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A modality of reading the social reality can be constructed on the base of a space of possibilities of the subject that it becomes space of dispositions inside, by and in function of the language. Modality that regards the description and reconstruction of the space of possibilities, therefore, the space of dispositions: the social relations in their complexity. This reading inside a framework of social network analysis, concerning the phase of the analysis of the data, can be constructed on the base and in function of the use of neural networks. This nets would work as an instrument to compare and to determinate the topology of the space of the dispositions, allowing to construct a continuum of vagueness. The hypothesis to analyze and to develop is that one of a tension between the two languages, natural language and the sociology language, tension solved inside the same natural language, that determines the sociology one according logical and epistemological modalities.

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           Habitus
           Logic
           Space of possibility
           Vagueness

1 THE LOGICAL – EPISTEMOLOGICAL CONTEXT

«Describe and describe and describe, and you never can describe a dates, a position, or any homaloidal quantity.» (Peirce, 1892). The quotation of C. S. Peirce seems to have been written thinking to all a series of difficulties that introduce every day to the sociologist in the moment in which he wants to study and to analyze the social reality.

Social reality that is made up of phenomena, processes, sets of actions and of interactions that become meaningful relations between social subjects inside of a context determined in the space–time. More than situated inside of a determined context, would have to be said that the social relations are extended in the space and time inside a context that is co–constructed with them, that is at the same time, source and limit, constraint and possibility extending one thought of Albert Einstein on the objects of the physical world.

The notation of Einstein makes us to enter inside of an always alive and open debate around the scientific qualities of sociology, the certainty of its methods, the research of a truth, of the truth, that it seems to be always a something of relative and subjective, rather than objective and general. Debate that finds its point of beginning in the considerations that try to identify and to describe the object of the sociology.

Auguste Comte refused the solution of social statistics like proper language and instrument of his science, language and instrument that are able to give the scientific qualities

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that must have the *scientia scientiarum* (Comte, 1830-1842). According to the contrary position another exponent of the positivism, Emile Durkheim who in its *rules of the sociological method* he characterizes statistics, scientific language, the only possibility to eliminate the veil that covers the eyes of the sociologist in the moment in which is in front of the language of the world of the every day life (Durkheim, 1895).

The central point inside this argument is, like has been understood from first remands, the analysis of the language inside sociology. Language that structure the proper object of the sociology, it gives a syntax to it and a semantic; syntax and semantic that from theoretical become heuristic and pragmatic The object of the sociology is a something that lives in the language, every scientific object alive in a proper language, the scientific language of the science that wants to analyze it, to study it, to explain it and to understand it.

The sociology has a problem in addition, its language is the same one in which its object is determined. The object is the social relations, the language the one of the world of the every day life. Language therefore is place in the core not only of the logical and epistemological reflection on sociology as a science, but language that becomes the base of the proper *data* of the sociology in a series of theoretical and heuristic dimensions that will carry to identify a *social data* and a *sociological data*, the natural language and its own diagramatic dimension, the language of sociology.

### 1.1 The Interpretative Function Of The Social Analysis

We return to the beginning quotation of Peirce, therefore, to the problem of the description. To study and to analyze the world of the social relations is something more complex than what it could be thought at a glance. Which is the problem? After all there is an object and there is someone that tries to study it. There are a series of theories, a series of instruments, a series of analysis techniques. After all it’s enough to choose each time, in relation to the single problem, phenomenon, process that is in front of, which is the better way in order to explain it, to understand it, to know it.

All this, at a glance, can seem the simplest thing in the world, in the moment in which who undertakes this enterprise knows the theories, the instruments and the techniques of analysis. At this point the complexity begins. Before penetrating us to the inside of the dimensions of the complexity we have to do some notations.

Peirce places the accent on the problem of the description. To describe something in sociology it wants to say, in traditional terms, to identify one syntax of the object, therefore, to construct on it one semantic. To trace at first the borders of the proper object, to make so that it stands out on the background of that it is the everyday life, to distinguish it from all that would not have to be important to the goals of the research. The result will have to be, in fact, something of comparable, valid, that is subjected to the rules of reliability.

Just this way brings to the Peirce’s quotation. In which way close borders can be traced also for a single social relation between two subjects? Lazarsfeld himself (Lazarsfeld, 1962; Lazarsfeld 1966) sets the problem of vagueness, in which terms we will see it later on. To trace close borders sends back to a very precise logical tradition, that one of the Classic Logic that has governed the world of science until 1931 when it has made its appearance The 1 Theorem of Incompleteness of Kurt Gödel (Gödel, 1931).

Theorem that puts in crisis the same concept of theory as it would have to be inside of science: theory as formal axiomatized system. An incomplete theory is a something that cannot find place inside science, inside the reign of the certainty and the truth, not even in the case in which one must be had conception of the truth like a something to which aiming. The incompleteness places a problem of the lack of something, the syntax of the theory is not in a
position to giving account of an object in its inside, object constructed inside of theory itself, not something inserting *ad hoc* in order to make it incomplete.

We have evidenced therefore two fundamental nodes already: the object and the theory inside sociology. A third point is the one regards the instruments. Problem that falls back, in second struck, on the techniques of analysis.

The probability is invoked from more parts as the single possibility to give account of social dynamics. However on the same type of probability to use it must be put some questions. Questions that can be resolved in the moment in which the same probability is assumed in terms of something that generalizes the subjectivist position and the objectivist one and it inserts them inside a discourse that beginning from the analysis of induction (Costantini, Geymonat, 1982) includes the belief itself like the solution of the doubt, in the moment in which it is arrived to the abduction like type of inference for the cognitive process of sociology (Peirce, 1878a).

This since for being able to describe an object, in the moment in which we take in consideration the *data* that regard it, as analyzed by our techniques, we must reflect in a preliminary way on the construction itself of the *data*, on the constraints and the possibilities that this construction offers to us. The *data* is not simply found. The logic of the research in sociology is itself a logic of relations, that it has relations for object, that registers relations inside a theoretical pictures (Peirce, 1892).

