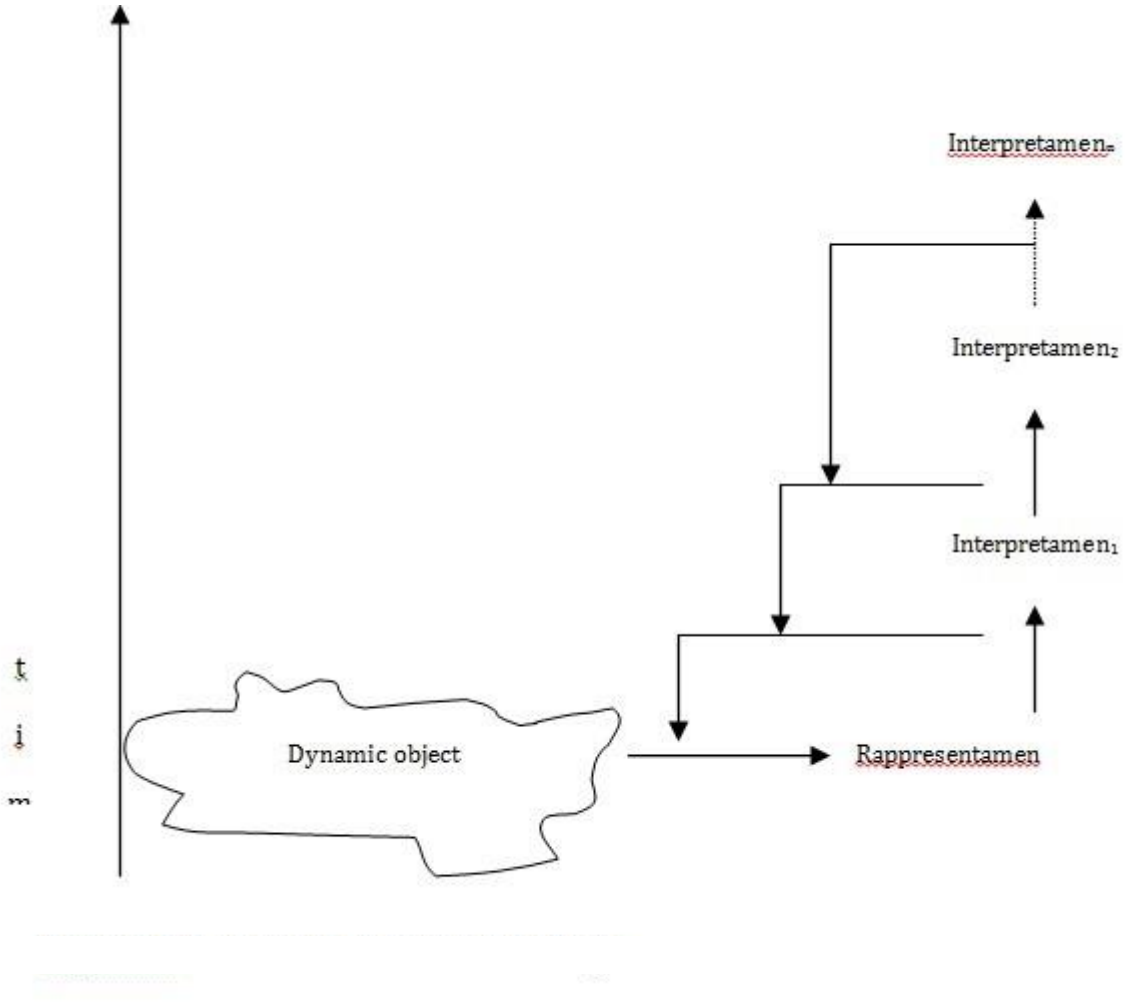

Figure 1 Pierce's triadic model of sign (from Salvatore & Freda, 2011)

Incidentally, this view allows to find a modellistic solution to the problem of conjugating the referential tension of language and more in general of sensemaking (i.e. the fact that we use and experience meanings as a way of representing the object), and its autonomy, its operational closeness (i.e. the fact that any sign cannot but refer to other signs, in a web from which is not possible to escape; e.g. Lahlou & Abric, 2011) (cf. Figure 1).

Second, it is worth repeating that the domain of pertinence is not an inherent property of the representamen; rather, it is one (a subset) of the "capacities" that the following sign sets among the infinite possible. One just has to imagine how many uses there are of a photo of a cake to get a - limited - idea of the infinite potential capacities that could underlie the domain of pertinence. The interpretant does not activate the subset of capacities; rather, it selects them creating a

boundary between the ones that in so doing become pertinent and the others, left in the background.

Peirce provides the following picture of such a dynamics:

> Namely, a sign is something, A, which brings something, B, its interpretant sign determined or created by it, into the same sort of correspondence with something, C, its object, as that in which itself stands to C. (Peirce 1902/1976, vol. 4, pp. 20-21)

Thus, the meaning of A, namely its domain of pertinence, the capacity of A to stand for C (the ground), does not lie statically in the relation A-C. Rather, it comes from the relation between B, namely A's interpretant, and C. In other words, B's entry into the chain of signs makes the relation B-C equivalent to the relation A-C and so forth along the on-going never-ending course (i.e. A-C=B-C=B'-C=B''-C=B'''-C=…-C).

Consider the following example. A person watches the sky (C) exclaims (or just thinks within herself) "how many clouds" (A). "It will rain shortly" (B). "I'd better take my umbrella" (B'). "It's a nuisance to have to take it with me" (B'') – "yet it is better to have it than to be completely soaked" (B'''). "I would not like to have to give up the week-end because of having caught a cold" (B''''). As one can see, the representamen A ("How many clouds") stands for the sky just for a certain capacity – the capacity to present many clouds. The sky is pertinent for this capacity, and not pertinent for any other potential capacity (for instance, for its capacity to appear blue). Yet, this domain of pertinence is not defined once and for all by the representamen A. Actually if there were no further (implicit or explicit) interpretant, there would not be any domain of pertinence. In the example, the domain of pertinence emerges only when the interpretant B comes into being. Before that, one cannot grasp the sense of A, simply because it is B that defines A's ground. When this happens, the A-C semiotic relation (i.e. A's function of standing for C, namely A's meaning) – is defined in terms of B, more precisely in terms of the equivalence between B-C and A-C. Thus, one realizes that the "capacity" of the sky that the statement "How many clouds" stands for, is equivalent to the sky's "capacity" to stand for the announcing of rain. And this "capacity" is equivalent to the recognition that it is better to take an umbrella, and so forth. This chain of equivalences between semiotic relationships defines the domain of pertinence and at the same time reproduces it through time. No sign grasps the object; yet the referential

tension is maintained through the ongoing, never-ending chain of interpretation, each of which rewrites and at the same time feeds the signs` semiotic relation of "standing for"[1].

The Phase Space Of Meaning

In sum, meaning is the way signs combine with each other in the recursive movement of interpreting how they stand for the object. Thus, meaning is the emergent property of the capability of semiosis to keep signs in (some kind of) correspondence with the reality they refer to *by means of their connection with other interpreting signs*, in turn in correspondence with reality by means of other interpreting signs, and so on in an infinite semiotic flow (cf. Figure 2). Every new interpretant somehow re-writes the relationship of equivalence that the previous sign has with the object; at the same time, in the very fact of doing so, it keeps this relationship active, opening to further potentiality of signification (Sovran, 1992). Thus, in the final analysis, meaning can be seen as the *trajectory of the chain of interpreting signs*.

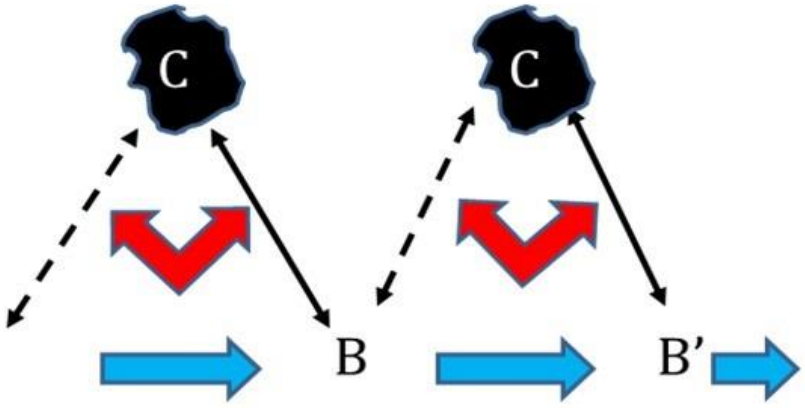

Figure 2 The semiotic chain

[1] The example above proposed uses signs corresponding to concepts. Yet, this does not means that signs are only conceptual. For instance, affective states, sensations, gestures, icons can work as sign (for a discussion of this aspect, in the perspective of an embodied theory of semiosis, see Salvatore & Freda, 2011).