The reference cannot to be therefore Thomas Khun (1962), the problems of translation of paradigms inside different formal systems, different scientific languages, do not are able to take care of the problems emerged with Gödel, but not even of a dialogics of relations.

### 1.2 Interpretation And Co–Construction

The problem of the theories is reflected, therefore, on the products of the thought and on the objects themselves of the sociological thought. In the moment in which the sociologist is in front of a determined phenomenon and/or a determined process to analyze, always that we are not speak about the same theoretical object, he is in front of the problems of description of which we have speak.

The traditional distinction between explanation and understanding sends back to outlines of analysis and inference inserted inside the frame of classic logic. The same problems and the distinctions that emerge do not regard only the logical frame, but different modalities of construction the formal system. The syntax always is given separately from the semantic one, alternatively one is given like a base and the other is superimposes in such way to assure inner and external coherence.

From a logical point of view it would seem to be inside a monotonic situation that, fixed the information once for all, it does not take care of possible variations, additions, modifications. The social reality, instead, is not–monotonic. The continuous flows of information determines a dialogical and continue co–construction of syntax and semantic. The sense more than interpreted is co–constructed inside and by the actions of the social subjects, actions inside linguistic games that become social practices: *habitus*. Co–construction that instead of eliminating vagueness and contradictions manages to them.

The problem of vagueness will emerge in all this work continuously, now we have to contextualize this ideas in a way that is a beginning point and a close examination of the idea of social reality as a complex multidimensional object. To do that we have to proceed with the epistemological and methodological dimension. We turn later on the logic dimension.
2 COMPLEXITY, POSSIBILITY, DISPOSITIONS

This logical frame finds its natural application inside the cognitive process of sociology. The reality of the world of everyday life is indeed the product, the emergency of set of the social relations. An emergency of one complex unit.

Complex unit according the approach described by Edgar Morin, but integrated through the theoretical constructions of Pierre Bourdieu and those of C. S. Peirce. These are not other that the constraints and the possibilities, on the theoretical level, of the model of reading, description and analysis that we are discussing here. Obviously they are not the only references, but they constitute the skeleton around to which the reflections of other authors are inserted.

The concepts that guide our reflections are, therefore, those of possibility, dispositions and complexity.

2.1 The Complex Reality

Beginning from the third one of the concepts that we have listed, now we have to contextualize in which terms we use the approach to complexity described by Morin. The complexity, according to this point of view, is not the one described by Von Bertalanffy, neither the more properly sociological one described by Luhmann. For these authors more than complexity it is perhaps the case to speak about complicatedness.

As far as the first (Von Bertalanffy, 1968), author and father of the General Theory of Systems, to which for a period, the one of the beginnings, it has contributed and joined also Lazarsfeld, the necessity is to identify a unitary formal syntax that it is able to overwhelming gaps opened inside the single disciplines in the moment in which the explicative function of these fields of knowledge does not succeed to give account of determined phenomena. A special type of cognitive connective able to going beyond the own semantic of every science, according to one syntactic description.

As far a as the second (Luhmann, 1984), the syntax is always present, and out in front of a semantic that constitutes the presupposed of it and its own functional reason. The distinction between ambient and system, as an example, is a something that identifies the content of sense of the social reality in the terms and reason of the possibility of a reduction.

Both these authors are placed in an context inner to Classic Logic, therefore, with possibility of reduction and referential background. Morin refuses the principles of this frame, in fact he amplifies them, expands them until making to make them vague. It falls the formalization like something of rigid and with the necessity of coherence and a completeness, as well as syntactic, how much semantic one.

The system becomes complex in the sense that is not reducible because characterized in a dynamic and unique way by its own emergent property. Property that finds their own natural habitat inside the borders, not more rigid or close; borderlines delineates by the three principles: dialogical principle ;principle of the recursion of organization; hologramatic principle.

The social relations become something, therefore, of vague, of vanished, a something that is not in the world because it must exist, but is in the world in order to be product and producer of the same world. The actions of the subjects are the beginning, but not the end. The information in its continuous flowing writes, cancels and rewrites the same borders of the world. The world does not become that one of the precision, but returns to being that one of the contingency, inside different linguistic games that describe the practices themselves in function of the their own vagueness, and according with the vagueness of the whole.
2.2 The Space Of Possibilities

The dimensions that constitute this complex reality are not other than the social relations. Saying it in these terms nearly seems that we return to a realism and a determinism of the type proper of sciences of the nature. As inside mathematics the Cartesian axes divide the space in four different regions, therefore the social relations divide the world of everyday life in a rigid way, precise, but above all translatable in precise terms.

Really, to assert that the social relations constitute the dimensions of the complex reality, wants to say that they constitute the possibility of change. They are not in prefixed number, there is no demon that can know the movements long these axes of every single man in such way to embrace once for all present, passed and future in a sure way (Laplace, 1814). He cannot know the same dimensions in precise and exausted terms.

The social relations are co–constructed by, and co–constructs, the single subjects in the moment in which they enter in relation among them, in the moment in which they act, in the moment in which emerges the sense of their actions. Sense that is contained hologramatically inside every single relation in its totality as social phenomenon, this because singles themselves determine and construct the phenomena, which, at the same time, the subjects are determined inside the relations that live.

Phenomena that are not, however, the simple sum of different actions, but they are the realizing of a possibility, something that it does not impose precise and rigid borders, but leaves to catch a glimpse on possible outcomes that do not deny a priori the future existence, also eventually contextual, of other presents. Indeed every single phenomenon, in order to be also a process is something that continuously change, something that for the presence in its own inner level of conflicting situations finds the force and the way to manage this information.

The space of possibilities is therefore the set of all that that generates a social phenomenon, not in terms of causes, there is not a linear dynamics for which it is possible, once fixed the information, to be able to say where, when and in which way will be arrived to the conclusion of the process. We are in front of a non–linear dynamics, it is the interaction itself that is realized in the relation that passes from possibility to disposition, to habitus.