It follows that *the sign in itself has no content*; rather, it has to be conceived of as a *space of potential relationality* (Visetti & Cadiot, 2002), namely the distribution of probability associated with the set of transitions to signs that may follow it. Complementarily, meaning is the reproduction/transformation through time of the equivalence between a sign and the following one, as such assumed to be equivalent to – therefore standing for – the original relation between the sign and its object.

The fundamental consequence of such a view of meaning is that *meaning is a function of the field* (i.e. of the trajectory expressed by the dynamics of the field). Any point contributes to the shape of the trajectory – in itself the point is devoid of any significance: its value is provided by the contribution given to the trajectory. If you like, the trajectory is like a journey: what makes it relevant is not where one arrives in itself, but where one arrives in relation to where one started from – the relation between the two points.

The view of meaning as a field dynamics, and more specifically as the trajectory of the chain of signs through time, lends itself to be the basis on which to refer to mathematical concepts for the sake of building an abstract model of meaning in terms of *phase space*. To this end, following a consolidated tradition in linguistics (e.g. de Saussure, 1916/1997; Jakobson, 1956/1971), it is worth depicting the semiotic flow in terms of two components: the syntagmatic and paradigmatic components. The syntagmatic dimension is the line of time whose points represent the sequence of signs that sustain/take forward the semiotic flow instant by instant. The paradigmatic dimension is the class of signs that can be activated in any instant of the semiotic flow, namely it is the dimension each point of which represents one of the infinite signs that could be potentially instantiated at a given point of the syntagmatic axis. Thus, as Figure 3 shows, the trajectory of signs moves through the syntagmatic axis in terms of the instant by instant selection of a point on the paradigmatic axis[2].

[2] It is worth observing that both syntagmatic and paradigmatic axes are considered here as one dimensional; this is so for the sake of simplicity. To be precise, both should be conceived as hyper-dimensional. The syntagmatic axis is the reductive representation of a plurality of temporal scales that run coextensively through the semiotic flow – i.e. just to focus on the domain of language, the transition among signs can be mapped at the level of words as well as of utterances, topics, and so on and so forth (for a model of the mind as working contemporarily on a plurality of temporal scales, see Manzotti, 2006). The paradigmatic dimension has to be considered as a hyperspace each dimension represents a peculiar form of equivalence among signs, namely a specific distribution of probabilities of relationships among them (see below, the notion of scenario). For instance, the words “banana” “apple” and “sphere”

The bi-dimensional space defined by the syntagmatic and paradigmatic axes can represent the basic phase space of meaning. Each point of such space maps the signs instantiated in a certain time t, as the interpretant of the sign occurred in the time (t-1), in turn followed by the interpretant in the time (t+1). Accordingly, the meaning emerging from the semiotic flow consists of the shape of the trajectory thus defined.

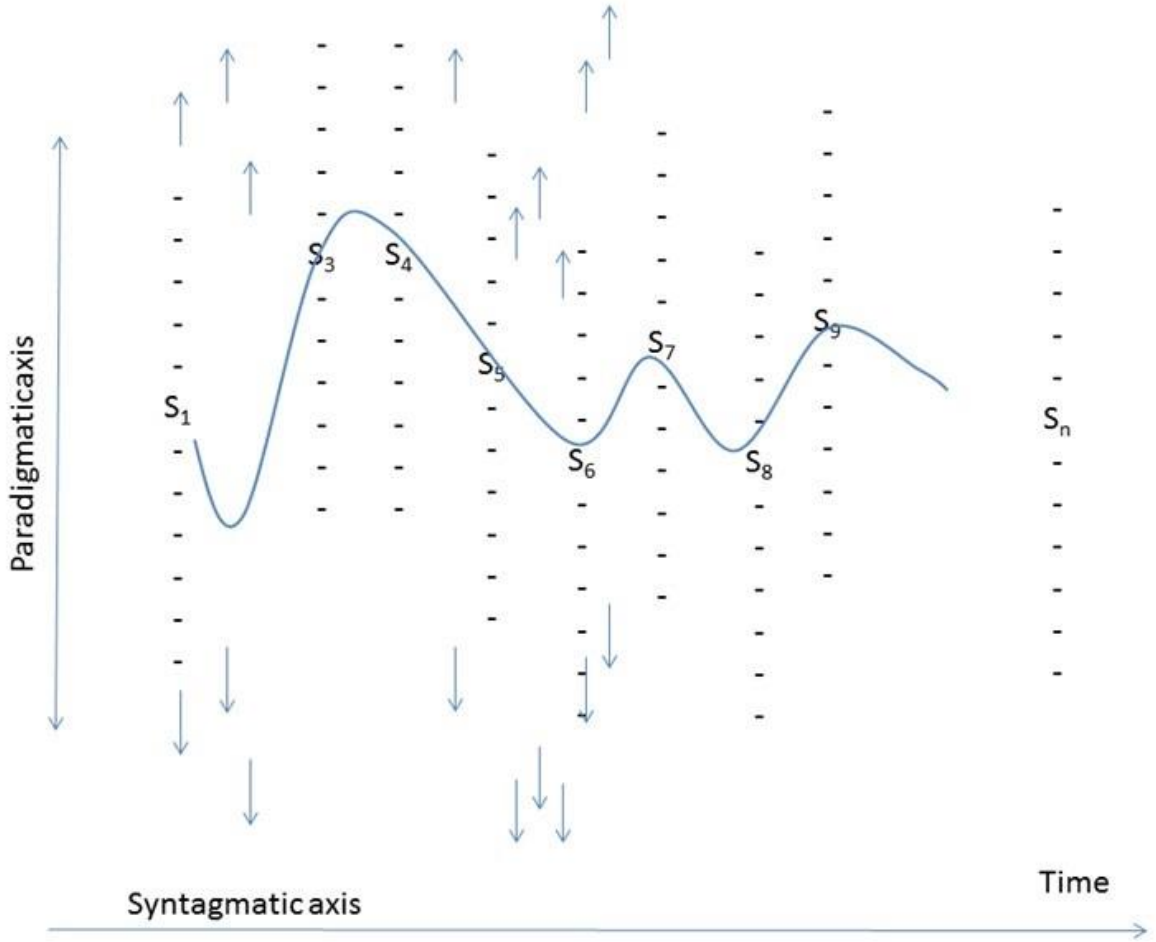

Figure 3. Meaning as the shape of the trajectory of signs (S)

do not have a single relationship with each other's. Their relationship can be mapped in terms of two dimensions – on one of them, "banana" and "apple" have the highest probability of being engaged in a relation of equivalence (e.g. the one concerning their capacity to be eaten), compared to "banana" and "sphere" and "apple" and "sphere". On the other dimension, "banana" and "apple" have the highest probability (the dimension concerning the form) to be related between each other's. From a computational standpoint, it could be demonstrated that, with N being the number of signs of the paradigmatic class – i.e. the signs that can be selected to "occupy" the syntagmatic slot – then the dimensionality of the paradigmatic hyperspace is virtually N-1.

The Dimensionality of Meaning

Further considerations need to be added to the latter statement in order to be fully clear in its theoretical and methodological implications. First, it is worth noting that the fact that the paradigmatic dimension is infinite (as any line that holds infinite points) represents at the level of phase space the polysemy of any sign. It has to be clear that such polysemy is something more and different from the fact that many signs (first of all words) are associated with multiple semantic content. The content, even if multiple, is however something already given, associated in a static, invariant way to the sign, as its inner property, as it were. Instead, polysemy is an inherent consequence of the field contingency of meaning, namely of the fact that meaning is not within the sign, but is produced locally, due to the way the sign enters relationship with previous and following signs – in the final analysis, the polysemy consists of the property of any sign to be able to relate virtually with any other sign and therefore to participate to the emergence of an infinite set of meanings (i.e. of an infinite domain of pertinence).

Second, the very recognition of the inherent polysemy of signs raises the central issue of how the new sign is selected as interpretant from the paradigmatic class. To put it in computational terms, if the paradigmatic axis were characterized by an asymmetrical distribution of probability (namely the signs' probability of being selected as interpretant), this would make it easy to select the sign – but no polysemy would be possible, because the asymmetry would establish the sign to be selected (i.e. the most probable). On the other hand, if the distribution of probability were symmetrical, namely all signs had the same probability of being selected, then no sign would be selected, because no discrimination would be possible. So, what is the way out of such a puzzling issue? A solution is to assume that the distribution is globally symmetrical (and this guarantees the polysemy) and locally asymmetrical (and this allows for the discriminative selection). Such a solution entails considering the distribution of probability of the paradigmatic class as *a distribution of distributions of probabilities*, each of them characterized by an asymmetry in the values associated with signs. In terms of an image, the paradigmatic class should be seen as an overlapping of slices, each of them defining a specific set of asymmetrical relationships among signs. A way of outlining this kind of meta-distribution is provided by the

geometrical description of a multidimensional matrix of data subjected to a Principal Component Analysis. If one uses all the components extracted, and projects the singular variables on the hyper-dimensional phase, the space so defined, what obtains is a cloud of points that is very similar to the description of the paradigmatic class provided above – any sign could be equivalent to an infinite number of other signs, at least one for any component extracted.

As the analyst does in the case of Principal Component Analysis, the same happens in the case of sensemaking (for an interpretation of the emergence of meaning in terms of component analysis, see Andersen, 2001): a subset of the components (i.e. a slice of the whole distribution) is magnified (Eco, 1975) and in so doing a specific distribution of probability is made to work. Incidentally, several models focusing on different psychological phenomena (learning, communications, semantic comprehension) adopt the same basic idea entailed in the previous thesis, namely the fact that meaning can be modelled in terms of the reduction of the dimensionality of the phase space (Andersen, 2001, Landau & Dumais, 1997; Salvatore Tebaldi & Potì, 2006/2009).

Scenarios and their Dynamics

The latter considerations lead us to conclude firstly that the sign that follows is selected from the paradigmatic axis due to the fact that a certain "slice" of the latter is involved. Any slice represents a local asymmetrical distribution of probability in accordance to which some signs are more probable than others to follow as interpretant, others are possible but not probable, others are very improbable, even impossible. In sum, any slice represents a form of boundary constraining the infinite polysemy, "imposing" an order, making a hierarchy of probabilities on the paradigmatic axis.

In a previous work (Salvatore, in press) one of us have proposed interpreting this form of boundary as a *scenario of experience* (henceforth, scenario), namely a redundant domain of life characterized by a somehow stable dynamic network of co-occurring signs, and therefore a particular distribution of the probability of their being related. In the sense used here, the scenario is a meaningful unit of subjective experience of the world: culturally defined markers – segmentation of activities, scripts, social roles, modalities of communication, spatial-temporal

units of perception and action, articulations of the material environment, and so forth – segment the flow of experience into discrete clusters of co-occurrences, namely in lived events endowed with existential value for those who experience them (for a similar view, see Stern, 2004).

The scenario at stake plays a twofold role in the dynamics of sensemaking. On the one hand, it is the product of the previous chain of signs. In other words, the way previous signs have been combined in the semiotic flow defines which set of scenarios is at stake. On the other hand, the scenario at stake works as the attractor shaping the trajectory of the chain of signs. This means that the following sign is selected from the subset of signs making up the scenario in question – it is the fittest sign (the most probable) given that particular scenario. This means that the set of scenarios at stake works as a constraint on the paradigmatic axis and in so doing it leads to the selection of the following sign, which in turn helps to reshape the scenario. For instance, imagine that in a certain circumstance of communication the utterance "she is a girl" comes about when the ongoing flow of signs has made pertinent a scenario somehow focusing on the valorising of age. This scenario will work as a mode of selection on the possible following sign: it will make it more probable that the following sign is selected among the ones that will keep the youth-age opposition in play, rather than, say, the subset of signs concerning the beautiful-ugly or male-female opposition and the like. Thus, the following sign could be something like: "yes, she is still young" or "but she is so mature for her age" and the like. And according to which following sign occurs, the boundaries of the scenario are reproduced or change, in a more or less relevant way.

According to a phenomenological standpoint, any set of scenarios corresponds with a specific *domain of sense*. Insofar as the boundary is set, the trajectory of a sign is loaded with a certain domain of sense. In the sense used here, the domain of sense is the subjective equivalent of the dynamics of scenarios – it stands to the boundaries of the scenario as the experience of hotness is to the dynamics of molecules. Thus, any trajectory of signs activates and reproduces through time a certain dynamics of scenarios and in so doing it is experienced by subjects as the (domain of) sense the signs implement.

One can arrive at a topological interpretation of the interplay between trajectory and scenario. The trajectory, in the way it unfolds, shapes the topology of the phase space, determining curvatures in it that work as attractors towards the ongoing trajectory. One can image

such a dynamic process in terms of the movement of a heavy ball on an elastic sheet. The movement of the ball on the sheet changes the shape of the sheet, creating a specific panorama of dips that determines the further trajectory of the ball.

The latter analogy leads us to conclude that the trajectory of signs in which meaning consists is not only a dynamic phenomenon; it is also non-stationary in the sense that the way of working of the trajectory – its shape – changes through time as a result of the way it works – the trajectory modifies the topology of the distribution of probability of interconnection among signs (i.e. the set of scenarios). The distribution works, in turn, as an attractor for the trajectory, in a recursive global dynamics where input and output can be distinguished only in conventional terms.

The Sensibility to the Final Condition: Normativity and Variability of Sensemaking

It is worth adding one last comment. The model proposed above is able to take into account two seemly contrasting properties of sensemaking, namely the fact that it is constantly open to variability while at the same time it works somehow in a normative way, namely by showing a redundancy which allows individuals to coordinate with each other and to have the experience of being part of a shared world. Take what happens in the case of language. Two trajectories of linguistic signs hardly ever follow the same path, even when it is the person himself or herself who performs them. Nevertheless, this does not hamper a certain level of predictability on the further development of the trajectory. Usually, we cannot forecast the specific word that will follow, but we expect that this word will be selected from a certain domain – and this is made evident by the reaction of surprise when incoming words do not match the expectation. Broadly speaking, commonsense considers such variability as depending on the intervention of the subject's intentional will or as a result of malfunctioning (i.e. madness) or of further situational factors - e.g., the person has answered Z (instead of the expected X) because she wanted to pursue W/ because she has the problem P/ because S led her to move from X to Z. Yet explanations like W, P and S are, at the best, general post hoc descriptions, linguistic transformations of the event to be explained (Smedslund, 1982), that do not solve the issue of modelling Y in terms of the specific dynamics of sensemaking producing it. Moreover, this kind

of solutions are inevitably exposed to the homunculus fallacy – namely the fact that the explanation just moves the problem of providing a model of the mechanism involved a step ahead instead of solving it; namely it leaves open the issue of how W, P or S work and are able to provide Y as their effect. In the final analysis this makes us conclude that the trajectory of signs has to be considered as subject to deterministic rules and that the explanation of Y requires that such rules have to be modelled. Moreover, these deterministic rules have to be able to model not only X, but also the fact that X is selected when Y is also a potential alternative. In other words, the model of sensemaking has to address the variability X <>Y.

The model of meaning proposed above offers a solution to this puzzling issue. The interplay between variability and normativity of meaning lends itself to be understood as the precipitate of the historicity of sensemaking, namely of the fact that the mind is shaped by the whole history of the co-occurring signs it has been exposed to. A possible way of depicting how historicity of sensemaking plays a role is briefly outlined below.

Once we have taken a long enough time span, some patterns of sign co-occurrence prove to happen with a frequency higher than one - incidentally, this means, at the computational level involved here, that culture lends itself to be conceptualized as the redundancy of the symbolic environment. Now, even if such frequency is quite low, it will be relatively much higher if compared to the frequency of the infinite patterns of co-occurrence distributed within the time span; namely, due to the fact that in a long enough time span the number of patterns is extremely high – almost infinite - their probability tends to 0. Therefore, the very fact that one pattern comes about a second time makes the difference. Now, if one assumes the multidimensionality of the distribution of probability making up a certain scenario, it can be concluded that some of these components map the patterns of signs with high relative frequency. In other words, these components represent the basic communality crossing the intra and inter-individual experience – they are the precipitate of the exposure of persons to the same cultural redundancy across space-temporal circumstances. So any scenario has to be conceived of as having a homogenizing ground working as the “semiotic gravitational force” feeding the normativity of sensemaking. As a result of such semiotic gravitational force, even if no sign trajectory is identical to any other, the instantiation of a new sign is kept constrained so to allow sensemaking to reproduce the condition of redundancy which, in the final analysis, makes up the domain of sense.