There isn’t, therefore, a single space of possibility. Every single subject has his own, given by his own existential history, by living inside one determined reality, by contributing to construct this reality. But there are also the spaces of possibility of the relations themselves. Spaces that together identify and describe every proper emergent property of single complex system and of the complexity as a whole.

Possibility that it does not have, however, to get confused with that express in terms of Classic Logic like the dual concept of necessity. As also it is not the set of possible worlds produced by the counterfactuals constructions. Possibility is not, on other side, probability. Also this last one, in fact is declined in terms of classic logic and it is one measure of the uncertainty more than one description of the vagueness.

The spaces of possibility of the subjects determine, therefore, the spaces of possibility of the social relations and the first ones are at the same time determined by the second ones. The first ones vanish in the others in order to introduce a situation that connotes like different respect to a reading of the social reality in terms of cause–effect, but also regarding the one could be supplied from traditional statistics, which becomes one member inside the analysis of description of the reality, but is not overlapped (Bourdieu, 1994). Possibility becomes a part inside the inferential abductive process described by Peirce (Peirce, 1878a). We can now discuss the dispositions.
2.3 The Space Of Dispositions

The *disposition* concept it is something that implies in a strong and decided way a relation with that space of *possibility* by and through the language inside the sociological the description and analysis.

We have said that the possibility, the spaces of possibility, are the dimensions of the complex reality in order to identifies the relational dimensions. But can one simple interaction become a social relation? The first answer can be that every single interaction, in order to establishes some correspondence among subjects, it is a relation itself.

The relation is in effects something more than this, it is a sense exchange, it is the emerging of the sense, inside one portion of the social reality. The interaction constitutes for the relation the base that can not be given up, but as it can be different modalities of social interaction, therefore for each of them the emergent sense can be realized in a series of actual states, in a series of *habitus*. The concept of *disposition* it is what we have to describe now, both in the logical level and in the level of social determination.

As far as the logical context, classic logic proposes by Carnap one description, in intensional terms, of the dispositions: the possibility to do or not to do an action, this in a formal context that characterizes the intension like the general condition that an object must satisfy for being able to fall under a predicate, in order to concur to a subject to make it to fall under a predicate (Carnap, 1955). As far as the social analysis this means the possibility by the researcher to construct close sets on the base of the exclusive belongings of the subjects to a dimension of the phenomenon that is characterized through its actions.

Also Lazarsfeld refers to the dispositions in the moment in which it determines the way to conduct the study and the analysis of the spaces of manifest attributes and those of latent ones, in order to identify the *dispositions, the dispositional concepts*, like the ones that allow to resolve the problem of the vagueness of the social phenomena by the empiricist language and its mathematical modelization of statistical type (Lazarsfeld, 1953).

These descriptions of what it is possible to intend with the concept of *disposition* they are in some sense the presuppose and the point of beginning of that we mean in this work with this term. Identifying, as far as the sociology, the term with a relationship between objects and concepts structured symbolically, the problem of the language, the natural languages and scientific languages, it is even more contextualized. According to us, the logical frame for giving sense and reason to the passage from *possibility* to the *dispositions*, to the *habitus*, it is that one given from Peirce. Frame that realizes and finds its own sociological content by the description that of the *dispositions*, of the *space of the dispositions*, gives Bourdieu (Bourdieu, 1972; Bourdieu, 1994).

*Dispositions*, therefore, like *structured structures structuring* thanks to which and in function of which the *possibilities* of the subjects become *habitus*, *social practices* through and by the actions of the single subjects. Actions that characterize the movement of the subjects in the social space, therefore, in the complex reality read like the construction of one network of *habitus*. In this situation the *dispositions* are, at the same time, development of *the possibility* and description of *the habitus* (Peirce, 1906; Peirce, 1934), of *the social practices* (Bourdieu, 1972; Bourdieu, 1994).

The role of the natural language and of what we will see to be one of its dimension, that language of sociology, is the central point of these passages in the moment in which we describe the social relations like one *complex network* of relations constructed, lived and analyzed through and by the language. Is the language of sociology a scientific language as the mathematical and physical one?
3 NATURAL LANGUAGE AND LANGUAGE OF SOCIOLOGY

The analysis of the space of possibilities and of the space of disposition in the terms of interactions that realize possibility in relations becoming practices, habitus it makes to emerge the central role of the language inside this model.

In the first lines of this argument we have seen some considerations of Comte and Durkheim in relation to the language, in relation to the tension between the natural language and the scientific language proper of the sociology. In effects because something can be called science it seems that it must have its own special language, a code like an esoteric language that delimits the borders among who is within and who is outside, between who is scientist and who is simple a profane one, between science and not–science.

As far as sociology this is rather problematic. The language in which the sociologists work and express is that one of the world of the daily life, the language of the so-called common sense. However it must at the same time be a formal language in the sense of a formalization that make protected from the vagueness and can give precision and certainty. There is something more, indeed the same object of the sociology, the social relations, are co–constructed in, by and through the natural language.

As far as the concept of formalization, expressed in these terms, we have already seen that the Theorem of Gödel puts a series, of problems in the logical level, but also in the epistemological one, to every closed conceptual set that it can be formalized in the terms of Classic Logic. Gödel is not a name to relegate inside the universe of logic and the mathematics, but a name with which confront in every field of the knowledge. The contradictions are not the absolute enemy, but something through which gathering information in its complexity.

Also other sociologists are themselves confront with the problem of the tension between natural language and language of sociology, if not explicitly, through the construction that has called datum, construction if not heuristic, at least cognitive. An interesting key of reading of this relation between natural language and language of sociology can be that one that proposes Peirce in the moment in which he defines the concept of hypoicon (Peirce, 1885; Peirce 1932).