On the other hand, any person has his or her own idiosyncratic map of the scenario, representing the precipitate of the trajectory of signs experienced in his own life. As we have said, some components of this distribution represent an inter-individual and intra-individual common ground, reflecting the redundancy of the symbolic environment and its constancy through space-temporal circumstances. Yet other components are the precipitate of the peculiar experience of the singular person. To say it in terms of an analogy, a scenario is like a wave that can be decomposed in a cumulative array of waves having different frequency and length. In the case of the scenario we will have a basic wave that is constant, and a lot of more or less important waves, representing the idiosyncratic components of the experience.

The last considerations provide the basis for understanding the variability of the sensemaking, both at the intra and inter-individual level. While the gravitational force expressed by the grounding components constrains the paradigmatic variability within a certain area, the idiosyncratic components of the scenario guarantee that in any circumstance of sensemaking the trajectory of signs is also a function of the uniqueness of the participants involved in it. And this means that sensemaking is determined by the collective history of its unfolding but that does not mean it locks out the local variability (even innovation) as produced by means of the situated interplay of the idiosyncratic components of meaning makers' biographies. One could say, paraphrasing the basic tenet of chaos theory, that sensemaking is *a deterministic system sensible to the final conditions*.

Significance in Praesentia (SIP) and Significance in Absentia (SIA)

These considerations lead meaning to be seen as *bivalent* (Abbey & Valsiner, 2005; Carli, 2007; Valsiner, 2007). On the one hand, it has an observable, perceivable side: the portion of the world (better, of world transformation) used as sign – e.g. a sound, a gesture, an image as well as an event, a body state. On the other hand, it consists of the pertinent set of scenarios working as the condition for selecting the subsequent sign. This border is the second component of meaning. It defines the pertinent subset of the infinite set of signs that are virtually available. Pertinent following signs are the ones that *may* follow the representamen as a valid ("meaningful") interpretant of the relation of equivalence in question. For instance, faced with a photo of a cake

people can react in a great many ways, but one can imagine a great many other ways that are not usually acted out. For instance, one does not usually say: "please put the rest of the photo in the refrigerator after cutting your slice".

In other works (e.g. Salvatore, in press), one of us have proposed calling the former side *significance in praesentia* (SIP), reserving the name of *significance in absentia* (SIA) for the latter component. Accordingly, the bivalence of meaning lies in this: meaning *is the effect of the cooperative tension between SIP and SIA through time:* the dynamic positioning of signs within the field of possibilities making up the SIA.

It is worth adding two further considerations.

First, SIA is not a SIP that does not occur or that it is hidden. Rather, it is an inherent component of meaning, namely the pertinent gestalt of linkages among signs in terms of which the following interpreting signs is selected. As conceived here, then, the SIA is not a content; rather, it is *the condition of interpretability of signs*, according to which their linkage are experienced as content. And this means that the SIA is not represented; rather it is enacted, namely it is instantiated and reproduced through time by means of the action of producing the interpreting signs.

Second, the bivalent view of meaning entails a view of the part-whole relation that lends itself to being considered a version of the hermeneutic circle. In fact, the SIA does not come before the SIP, as a super-order meaning framing the selection of the following sign. Such a view would let in through the back door the reification of the meaning that has been ushered out through the front door. Thus, it is more consistent and plausible to conceive the selection of the SIP and the instantiation of the SIA as two outputs of the same iterative mechanism of optimization of the form of experience: the new sign is selected as the fittest solution within the constrains defined by the SIA which, in turn, are shaped so as to allow the optimization of the solution. Thus, parts produce the whole which at the same time guides the activation of the parts.

Free schema crosswords provide an image of this mutually interactive constitutive tension between *parts* and *whole*. Free schema crosswords cannot be solved by separating two such components – i.e. finding the right word and the definition of the constraints defining the compositional order of the words. It is not possible to address them as two sequential tasks, to deal with one before the other, because both tasks require that the other task is addressed in order

to be addressed – one has to search for single words in order to establish the constraints and at the same time establishing the constraints is one of the criteria thanks to which single words are selected.

The iterative mutual constitutive tension between parts and the whole proposed above could seem counterintuitive. Yet, this is so only if one assumes the commonsensical conception of the non-extensionality of points of time, namely that time is made by elementary units (i.e. instants) devoid of duration. As thoughtfully discussed by Stern (2004), psychological time does not work in this way. The psychological instant has a duration. And the enduring psychological instant of time is the temporal room hosting the iterative tension between bottom-up process of inference and top-down constraints.

During the psychological instant the enactment of the SIA is more precisely than the enactment of a variation of the SIA. Indeed, the iterative process does not start any instant from 0; rather it moves from what is already involved, introducing progressive variation in the search for the optimal solution. Accordingly, one can conclude that the effect produced by sensemaking consists of such a variation of SIA - a variation of the domain of sense. Humorous stories often provide clear examples of the latter statement. Take the following funny story. A patient goes to the doctor and says: "Doc, every time I have a coffee, I feel a pain in my right eye". The doctor answers: "Have you tried taking the spoon out of the cup?" What is funny about this story? In the terms of the model provided above, the shift of sense generated by the sudden variation of the boundary of the SIA. As the story starts, the linguistic cues (doctor, patient, pain) contribute to a SIA keeping the trajectory of signs in the domain of sense about health problems, illness, medical semiotics, and so forth – as it were, a scenario of *"caring for sufferance"*. The interlocutor's reply provides a sudden shift, instantiating the image of a person able to damage himself or herself by the very simple act of drinking a cup of coffee – a scenario of "*handling stupidity*"

Summary

In this section a semiotic and dynamic model of meaning (DSMM) has been presented. The model can be summarized in terms of the following tenets.

a) *The ontological primacy of sensemaking.* Meaning is not an autonomous entity existing before

the process of its production and communication (sensemaking). Rather, it is the field form of such dynamics (see point b)

b) *Meaning as a field property.* Meaning is not the content of the sign; rather it consists on the way signs iteratively combine the each other in the local circumstances of communication.

c) *Ontological homogeneity of meaning and action.* Meaning and action cannot be distinguished ontologically from each other – meaning is a form of action and action is the way sensemaking unfolds. Needless to say, this does not mean that meaning and action cannot be separated (just nominating them differently one does so). Rather, it means that a distinction of this kind is an epistemic operation whose validity depends on the heuristic project pursued, rather than the mirror of a state of fact.

d) *Meaning is bivalent.* It has a sensible side (the SIP) and a latent side (SIA) defining the condition of interpretability of the former. Meaning emerges from the cooperation of such components, namely as the position of the SIP within the SIA of and the complementary transformation of the SIA.

e) *The hermeneutic circularity of sensemaking.* The relation between SIA e SIP has to be conceived in terms of iterative mutually constitutive tension. The selection of SIP is performed through the optimization of the SIA and, at the same time, the enactment of the SIA is performed in terms of the optimization of the SIP.

f) *Meaning's sensitivity to the final condition.* The redundancy of the symbolic environment produced by the historical sedimentation of the practices of communication (i.e. the way signs have been combined with each other through time, so as to make each person exposed to certain distributions of frequency of co-occurring signs) works as a basic attractor modelling the shape of any current trajectory of sign. In this there is the normative valence of sensemaking. At the same time, however, idiosyncratic components of the personal biography of exposure to the symbolic environment works locally, in the situated circumstances of communication, as sources of intra/inter individual variability of sensemaking.

TO MODEL SENSEMAKING. METHODOLOGICAL CONSIDERATIONS

In order to model sensemaking first of all one has to define what aspect of it has to be modeled,

what it is important to know about it. Needless to say, the answer to this basic issue depends on the theoretical framework adopted. The DSMM provides the following general answer: *the aim of the analysis of sensemaking is the modeling of the phase space of the trajectory of signs, as it is shaped by the dynamics of the SIA.* In other words, analyzing sensemaking means understanding the SIA that grounds the production of signs, their capacity to interpret - and to be interpreted by - other signs, therefore to create feelings, thoughts and acts.