By this classification, as far as the language of sociology like dimension of that natural one, we can group, as an example, Comte, Spencer, Durkheim, Pareto under the hypoicon of image; while Weber, Schütz and Cicourel can be place under the hypoicon of metaphor. Other authors still, like Lazarsfeld, Merton, Luhmann, Morin can, instead, enter inside the characteristics of third hypoicon, the diagram.

This last one will be the choice that we will follow inside our model, in different terms, from the uses by the last cited authors, authors, that however, play a fundamental role inside the relational approach that we are delineating. The complexity of Morin is, in fact, one of the conductors line of the entire analysis, in continuous dialectic tension with the approach to complexity of Luhmann. While the algorithmic determination both in theoretical level and in heuristic level of the thought of Lazarsfeld and Merton are a series of constraints and close examinations that can carry out an important role inside the construction of a model, even if based on one different logic.

The point of view that we will use it is of construction, description and analysis of what is the datum in the sociology. Datum that it emerges from the tension between natural language and language of sociology, in the moment in which it is identified in a possibility space realized in habitus. Now we have to arguments more in details the language of the everyday life, the its relations with the language of sociology.
3.1 The Language Of The World Of The Everyday Life

The interactions between the social subjects and, consequently, relations, are constructed through and by the language of the world of the everyday life. The distinction given from the terms through and by is not a simple complication of the conceptual picture, but to put the accent inside the multidimensionality of the relations and the language itself.

Firstly, the social relations are constructed through the natural language. Which is the meaning of this sentence? Beginning from what can be identified as interactions, therefore, something that is the possibility itself of the relation, the language is introduced as the dimension of use, the context inside which and in function of which the relations realize the possibility given from the interaction to delineate and to play their own linguistic games (Wittgenstein 1953).

This dimension of use, encloses in itself, in a complex way both the syntactic dimension that that semantic one. The natural language itself, used by the social subjects, is a social institution. The dialogical recursion between subjects and language is realized in the mutual and continues construction of meanings, construction of actions, events that are determined and determine intentional actions full of sense. The sense is, therefore, one structural and formal characteristic, an emerged property of the social relations.

In the second place the social relations are constructed by natural language. In the moment in which we describe the world of the everyday life as a network of social relations we can identify the same social phenomena like processes that use the natural language as instrument for their own structuring.

This description puts a series of problems on different levels in the moment in which it is wanted to be described and to be analyzed the social relations themselves, social relations that are, therefore, the object of this sociological model. Later on we will see as the same relation of description and analysis in which the sociologist is engaged is something of complex, for the moment we have to concentrate our attention on the relations between the so-called subject–object as determined from, by and through the language.

In the world of the daily life, the world of every day, is just the language that allows to the subjects a co-construction developed in spaces and in time of their own relations. The natural language covers, therefore, a twofold role, the one of object and the one of instrument. Twofold role that is still divided in the moment in which it is contextualized inside the social research. We can now distinguish the different dimensions that compose the natural language inside and in function of the analysis of the social relations by a sociological model.

We will have, therefore, the dimension of the language object, L.N.O. that is declined in L.N.O.1: language lived between the social subjects, the language that the subjects use like base for their own classification, categorizations, intentional action full of sense in the moment in which they enter simply in interaction with other subjects or with their surrounding ambient, or still with the complex summary of subjects and ambient. The third option is the one that we have chosen like background of the social relations inside our model. Complex background, as we have seen, not reducible inside a research of the sense of acting itself, the sense meant as distance between abstract and the concrete.

L.N.O. has, in its turn, a second dimension L.N.O.2, the one of really object, object in the scientific sense of the term, therefore something that needs of an explanation and an understanding process inside the background given from the model. Explanation and understanding, two modality of thought that realize in two different cognitive styles and requests of search. Two modalities that interlacing itself in complex way avoid the traps of reductionism, on one side, and those of the holism, from the other one. L.N.O.2 becomes the base for this analysis.

The second role that the natural language plays is the one as instrument, L.N.S.. If
from a side the natural language is object, from the other is instrument, instrument in the sense that what it is found, the dimension L.N.O., is found and analyzed along dimension L.N.S.. We will have, therefore, a dimension L.N.S.1 that is the instrument by which the subject-object modify their own relations, their own living long the relational dimensions of the complex reality, inside a process of a recursion of organization that involved the language itself. We will have also a dimension L.N.S.2 that is the instrument used by the sociologist inside their description and analyses process, the language itself in which the description and the analysis are given.

3.2 The Language Of Sociology As Diagramatical Dimension Of Natural Language

Inside this multidimensionality of natural language the proper language of sociology is an ulterior dimension that cross-sectionally cuts the dimensions that we have characterized. The issue that we have to describe, therefore, is that one of the relation, the tension between the natural language, complex object, and the language that make the sociology a science, a scientific language that allows the description and the analysis.

The sociologist in his job uses and is bound to the natural language, to its vagueness, its lack of precision, its complexity. More than problems these are point of force in the moment in which something is wanted to be described, the social relations, social relations that are constructed in and use this language. Social relations that structure they themselves the vagueness of the real world. The problems and the limits of a rigid formalization determining borders well delineate and precise that we have seen to derive by the results of Gödel’s Theorem are introduced in all theirs existence of sense.

The tension between natural language and language of sociology connotes, therefore, the second one as a diagramatical dimension of the first one. Diagramatical dimension a la Peirce. We can contextualize in this way, inside the logical frame, the epistemological and heuristic content of the model that we have traced. Still we have not said anything on the real data inside the model, this will be the successive step.

The language of sociology, determining and determined from the language of the world of the daily life, the natural language, is expressed, therefore, through the possibility that becomes sense, through a situation of relation between every single set, habitus social instituted, and the symbols (propositions inside the language of sociology). Relation that necessarily presupposes two poles between which the tension of the emergency of the sense takes form and content.