It is worth highlighting the peculiarity of the methodological approach proposed above. According to it, the scientific investigation of a semiotic phenomenon does not consist only of the collection/description of its representational elements (themes, symbols, images, and the like). Rather, the investigation has to be aimed at *modelling the semiotic landscape* (to use the DSMM term, the SIA) that works as the *condition of interpretability* of those representational elements.

The map of the semiotic landscape is a challenging methodological task for psychology and more in general for social science. The actual challenge comes from the field and dynamic nature of sensemaking, as it has been discussed in the previous paragraphs. The field nature of sensemaking is reflected in three basic phenomenological characteristics of meaning: *contextuality*, *situativity*, and *time-dependency*. In what follows, each characteristic is briefly outlined, together with the basic methodological implications deriving from it as well as a strategy of empirical investigation providing an exemplificative implementation of those implications.

Contextuality Of Sensemaking: The Focus On Patterns

The view of sensemaking in terms of a trajectory of signs, as outlined above, has to be recognized to be a simplification. Indeed, the syntagmatic axis is hyper-dimensional as well (see footnote 2). This means that in any instant of time a set of co-occurring signs are made pertinent on the paradigmatic axis, rather than a single element. Thus, what is relevant is not the occurrence of the sign in itself, but the relationship amongs them: which other signs come together with the sign.

The recognition of the contextuality of sensemaking leads to methodological approaches that take patterns of co-occurring elements as their unit of analysis. According to the logic of pattern analysis, what is significant, endowed with informative power, is not the single element

(e.g. a certain sign, a certain semantic content, a given word or behaviour), but the co-occurrence of several elements whose interpretation reflects their way of combining with each other. In this there is the difference between a pattern and an aggregation of elements: the elements of an aggregation have a meaning before their coming together, the elements of a pattern acquire their value due to their being part of the pattern.

Methods of automated textual analysis provide examples of pattern analysis. In the last two decades, sophisticated approaches have been developed, aimed at taking into account the contextuality of lexical and semantic units (Chartier & Meunier, 2011; Lahlou, 1996; Lancia, 2012; Salvatore, Gennaro, Auletta, Tonti& Nitti, 2012; Veltri & Suerdem, 2011). Regardless of their methodological and theoretical differences, such developments can be conceived of as many instances of pattern analysis. In the terms used by Chartier and Meunier (2011), the basic idea grounding such approaches is that " […] the meaning of a word is measured by the set of works that co-occur within it in a given context of enunciation, usually a window of a few words, a sentence or a paragraph" (p. 5). From a computational standpoint, the detection of the patterns of co-occurring words is carried out through procedures of clustering analysis, applied on a data matrix with context units in rows, lexical units (e.g. words, lemmas) in columns and presence/absence values in cells. The clusters thus obtained are interpreted as sets of statements that, given their similarity to the words they share, can be seen as having a common semantic core.

Thus, the contextuality of the meaning is taken into account in its intra-textual component – the textual surrounding within which the combination of words with other words makes them acquire their situated meaning. Needless to say, the anchorage to the intra-textual dimension of context is only a partial reconstruction of the multidimensionality of the meaning. Paralinguistic, pragmatic and performative components of meaning are not considered. Nevertheless, even if only partial, the anchorage to the context has proved to enhance the heuristic power of analysis: Salvatore Gennaro, Tonti and Nitti (2012) showed that an automated procedure of thematic analysis implementing the logic of the pattern analysis (i.e., focusing on the detection of word co-occurrences within sentences) reaches significant standard of validity. More in particular, it has been showed that this kind of analysis is able to overcome a like-Turing test – i.e. to result undistinguashable from parallel analyses performed by expert researchers.

Specifically, a textual corpus (the transcript of a psychotherapy) was subjected to the automated analysis. At the same time, 3 skilled analysts were asked to perform the same tasks of semantic analysis (on the same textual data) – namely comparison of the semantic similarity among context units and their classifications in semantic classes. The main result was that the differences among researchers were even broader than the differences between the automated method's output and the researchers' outputs; accordingly, it was not possible to distinguish these two kinds of outputs.

The Situativity Of Sensemaking: The Subject Of Meaning

As DSMM models it, sensemaking is a matter of signs that, through their ongoing interpretation of previous signs, keep alive the tension between the semiotic world and what feeds it from the outside (even if, strictly speaking from the standpoint of the semiotic domain there is no such thing as the outside). Accordingly, meaning is inherently local, consisting of the ongoing shape of the trajectory of signs - more precisely, of the ongoing backward transformation of the semiotic landscape produced by the incoming sign. Thus, sensemaking is situated not only because it can occur in local circumstance of communication – and this would be obvious – but above all because it consists of the instant by instant transformation of such local circumstance.

The recognition of the situativity of sensemaking raises the important issue of the conceptualization of the participants in empirical studies as sources of the meaning to map. Many studies decide the subjects to be involved as participants in terms of their membership of a certain group (e.g. student, worker, French) and/or of the membership of a certain socio-demographic class (e.g. adolescent, male). This definition is then used as the grounds on which the data are collected and the results are interpreted and generalized. In the final analysis, considering subjectivity as the grounds of membership leads us to see data (broadly speaking, interviews, answers to questionnaire, acts) coming *from* a given subject, as being *of* that subject, reflecting his/her characteristics. On this basis, subjects can be aggregated and the data collected can be assumed to be informative of the class of membership on which the aggregation has been carried out. Thus, N individuals may be selected because they are members of the category X (students, immigrants, soccer supporters and so forth) and the data obtained (for instance the transcripts of

interviews or answers to a questionnaire) are aggregated because it is assumed they concern X. Moreover, the redundancies and variety within data are interpreted in terms of the similarities and differences within X (i.e. in terms of the comparison among subclasses X_1, X_2…). Finally, interpretations are generalized to the whole population X. For instance, Scheidegger and Tuscher (2010) have showed that students' social representations of the economic system are affected by subjective knowledge of economics majors. They arrived at this result by adopting the following research design: students (X) were segmented in subclasses defined by the academic major they attended (X_1 vs X_2) and such subclasses were used as independent variables in a regression analysis with the social representation as dependent variable.

Now, the recognition of the situativity of sensemaking leads us to question the "independence" of the subject from the system of meaning. Consider the following excerpt of the interview of Sultana, a young woman living in the States. The interview was carried out in the context of a study on the culture of Muslim Indian immigrants in California.

> As you grow older, it becomes your own responsibility to take on and learn about your religion, I've been doing that, reading books, going for lectures, things like that. I got involved in my responsibilities to learn about my religion as I grew older. A group of students for learning religion – in masjid [mosque], Sunday school, talks about various topics. [I] Went a lot in elementary, middle and high school; both me and brother. He is also a practicing Muslim, is very involved in the practice of Islam. He influenced me in my choice of joining MSA [Muslim Students Association] (Sultana, a 21-year-old girl, Muslim, daughter of Indian parents, living in California, a student…) (Sriram, *in press*).

We have a speaker – Sultana – but so many pieces of membership – so, who is the subject that speaks? Sultana could be involved in so many studies – studies sampling girls, Californian people, immigrants, Muslims. The fact is that such pieces of membership (and of the self) do not form an accumulation. Rather, they interact dynamically with each other and form a nonstationary balance within, through and because of the local dynamics of sensemaking. To say this in DSMM terms, Sultana's subjectivity is a matter of field dynamics.

As a result, it is worth to consideral a terms reversal. Instead of assuming the content of the

subjectivity as a priori defined by membership, one should start from the meaning and use it as the frame for understanding the subjectivity. In other words, instead of asking: `what is the system of meaning of group $X_1$ and how does it vary from that of group $X_2$?`, one should ask: `how does the system of meaning vary and how does such variation lead forms of subjectivity to emerge?`.