The social scientist co-constructs, with another one, his own object of study, the relation, the constructs that are nothing else that clarifies linguistic meanings. Clarified meaning is not something well defined, but the entire vagueness of the sense that is unfolded and at the same time is determined inside a concept proper of the language of sociology. Concept, in its turn express, in and by natural language, the diagramaticity it is not only a semantic datum of coincidence with a meaning, but also a syntactic datum that it is realized in the term.

The diagramaticity of language of sociology as a dimension of the natural language it can be expressed through the dynamics that unify among themselves concept, category and property. Concept, category and property that are the instruments through which the epistemological level becomes heuristic level, for the co-construction of the sense. Heuristic level that will return to the epistemological level in a recursion of organization that show the complexity also in relation with the epistemological and methodological dimensions.
4 THE DATA AND THE COMPLEX SOCIAL NETWORKS

*Complexity, possibility and dispositions* have been until this point the guiding lines of the model that we are describing. Inside a world of the daily life that structure itself as an (in)finite province of sense in function and reason of its own structural and formal complexity, *the space of possibility* of the subjects and those of the social relations are realized in *habitus* through *the spaces of dispositions*.

The natural language and the language of sociology as its diagramatic dimension is the context inside of which this process take form, but, at the same time, the instrument that allows the same description of the world of the daily life. World of the daily life that, through the social relations that constitute it, is introduced during analysis as a set of complex social networks.

This part of the model is the one that we must, now, to develop, at least for giving reason of some theoretical and heuristic points. More times inside the presentation the term *social networks* is emerged like something able to describing, according to a determined point of view and inside an instrumental perspective, the structure itself and the form of the social relations. It is introduced, therefore, the requirement to configure theoretically and heuristically what it would have to be the proper *data* of sociology.

Saying that the social relations constitute the *data* it is a proposition to develop along more dimensions, the entire all to recompose inside a network structure. The social relations are something that lives in the language, uses the language, is structured and analyzed in terms of a language in continuous tension, as we have seen, with that natural one. We can, therefore, firstly, delineate two different dimensions of *the data* in sociology, dimensions they too in a continuous tension, this in function and reason of the language in which they take body and in reason of which they are proper characteristic of the object of sociology.

These two dimensions can be identified in the terms of *a social data* and *a sociological data*. Which is the difference between these two dimensions that, forming a complex unit (Morin, 1977), make possible the emerging of the sense, the sense of the social subjects, but also that sense of the sociologist themselves? The problem of a syntactic and semantic coherence between the theoretical context and that empirical one is exceeded from a change of the logical frame that we will contextualize later on. For the moment we can say that the *social data* is the expression inside and in the terms of the natural language of the social phenomenon under observation, while the *sociological data* is the description that of it the sociologist gives in the moment in which he contributes to co–determine it in, through and by the language of sociology.

This double nature of the *data*, dialogical double nature that it is recomposed with hologramatic elements, can seem a problem in the moment in which the social relations are described as determining networks of relations. Really the concept of social network from which this part of the reflection takes the way, leaves opened *the possibility*, it has is own *space of possibility*, to realize inside this model. The complexity, the not–linearity, the not–monotonicity of the social relations are something of which the description and the model of the network must take care.

The social networks are not only determined from the social relations, but at the same time, they constitute a part of *the space of the possibilities* of these. They are at the same time, in complex way, *possibility, dispositions, habitus*. To describe the world of the daily life through and by the identification of the complexity of the social networks, it wants to say not to eliminate information by an extreme precisation of the vagueness of the reality itself. We have to contextualize and continue this analysis.
4.1 The Complexity And The Social Network Analysis

The complexity of the world of the social relations is, therefore, something multidimensional that introduces problems in being described both in pure reduzionistic terms and in pure holistic terms. The comparison is placed naturally with the social subjects. We have a world made of relations, relations that implies some kind of interaction between the subjects.

To assert that the complexity of the social reality can be described simply beginning from the subjects it puts limits to the possibilities of explanation and understanding of the emergent property, property that characterize, in an unique and substantial way, the same social phenomena inserted inside a space and a time, that they contribute to determine a space and a temporal flow.

To a metalevel we can assert that the action, the concept of action itself, is something that emerges inside this modality of reading. We have a series of subjects that live, that they have relationships each others, that they bring inside in every moment their entire experiential lived and through all this they have relations with the surrounding world, with the other subjects, their same context.

One good base of beginning for the description of the social networks and of their own complexity, it can be, therefore, the one according to which: «Network analysis assumes there is no way of knowing in advance how groups or social positions come about, i.e. how combinations of relations are formed. Network analysis analyses overall relations in an inductive attempt to identify behaviour patterns and the groups or social strata that correlate with those patterns. Then it sorts out the pertinent groups a posteriori and identifies the concrete constraints of structure on behaviour at the same time as it uncovers constraints on structure from group interactions.» (Degenne, Forsé, 1994).

We do not want to assert that abandoned the road of the reductionism our chosen it falls on the road of the holism. Both, reductionism and holism, constitute specific points of view on real world(for the co–construction of a description of the real world, perhaps of real world itself), points of view of which inside a complex approach have need, not in absolute and exclusive way, but in relation to the single dimensions of the phenomenon that is wanted to be analyzed. The complex unit, in the theoretical phase, derives from this dialogic its own possibility; possibility that realizes itself in methods and techniques of research and analysis.

Analyzing the affirmation of Degenne and Forsé, we can better contextualize our description of the complexity of the social nets. Firstly, «Network analysis assumes there is no way of knowing in advance how groups or social positions come about, i.e. how combinations of relations are formed»: we have a real description. The forecast possibility is not a characteristic of the model, neither in the epistemological level, either in the heuristic level, in a generalized manner, but also in the concrete form of the sociological analysis. As this it is translated within the technical analysis we will see it discussing the choice and the use of the neural networks, which, however, open some extremely interesting perspectives.

Secondly, «Network analysis analyses overall relations in an inductive attempt to identify behaviour patterns and the groups or social strata that correlate with those patterns»: the inferential choice of the induction leads, in the terms in which we are describing the complexity, to its contextualization inside the complete inferential process described by Peirce (1878a).The abduction cannot any make less.

In third place, «Then it sorts out the pertinent groups a posteriori and identifies the concrete constraints of structure on behaviour at the same time as it uncovers constraints on structure from group interactions»: the space of possibilities and the space of dispositions, becomes habitus, social practices as far as the description, therefore, the giving sense to the social phenomena by the sociologist, the co–constructing the sense like emergent property.
4.2 Data, Language, Complexity, Network Analysis

We can now beginning to recompose the whole inside a description of a sociological model; abstract model, but able to being the guide for the construction and the determination of surveying methods and techniques of analysis beginning effectively from the construction of the *data* of sociology itself. Construction of the *data*, that it has implied a moment of reflection concerning its structuring, necessary moment for the successive moment of empirical construction and analysis.

We do not want to support that this is the only correct way to construct the *data* of sociology and, therefore, to think it, in relation to the theoretical moment, to find it, in relation to the moment empiricist, to analyze it, in the synthesis of the two previous moments. What we are discussing it is a model that takes the way from the meeting of different logical reflections, epistemological reflections, methodological reflections, heuristic reflections. As all this can be recomposed it is the same choice of a description that take care of the indication of Peirce that opens these work.

Firstly we have discussed an argument on the language of the social phenomena, but also an argument on the description and analysis of these phenomena in their being processes. Phenomena as processes want also means that we have given a structural connotation in terms of *practices*, therefore, in terms of the complex game that elapses between the *possibility spaces* and *habitus* in the terms of the *disposition spaces*.

The tension between the two languages, that natural and that one of sociology, has been resolved in an identification of the second one as a diagramatic dimension of the first one, therefore, inside an logical–epistemological context that doesn’t made more the vagueness something to eliminate, but it contextualizes vagueness inside the single linguistic games, the one among subjects and the one among subjects and the sociologist.

Linguistic games that design a complex reality, a world of the social relations as an (in)finite province of sense, sense that emerge through and by the relations that it structures and renders concrete. Relations rendered concrete inside an heuristic model of complex social networks.

Every *data*, however, must be something of usable inside the context of the analysis, therefore, what effectively is found inside this model and in which way this found object can be analyzed? The double nature of the *data* of sociology as a complex unit of *social data* and *sociological data* it renders all this extremely problematic. Still more problematic in the moment in which we introduce reflections on the measurement of the *data* itself.

The problem of the measurement, in effects, is one of the nodes to melt in a decided way in the moment in which we wanted to proceed to a construction and a description of the heuristic part of the model. Measurement that in the sociology has in front of it an object naturally vague, rendered still more problematic from the participation of the sociologist in the clothes of a researcher on the field.

A possible solution is to identify the *dispositions* of the subjects inside a complex social nets, dispositions that are base of them, but at the same time product, inside a constant change which it is had to the relations themselves. The measurement is not, therefore, a something closely quantitative. Gödel has shown the double nature of the number, for which the same object can identify a quantity, but also a label.

The *data* of the sociology it can be, therefore, represented from an array that reflects in its own inner both the linguistic determination (and also eventually quantitative) of the inquired subject, and the component given by the sociologist, not in terms of a quantity like can be those of physics, but in terms of a description of the borders of a space: the *space of dispositions*. 
5  THE DATA AND NEURAL NETWORKS

A *data* constructed, described and represented in this way puts a series of problems regarding to the moment of the analysis. Not only from a point of view of adhesion with the beginning model, both regarding the logical level, and for the epistemological level, but also regarding to the moment of relation with the single phenomenon that is wanted to be analyzed, and as far as the effective possibility of explanation and understanding of dynamics of the phenomenon.

An ulterior consideration to make is the one that it regards the relation of this construction of the *data* with those more usual ones inside the world of the sociology, both quantitative and qualitative. The model that we are describing resume, once again, inside a complex unit, this time both and heuristic, these two modality of investigation, but also of description of the world of the daily life.

It resume them modifying form the root the logical frame and the epistemological one, going beyond a dualistic vision that does not allow, according to its own logic, the passage to a third possibility or a coherent synthesis. The *data* constructed based on the *possibility spaces* and on the *disposition spaces* (than it is not a reproposition with other terms of the distinction between *manifest attributes spaces* and *you latent attributes spaces*) it has inside the constructed *data* with the traditional modalities. This last one it represents particular cases in relation to the vagueness itself of the phenomena.

Now we must delineate which it can be the instrument of analysis of the *data* of sociology represented through an array that gives information on the *spaces* of the subjects and, therefore, the social relations structured like *complex social networks*. An instrument that seems to be a good answer is what it is identified with the *neural networks*.

One simple coincidence of term between *social networks* and *neural networks* it is not the justification of this choice. The reasons go beyond this and they bring up-to-date by the model inside which we are moving. The choice would seem well founded also following the indications of Parisi (2001), who let see inside an epistemological choice of strongly anchorage of science, of the reflection on and of the science, with the empirical world, as the *neural networks* inside the universe of the *simulation* they can resolve not little problems to the sociologist.

However, the choice of an hard realism by Parisi and the position and the role that he designs for the language are not properly those of the model that we are describing. The *neural networks* are the instruments that allow us to give an analysis of the *data*, but are not an ontological different entity from other instruments of analysis. In the moment in which we choose to use the numbers, therefore, the members of the array as labels, with the single constraint of an ordering, but not, therefore, that one of a metric, the language of the sociology expresses a part of the own diagramaticity in relation with the natural language. The social phenomena are expressed and they are constructed inside the natural language, a translation in the language of an algorithm that simulates them to the computer implies however a loss of information in reason of a simplification.

The *neural networks*, instead can give as output other array that represent as the single attributes, the single investigated property, can be redistributed in the space leaving from and in constant interaction and co–construction with the positions of beginning and with the position of the sociologist itself. The result is the description of the *space of dispositions* in the terms of the co–construction of the sense.