An example of a study adopting this logic of analysis is provided by Guidi and Salvatore (in press), aimed at analyzing how students' parents represented the school system. To this end, the authors proposed a questionnaire to a sample of parents in several Italian schools. The questionnaire concerned aspects of the micro and macro social environments (e.g., evaluation of social structure and institutional reliability); representations of the (local and national) school system (e.g., opinions about the main school functions and goals; problems with the school system…); representation of the teacher's role and function (e.g.: teachers' mission; teaching aims; characteristics of the "good teacher"…); school service satisfaction models (e.g.: feeling/judgement about school service and teacher qualification according to different criteria, such as school environment, equipment and supplies and so on and so forth). Moreover, information about parents concerning socio-demographic (e.g. gender, age, profession) as well as role characteristics (namely parents' relation with the school, e.g. number of children in the school, years of contact with school, distance home-school) were collected. Answers to questionnaire were analyzed through a multidimensional procedure (multiple correspondence analysis and cluster analysis) aimed at detecting patterns of response modalities among respondents. Each pattern was interpreted as the cue of a corresponding model of representation of the school system and participants clustered in terms of the way they responded. Finally, the cultural segments were described (in their similarities and differences) in terms of the socio-demographic and role indicators. What is relevant here is to highlight how this study proposed a reversal – at first the differences within the system of meaning were mapped (in terms of models of representation), and then they were used for the sake of interpreting the psychosocial value of the characteristics of micro and macro social inscription. The latter approach seems to be more consistent with the assumption that the content of subjectivity – in this case, "parenthood" - is not something that is autonomous and exists outside from the dynamics of sensemaking within which it is addressed. Rather, the subjectivity emerges through and in terms of situated positioning

within the semiotic dynamics.

The latter statement raises a methodological issue. Insofar as studies aimed at mapping dynamics of sensemaking have to start from the meaning rather than from a prefixed social category of membership, the problem of defining the universe of investigation comes into play. This is so because in most cases the universe of investigation needs to be described in terms of groups of individuals. For instance, in Guidi and Salvatore's study, the universe consisted in students' parents, individuals identified by means and in terms of their membership to a social category ("parenthood"). So, one could here argues that the suggested reversal is only apparent.. This is not necessarily true, if the definitional anchorage of the universe is conceived in terms of the participation to a system of activity, rather than in terms of the membership to a social category. This methodological tenet rests on the idea of the situativity of the dynamics of sensemaking. Accordingly, any system of meaning is embedded and at the same time emerges from a lived context of interaction addressing a certain object, more or less explicitly identified. Given that, the universe of meaning (i.e. the identification of the individual involved in that dynamics of sensemaking) has to be defined in terms of the common condition of relation to such an object. This condition is often depicted in terms of a social category (e.g. parent, student, immigrants). Yet the overlapping is only apparent, because there are significant differences between using the category of membership as the definition of the universe and using it to interpret differences of meaning within such a universe. First, in the former use, membership of a category is not the marker of a state (being a parent), endowed with its own psychosocial characteristics, but of a situated process (be engaged in the activity of addressing a certain object). Second, and consequently, when the category is used for defining the universe, it works as *explicandum* – i.e. what has to be understood – while when it is used to interpret the variability of the system of meaning, it assumes the logical position of *explicans* – i.e. what is used to understand. Needless to say, the distinction here proposed could be a matter of theoretical interpretation of the conceptual framework of research designs rather than a matter of empirical differences amongst the latter.

Time Dependency. The Study Of Transitions

To consider sensemaking in terms of trajectory entails recognizing its inherently temporal structure. Relations among signs are necessarily temporal relationships – what is close in the trajectory of sensemaking is what is near in time (namely on the syntagmatic axis). Thus, time is not only the container within which meaning unfolds: time has a constitutive role in sensemaking (Lauro-Grotto, Salvatore, Gennaro & Gelo, 2010; Nitti, Ciavolino, Salvatore & Gennaro, 2010; Salvatore, Gelo, Gennaro, Manzo & Al-Radaideh, 2010; Salvatore, Tebaldi & Potì, 2009). To exemplify this tenet, consider the following two statements:

X= I totally disagree with you but I am your friend

Y= I am your friend, but I totally disagree with you

As it is clear, X and Y are constituted by the same subset of words, but, due to the fact that their order is different, they have different meanings: X focuses on the connection and the need to defend it from the threat provided by the disagreement. Y gives a sense of someone who makes the disagreement pertinent, despite the friendship. In X the friendship is on the foreground and it works as the value magnified by the act of communication. In Y the disagreement is on the foreground and the friendship acquires the valence of a virtual constraint on the autonomy of actors who are negotiating their own divergent positions. In sum, sensemaking is carried out not only by the means of *what* is said and of *how* it is said, but also by the means of *when* what is said is said – before and after what.

Following these considerations, time-dependency is a related, but different characteristic from the historicalness of meaning. Historicalness concerns the fact that the meaning *evolves over time*; whereas time-dependency concerns the idea that time is a constitutive condition of meaning – accordingly, meaning *works by the means* of time. This means that the longitudinal approach, aimed at mapping the historicalness of meaning, is a necessary (see Bauer & Gaskell, 1999; Sammut, Tsirogianni & Wagoner, 2012), but not sufficient methodological tenet. It has to be complemented by a micro-genetic view aimed at mapping the time-dependency, namely at modelling the emergence of the meaning from the local dynamics of transition between a sign and what follows it, unfolding alongside the syntagmatic axis.

In a recent study (Salvatore, Gennaro, Auletta, Grassi & Rocco, 2012), the probabilities of

transition among thematic contents, as a marker of the dialogue between a patient and her therapist, were computed. To this end, the authors firstly identified the set of thematic nuclei characterizing the communicational process across several psychotherapy sessions . This task was performed through the automatized method for content analysis presented above (Salvatore et al, 2012). After that, the Probability of Transition [$PT(j_{t+1}|i_t)$] of each thematic nucleus toward every other thematic nucleus (including itself) was computed. The calculations were made separately for each session of psychotherapy. The $PT(j_{t+1}|i_t)$ was defined as the probability that, given a sequence S of a finite set of states M (with states M_i i=1….n) the state *i-th* occurring in the temporal unit t was followed by the state j-th in the subsequent temporal unit (t+1).

$PT(j_{t+1}|i_t)$ was calculated as the relative frequency of the sequence:

$$PT(j_{t+1}|i_t)_S = k/p$$

where *k* is the frequency of the occurrences of the states i_t-j_{t+1} in the sequence of state S and p is the number of states i in the same sequence. In this case S is the sequence of Units of analysis in which the transcript of the single psychotherapeutic session was segmented and the states M are the thematic nuclei. The most interesting result of the study was that some probabilities of transition of thematic nuclei were associated with the positive (or negative) clinical efficacy of the session (as evaluated by independent blind clinical judges).

THE ABDUCTIVE RECONSTRUCTION OF THE SEMIOTIC LANDSCAPE

Semantic And Semiotic

One last issue has to be addressed. The strategies and criteria of analysis discussed above offer some paths for mapping sensemaking. Yet, they are not enough to address the core task of socio-symbolic analysis, i.e., in the terms of the DSMM, the modeling of the semiotic landscape of sensemaking. The identification of patterns of signs and the analysis of transitions among them provides hints of the landscape, but they cannot be considered a complete description of it.

This point concerns with the distinction between two different levels of analysis, that accordingly to the considerations discussed above, we propose to label “semantic” and “semiotic”. According to the former level, signs are seen as endowed with an elementary semantic content, representing the minimal units of significance working as the building blocks of the system of meaning, with the latter regarded as an organization of semantic contents. Needless to say, such building blocks are not necessarily conceived as having a fixed meaning. Rather, insofar as the analysis is able to project them onto a salient context, they can be interpreted in accordance to it. According to us, these are the merits of analysis strategies like pattern and transition analysis. Yet, building blocks are assumed to have content in themselves, rather than acquiring it instantly, through the dynamics of their situated displacement. For instance, the patterns of words identified by Salvatore, Gennaro, Tonti and Nitti (2012) are interpreted on the basis of the assumption that each word has its own semantic content and that the content of the pattern resulted from the combination of those elementary contents.

According to the discussion presented in the first part of this paper, semantic content is not what moves sensemaking, but the product of the latter. More specifically, it is the generalization of the instant meaning emerging from the dynamics of sensemaking: a sort of pertinentization of the most frequent values that a certain sign acquires through the way it is used. This can be illustrated through the topological distinction between sense and meaning, proposed by Vygostky. According to him, "sense" is the "totality of the psychological events aroused in our consciousness by the word", while "meaning" as "only one of the zones of sense that word acquires in the context of some kind of speaking" (p. 305, as translated by Valsiner, 2001, p. 89). So, the semantic content can be intended as the zones of sense corresponding to a redundant use of the word, as emerging through a plurality of contexts of speaking. This is what the shift from semantic to semiosis consists in, to say not the negation of semantics but rather the enlargement of the analysis to the level of sensemaking where the dynamics of interconnection among occurrences (i.e. the context of speaking, as Vygotsky says) makes the latter emerging as a sign having its own content. By analogy, the enlargement from semantic to semiotic, in psychology, is the equivalent of the passage from classical to quantum physics. The latter does not cancel the first, but enables it to be considered a special case at a specific scale of observation.