The prediction, fundamental inside the theory concept, moves its point of participation and becomes an object inside the *space of the possibilities* here. The absolute is not more at home, the contingent, in strong sense, it is too much reductive. The neural networks give back as output, according to the specific *network*, therefore, of the way in which the labels are
mutual confronted, different dimensions of the *possibility*, possible different descriptions of the social phenomenon not only in the space, but also in the time extended.

Now we must describe as the output of a social *networks* is able to take care both of the syntactic dimension and of that semantic one of the *data*, dimensions that co–construct themselves and let emerging the possible sense.

### 5.1 The Structuring Of The Topology Of Social Meanings

A theoretical and heuristic model able to representing both the semantic level and the syntactic one of the *data* in sociology, in its dimensions of *social data* and *sociological data* it can be identified by those objects and instruments that possess as one of the peculiar characteristics the one of being the portions of space with given area and infinite perimeter: the fractals. What does it means that the fractals can be an adequate model for the sociological analysis? In which relations are fractals with the output of the *neural networks*?

Firstly, they can be an adequate model because in their structural characteristics there are the same determination of the complexity that characterizes the social phenomena as *networks of social relations*. The hologramaticity represented through the procedure of generation by inner homotety, the emerging of the sense as a description of the given area inside an infinite perimeter.

Secondly, hologramaticity and inner homotety allows to answer also to the second question, united to the fact that they are strange attractors, therefore, objects that succeed in giving to reason of the not–linearity and not–monotonicity of the world of the social relations. We see in which way all this is possible in more immediate terms.

When it is wanted to analyzed a social phenomenon it can be expressed with a concept or a series of concepts. Every concept, is, therefore, described in terms of property that become variable. Each property, however, contains the entire concept hologramatically, in fact it is not only determined by the concept, but it contributes to determine it; the property indicate, therefore, the coverings of the concept both in syntactic terms and in semantic terms inside the sociological analysis. In the moment in which the array of a property is had, as described previously, for every single subject, they become the inputs of the *neural networks*, in such way to have a comparison between all the single subjects, also the investigator.

The output, according to the type of *network*, therefore according to the construction of the concept in the epistemological level by the sociologist, it represents the distribution in the space of the single subjects. Distribution that not being metric can be analyzed also in statistical terms, by the use of the subjective probability, but this is anything else than one possibility, not the only way.

The number of the property, represents, therefore, the constant *k* in the determination of the inner homotety that generates shadings leaving from the position indicated for the comparison: the number of the coverings of the concept by the attributes in relation to the single subjects, therefore, not in a rigid and precise way, mutually exclusive, but in a vanished one; while exponent *i* it represents the number of iterances inside of the *neural network*. In formula:

\[ r_i = \frac{1}{k^i} \] (1)
5.2 Dispositions And Possibility As Spaces

We can now still further contextualize the description that we have given of the world of the social relations through the possibility spaces and the spaces of dispositions. In the moment in which we construct the array of the property of the single subjects, this array does not make other than describe the subject as a set of positions across the relational axes, the dimensions that identify the single relations.

Positions that are not enclose inside a metric space, but in a space of meanings. With this we do not want to say simply that the language of the mathematics does not have meanings inside the description and the analysis of the data of sociology, but that also this, like the language of science tout court, is an other diagramatic dimension of that natural language inside the universe of speech of the sociology. The constraint of an ordering, even if not metric, re-enters inside this dimension, as also the description in array form. A syntax that is emerged through, but determines in its turn, the semantic of the social data itself in the moment of the analysis.

The array indicate, therefore, the disposition spaces of the subjects, as actualization of possibility spaces. In this context the spaces indicate the vanishing of the attributes as coverings of the concept, coverings that characterize the vanishing itself of the different dimensions of the same concept: the vanishing and the contextual overlapping of some portions. This is one ulterior qualification of the proposition concerning the given area and the infinite perimeter of the fractal, therefore, the concept and the proper vagueness of the concept.

In this way the phenomenon is represented by a fractal constructed on the base of the concept that represents it, of the property that determine and are determined from the concept. Fractal constructed through the mutual comparison of the arrays of the different subject that constitute the complex social networks.

In this way is not reduced the content of sense of the single subjects in the moment in which the social relations are analyzed, therefore, the networks, but, at the same time the single contribution of every individual becomes fundamental inside the representation, also in function and reason of the fact that without individuals not would be the relations, the networks, but, at the same time, the networks determine the spaces of action of the single subjects.

This continuous recursion of organization strongly depends by the single points of beginning, the not–linearity and the not–monotonicity are structural characteristic of the social spaces. Characteristics that structure and give sense to the possibility that it becomes disposition, therefore, habitus, practices. A representation by the graph theory could, therefore, be integrated from a description of the networks in terms of spaces. In terms of areas, of zones that overlapping itself, in reason of their quantity of covering of the concept, describe the map of the sense inside the social relations.

It still remains to discuss the problem of the effective exchange between single subjects, as determined from the action of everyone inside these spaces (possibility) and generating the dispositions. Element this that needs ulterior close examinations and reflections in the moment in which the habitus are identified: the practices of the single subject as the actualization, but also the genesis of some new possibility of relation, therefore, a complexity of the relationship among subjects and networks given by social relations.

In which way the single positions of the subjects are determined and determine the positions of the other subjects? It would have perhaps to be used instead of a description that uses points a description that uses vanishing neighbourhoods?
6 POSSIBILITY AND VAGUENESS

Inside these pages the concept of possibility it has been more and more contextualized in relation to the term vagueness. Not only, but the vagueness is emerged in more than an occasion inside the model that we have described, it is emerged as a dynamics, a structure, as a proper characteristic of the world of the daily life, both in the moment in which it is watched to the relations among subjects, and in the moment in which it watches to the same relation of study and analysis.