The Abductive Inference of The Semiotic Landscape

The field and dynamic nature of sensemaking represents a methodological challenge for psychology and calls for a major innovation both in theory and in methodology (e.g. Salvatore & Tschacher, 2012). As a matter of fact, traditional psychological strategies of empirical investigation prove inadequate when the map of latent field dynamics is involved. Dynamics of this kind are a matter of relations, having a contingent linkage with their empirical content. This means that the same pattern of relations (e.g. a certain SIA) can be associated and implemented by different empirical contents (e.g. a certain set of co-occurring words) and, conversely, the same empirical content can be the indicator of different patterns of relations, according to the situated circumstances (Salvatore & Valsiner, 2010). Consequently, the inductive aggregation of data is geared toward providing a map of the semiotic landscape, because this strategy is based on the assumption that data have informative content about steadily related to the phenomenon to map (i.e. the state x of the marker corresponds to the state of the phenomenon x).

These considerations lead us to embrace the thesis that the map of the semiotic landscape is a matter of abductive reconstruction. This kind of knowledge building consists in producing inferences of the phenomenon through the empirical clues which are available. It is aimed at defining the minimal phenomenon whose (past or current) presence makes such clues meaningful. In other words, the phenomenon is reconstructed as it works as the grounds of the plausibility of the clues co-occurrences. For instance, take the policemen, who realizes that pieces of glasses are on the floor, under a broken window, and footprints are spread around the room. These co-occurring clues are mute, meaningless, parts of the same background where infinite other elements co-occur together with them (e.g. the colour of the wall, the temperature of the room and so on and so forth). As soon as the policeman abducts a phenomenon working as the scenario of the available clues – "someone must have broken the window to get inside" – the clues enter a gestalt, acquire plausibility, then eventually sense. Insofar as this happens, the reconstruction comes to be a meaningful inference as well.

Peirce (1897/1932) called this kind of inference the "unification of predicate"– if C (Phenomenon) is assumed, then the co-occurrences between A and B come to be meaningful; therefore, whenever C is A and B can be unified as a whole accordingly to it.

The difference between abductive and inductive inference is worth highlighting. Inductive inference addresses clues in order to extract redundancies from them and use them as the basis for the identification of regularity, which is the kind of knowledge it is designed for. Pierce (1897/1932) defines this work of induction as "the formation of a habit". Differently from inductive inference, abductive inference does not pursue the generalization of regularity. Rather, it uses a general model in order to interpret the clues by reconstructing the phenomenon through which these clues acquire meaning.

This difference is reflected on the operative level too, namely at the level of how one performs them. An analogy comes into play here. Inductive inference proceeds as if it calculated the greatest common divisor among clues, as it were: the largest amount of shared information within the empirical content of the units of analysis. Abductive inference calculates the least common multiple, namely the smallest gestalt able to encompass units of analysis so to integrate their empirical content in a meaningful whole.

In sum, we support the idea that the mapping of the semiotic landscape, understood as a latent field dynamics, has to be performed in terms of inferential reconstruction based on the abductive logic of interpretation of the (synchronic and diachronic) relationships among units of analysis.

A Strategy Of Data Analysis Supporting Abductive Inference

Abductive reconstruction requires a set of clues to start from. This means that abductive inference is not the first step of an empirical investigation, but the conclusive phase which comes after a previous process of investigation aimed at identifying/selecting/constructing the pertinent clues from the empirical field[3]. Following the analogy with police work, the first step of the investigation is the study of the scene of the crime in order to retrieve the right clues that can lead to the discovery of the murderer.

Below, we briefly present a strategy of analysis aimed at constructing an empirical basis for the abductive reconstruction of the semiotic landscape. It is based on the assumption of the oppositional structure of the SIA (Salvatore, Tonti & Gennaro, in press). This derives from how it

[3] Incidentally, this process of collection is guided by the general theory. This is why abductive inference is theory driven, rather than data driven, the way induction is (Salvatore & Valsiner, 2010).

is defined, namely from the assumption that the SIA is a form of constraint upon the combinatory activity of signs. Therefore, when a certain set of signs may follow as SIP, this means that a certain other set may as well but does not, while another set is not pertinent at all. This is also clear at the phenomenical level: for instance, the statement "he is a man" may be meant as |"he is not necessarily a baby"| or as |"he is not necessarily a woman"| or as |"he is not necessarily frightening"|. Any of these oppositions defines a specific boundary of the set of pertinent signs, creating a difference between those that may and those that may not follow. For instance, if the first opposition were at stake, signs concerning age, adulthood and so forth may follow, signs concerning childhood are unlikely to emerge (or are however far less probable), while signs concerning the weather would simply be non-pertinent at all.

Hence, any oppositional dimension corresponds to a component of the sense, a scenario in the terms of the DSMM. The more generalized this component is, the more polarized is its structure (Salvatore & Freda, 2011). Accordingly to such a view, the basic state of affective activations – positive versus negative – can be conceived as the polarized highly generalized embodied patterns of meaning which provide the basic semiotic differentiation of experience (Salvatore & Zittoun, 2011).

On the grounds of the assumption of the oppositional structure of the SIA, it is possible to conceive the semiotic landscape in terms of an array of pertinent extents of oppositional dimensions of sense, with each extent mappes a specific scenario, from the most generalized embodied affective ones to those concerning specific areas of sense (Salvatore & Zittoun, 2011). Given this, the semiotic landscape lends itself to be mapped in terms of multidimensional procedure of data analysis (in particular, Correspondence Analysis), applied on a matrix composed of units of analysis (rows) by SIP[4] (columns) and presence/absence values in cells. Correspondence Analysis breaks down and reorganizes the relationships occurring between signs in terms of a multidimensional structure of opposed factorial polarities; each polarity is characterized by a set of signs that tend to co-occur and, at the same time, to not occur the event which characterizes the set of co-occurrences on the opposite polarity. Accordingly, this structure can be interpreted as the operationalization of the phase space of the sensemaking, with any factorial dimension to be seen as an indication of a *latent component of sense* that is active in the

[4] Due to its flexibility, the MCA can be applied to various kinds and formats of data as well to mixed modes among them as well (e.g. answers to questionnaires, textual data, data describing behavior).

dynamics of sensemaking. Thus, the output of the Correspondence Analysis provides the empirical basis for the abductive reconstruction of the semiotic landscape (for details, see the study illustrated below).

Needless to say, also the factorial dimensions are depicted in terms of elements that, in the final analysis, can be used as clues insofar as a semantic content is attributed to them (for instance, a factorial polarity may be described in terms of patterns of co-occurring words). Yet this is not the same to say that the factorial dimensions *have* semantic content according to two main reasons First, from a conceptual standpoint, the main factorial dimensions are conceived and interpreted as indications of generalized, embodied components of sense[5] (Guidi & Salvatore, in press; Mannarini, Nitti, Ciavolino & Salvatore, 2012; Mossi & Salvatore, 2011; Venuleo, Mossi & Salvatore, submitted), and because of that they are understood as pre-semantic, grounding any enactment of signs without being fully grasped by any of them (Chartier & Meunier, 2011). Second, from a methodological standpoint, any component of sense is reconstructed abductively as the gestalt grounding the opposition between the two polarities. Due to this, by definition, component of sense are not obtained by the means of a composition of the information held in each polarity; rather, they are interpreted in terms of the information provided by the combination of the *in presentia* relationship (i.e. the pattern of co-occurring sings mapped by a single polarity) and *in absentia* relationship (i.e. the oppositional pattern of co-occurring signs mapped by the opposed polarity). In the information provided by this combination lies the specificity of the semiotic level of analysis: the factorial dimension is interpreted not in terms of the content of the pattern of co-occurring signs (i.e the pattern placed on the polarity), but in terms of which component of sense corresponds to the fact that the enactment of that pattern of signs is the instantiation of a specific network of *in absentia* relationship among signs (i.e. the enactment of a SIA). Take the pattern: [screwdriver, hammer, pincers]. Despite its invariant content, its sense can vary accordingly to the pattern it is opposed to. For instance, its sense may

[5] The factorial dimensions extracted by the CA are associated with progressively lower amounts of variability. This leads us to conclude that the first dimensions – that are associated with the highest amount of variability – are the ones associated with generalized components of sense. This is so because the more generalised component is, the more it spreads to the field of experience and therefore is able to affect (i.e. to polarize) the whole set of signs involved. For instance, when one feels very happy everything seems rosy, even things that have nothing to do with the circumstances that have triggered such happiness. Mannarini Nitti, Ciavolino and Salvatore (2012) have provided a source of evidence of this tenet, showing how the representations of different objects share a generalized pre-semantic ground of meaning, which binds the representations that at the level of content have no relation between each other's.

be |light and small objects|, if it is opposed to the pattern [lathe, press, excavator], in its turn interpretable as |heavy and big objects|; while it may be |tools| if it is opposed to the pattern [orange, rice, cheese], in its turn interpretable as |food |. Each of these two components of sense magnifies an area of the semantic content of the pattern. In the former case the area of the volume/weigh of the elements (in terms of the opposition light/small *versus* heavy/large elements), in the latter the area of their function/utility (in terms of the opposition tools *versus* food)[6]. Thus, *the content needs to be projected on the semiotic network of in absentia linkages among signs to be fully understood*.

It is worth to insiste on the latter point a bit more.

The map of the semiotic landscape provides a further level of interpretation of the content of signs. In particular, we focus here on the possibility of integrating the semantic interpretation of the co-occurring signs which derives from pattern analysis with the characteristics of the participants marking their subjectivity (see paragraph N *The situativity of sensemaking. The subject of meaning*). The central point here is that the Correspondence Analysis allows for the representation of any further variable on the factorial dimensions extracted from the data matrix. Such further variables are called illustrative, because they do not contribute to the definition of the multidimensional phase space, but are associated to the factor dimensions once they are defined. The patterns of co-occurring signs interpreted as indicative of thematic nuclei may work as illustrative variables in the Correspondence Analysis and the same can be admitted concerning the characteristics of the participants. In doing so, topics and subjects (as well as any other aspect researchers are interested in analyzing) may be interpreted in reference to the semiotic landscape, namely they may be mapped in terms of their position on the phase space of the meaning.

Sometimes the interpretation of the patterns of signs in accordance to the semiotic context may provide quite interesting and counterintuitive insights. This is so because it allows access to a level of analysis where it is possible somehow to put within brackets the semantic contents of

[6] As one can see, both oppositions can be interpreted in the other way too. For instance, the former opposition could be interpreted in terms of: |tools not requiring professional skills *versus* tools requiring professional skills|, namely in terms of a component of sense magnifying the modality of constraints in the usage of the elements, rather than their physical characteristics. On the other hand, what is relevant here is not the uniqueness of the component of sense magnified by a certain opposition (any opposition is opened to a plurality of interpretation, though constrained by the extension of the opposed patterns); rather, the fact that any pattern varies its sense in reason of the oppositional linkage it is engaged with – in final analysis in reason of the SIA it is projected.

the topics, in order to interpret them in terms of their semiotic relationships, namely their positions on the semiotic landscape. Accordingly, this level of analysis lends itself to be conceived as a way of modeling the semiotic genesis of the topics.

For instance, Guidi and Salvatore (in press), in their analysis of parents' model of representation of the school system (see above), showed that a model expressing an idealization of the school had a similar position on the phase space of two other models whose contents were very different from the former (i.e. parents expressing reactive and negative attitudes to school). All three of these models proved to be positioned on the polarity labeled "Familistic relation with the context" and interpreted as the marker of an anomic conception of the social environment, connoted in terms of in-group membership as opposed to a persecutory representation of otherness. Accordingly, the authors concluded that the three models, so different in terms of content, shared the same semiotic root, a generalized meaning (a generalized SIA, in DSMM terms) that allows positive relations with the environment only if the social system is experienced as part of the in-group niche, while it leads to sharp negative connotations when the social system is experienced as other than the primary niche.

In another study, Mossi and Salvatore (2011) analyzed the self-representations of Italian students before and after the passage between two levels of school (from the level of middle school to the secondary level – a passage that in the Italian system occurs when students are 13-14 years old, representing a relevant moment in the students' career). They found that while at the level of the content of the representation there was a clear transition – students' topics changed - the semiotic landscape remained the same. They interpreted this result as the basis for rethinking the notion of transition from a psychological standpoint, suggesting the need to distinguish between changes at the experiential level – which is sensitive to the contingency of the context – and actual transition – which requires a transformation of the deep structures of meaning grounding the experience.

Finally, we want to mention a recent study (Venuleo, Mossi & Salvatore, submitted) which showed that the students' position on the phase space mapping their culture can predict the dropping out of the academic career. (A prediction that was not possible if the content of their role representation were taken into consideration alone).

The position to the phase space of meaning may be of interest also for modelling the subject

of meaning from a semiotic and genetic point of view. Salvatore and Venuleo (2006) analysed the transcripts of 5 official political debates occurring during the electoral campaign for the 2006 Italian political elections. Each statement was associated with the subject that uttered it. Then, subjects were marked in accordance to the role performed in the context considered – in particular: the journalists who proposed questions, the politicians who answered, the host/moderator who regulated the communication and supervised the compliance with the rules of the debate. In order to fully understand this structure of events, one has to consider that these 5 debates – each involving one politician from the left and one politician from the right – were subject to strict rules in order to ensure that the maximum degree of equal conditions was guaranteed to both participants.

The textual analysis of transcripts, based on the procedure of Correspondence Analysis described above, led to the identification of sets of co-occurring words that were interpreted in terms of the corresponding set of topics discussed. Moreover, the findings of the association of such topics with the politicians' orientation not surprised as well as well. On the contrary, less obvious was the position of the topics and of the journalists within the phase space. The topics proved to be very close to one another, placed on the same polarity and opposed to another topic concerning the co-occurrence of signs referring to the regulation of the here and now communication. Moreover, while the journalists gave no indication of being associated to a particular topic, their position on the phase space proved to be very close to that of the right-wing politicians. This twofold level of analysis (semantic and semiotic) allowed the authors to argue the following interpretation of the dynamics of sense making which characterized the debates (and supposedly their impact on the public opinion): a) the symbolic relevance of the equality of the conditions was so strongly salient that it worked as the fundamental semiotic organizer of the communication – somehow the basic sense of the debates was to respect the rules of the debates; b) the salience of the here and now had obscured the differences among the political positions; c) quite ironically, despite the attention paid to the rules of communication, the journalists' questions (also the ones proposed by journalists with a left-wing political orientation) were more consistent with the semiotic structure of the right-wing politicians' discourse.

In conclusion, the integration of the semiotic level of analysis with the semantic level is

expected to empower the empirical investigation of sensemaking. Chartier, and Meunier (2011) described the rationale of the method of textual analysis elaborated by Lalhou (1996), aimed at the identification of thematic nuclei through a computational procedure of clustering – in a smart instance of what we have referred to as pattern analysis logic. They concluded that this method can analyze the content of social representations but not map its structure. The integration of the semiotic level of analysis with the semantic level of analysis could help to make possible to address the structure of social representations along with the challenging enterprise of understanding the "sense/meaning of meaning".

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SERGIO SALVATORE is Professor of Dynamic Psychology at the University of Salento (Lecce, Italy). His scientific interests regard the psychodynamic and semiotic theorization of mental phenomena and the methodology of analysis of psychological processes as field dependent dynamics. He also takes an interest in theory and analysis of psychological intervention in clinical, scholastic, organizational and social fields. On these issues he has designed and managed various scientific projects and published several volumes and more than 160 articles on Italian and international Journals. Co-editor of Integrative Psychological and Behavioral Science and of Research in Psychotherapy: Psychopathology, Process and Outcome; Member of the Advisor Board of several peer-reviewed Journals.

CLAUDIA VENULEO is Researcher in Clinical Psychology at the University of Salento (Lecce, Italy). Her clinical and research interests regard the role of meaning-making in the clinical psychology intervention, addressed to individuals, social and cultural groups, and the community, within a socio-constructivist and psychodynamic perspective. In particular her studies concern aspects related to the training in psychology and to the construction of professional identity. On these issues she has published about sixty scientific papers in national and international journals.

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