Previously we have pointed out to the fact that Lazarsfeld himself (1962; 1966) have stressed on the problem of vagueness. Obviously it is not the only one. His description is in terms of a relation between the concept and the empirical reality inside the determination of the object of the sociology and the modalities of study and analysis it. We can, therefore, to say that also him, like others, has placed the problem in the terms of a precisation of the language.

The tension between possibility and vagueness, regards, therefore, in a deep way the sociology and the model that we are describing here. In which way? The answer is, also in this case, an answer that is involved different levels: logical level, epistemological level, heuristic level. Classic logic, we have seen, is not the more adequate frame for this type of analysis, but at the same time, it must however be able to be a reference and one instrument able to describing particular cases.

The concept of truth, in relation to what is the possibility itself, as a relational co-construction of the sense that leaves opened different outcomes, different habitus, it cannot be the realist truth of referential type. The world of the social relations cannot have one description of the truth for correspondence.

The translation to heuristic level needs, moreover, of a description, a model of description, that it take care of all this in the moment in which the comparison with the world of the everyday life moves itself to level of the empirical investigation. Remaining in an abstract level without the possibility of a relationship with the effective object of study would be remaining in mid–air without the possibility to go up in the world of the clear and distinguished ideas, not in Cartesian sense, but a la Peirce (1878b), neither to arrive on the earth, therefore to construct a set of procedures of research and a set of techniques of analysis.

The vagueness, therefore, as a fundamental characteristic of the studied object, represents the complexity itself of the information, the complexity of the emerging the sense in the space of possibilities and in the space of dispositions, it does not have to be confused with the uncertainty that, instead, is a lack of information, that same lack that justifies the statistical inferences in terms of the traditional scientific objectivity.

The vagueness cannot be reduced, must be managed. The natural language of the world of the daily life does not have to be specified in an artificial construct that it renders partial the content of sense, but it must be watched to its diagramatical dimension, therefore, always an inner dimension, but at the same time an external one, that it is the language of sociology like here has been described. The social data is vague, the sociological data does not have to renounce to this vagueness instead of an unreal and often reductive precisation.

The simplicity is always an ideal, the complexity is the proper nature of the world of the social relations in not–linear and not–monotonic terms.

6.1 The Logic Of Vagueness

Classic logic governed by the three principles of identity, contradiction and excluded middle is not able to managing the type of vagueness that we have delineated. The information, the
sense, inside the social relations is something in continuous change that does not describe a universe closed and rigid, formalized through the three principles and the classic axiomatic rules. We need to change the logical frame.

One first option could be to identify fuzzy logic as the adequate frame, both to theoretical level and to heuristic level. Classic logic is inserted inside of this, but at the same time it constitutes only a particular case. The excluded middle seems not to be more a fundamental principle, like of the rest also that principle of contradiction. However fuzzy logic in a specific sense betrays its proper assumption of being a logic for and of the vagueness.

Fuzzy logic, in fact, structured and it is constructed on a series of assumptions that are contradictions in the moment in which it is arrived to a comparison with the probability. The negation in the fuzzy logic constructed in terms of complement to 1 it is something that re-enters totally inside the universe of the probabilities, in this case, quite, the membership functions coincide with the functions of distribution of probability, therefore, with objects that follow in precise and faithful way classic logic.

The membership functions are the object from which beginning in order to try to describe a type of logic that has the same relationship with classic logic, as far as the being of this last a particular case, but, at the same time, it is not something extremely similar, if not sometimes coinciding with the traditional statistical probability. Membership functions to describe in intensional terms in order to render the instrument adequate of description and analysis of the dispositions, of the habitus, of the practices, that emerge from a possibility space.

In relation to the construction that we have described of the data of the sociology we will have, therefore, two different modality of the membership functions, one for the social data, therefore, the functions that describe the relations from the point of view of the subjects, the instruments that the subjects use in their living the world of the life of all days in the moment in which they construct it and by which they are modified. The second modality is the one of the sociologist who inquires this world, he wants to describe and to analyze the social relations beginning from and interacting with the social data.

For every concept, for every property, it will be have, therefore, one different membership concerning the level in which we are moving, not only, different membership functions for the property and the not–property, its formal negation, functions that not necessarily, like for fuzzy logic they give back two values one the complement to 1 of the other.

In this way the vagueness of the real world has found one cognitive and heuristic instrument to translate in terms of instruments of survey and to insert as presupposed and object inside the techniques of analysis. The structuring of the positions of the subjects in the terms of an array is nothing different than the construction of the dispositions in the terms of the values of the membership functions of the single subjects. In this way the entire complex social network it is determined and it determines the single positions.

The vagueness is not more, therefore, something of problematic, something that makes notscientific the sociological speech that it finds it in every passage of its own proceeding. It is a information source that instead of having to be reduced and to be specified, also like epistemic ignorance, is a structural characteristic of the complex emerges of the sense.

7 THE SOCIOLOGY OF THE SOCIOLOGICAL RESEARCH

In order to conclude these reflections we must turn now the look to all which we have described from a particular point of view. The point of view of the sociologist like integrating part of the social relation that is the scientific search itself.
In effect, the entire model that we have described introduces among its own presupposed and assumed that one of the effective involvement of the investigator in the search process. The same strategy of description of the co-construction instead of the interpretation, in order to have the emergency of the mutual determination of semantic and syntax, is based on a position of the sociologist who is not an external observer, but does not re-enter, not even, inside the modalities of the participant observation of traditional type.

The position of the researcher vanishes, he is a scientist whom it wants to explain and to understand a determined phenomenon, but at the same time he is object of the social process of research. The social research in its complex, as far as the model that we have described, reflects this dialogic.

The same construction of the data of the sociology it introduces its own modality of the relational dimension given from the research, from the being of the sociologist one member of the same complex social network that at the end he have to describe. It is in reason of the co-construction of the sense of the social phenomenon that it has in front of him.

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