SEMANTIC NETWORKS IN CONCEPTUAL STRUCTURE[1]

FRANCISCO J. RUIZ DE MENDOZA IBÁÑEZ
Universidad de La Rioja

O. INTRODUCTION

The idea that semantics is encyclopledic runs counter to restrictive theories where lexical items are seen as closed sets of features, some of them entertaining primitive status. Proposals in favour of the encyclopedic conception have predominated for some time in cognitive psychology and artificial intelligence, and in general most people working within a cognitive paradigm have come to the conclusion that semantics is encyclopedic; otherwise a large amount of cognitive phenomena are left unexplained.[2]

The encyclopedic conception has found serious opponents both within the world of linguistics and of psychology. Some psychologists have argued that it

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[2] Within this encyclopedic orientation we find nowadays pragmatists like Dan Sperber and Deirdre Wilson, and cognitive linguists like Ronald Langacker, Charles Fillmore and George Lakoff. But part of the initial thrust to the encyclopedic conception in linguistics can also be traced back to discourse analysts like Teun A. van Dijk, and his collaborator Walter Kintsch.

is impossible to make hard and fast statements about the apparently unlimited number of encyclopedic associations of every lexical item (Drescher & Hornstein, 1976). To this we add that some linguists have contended that there exists a set of necessary and sufficient conditions that define every item; this conception has provided the rationale for the study of lexical fields.[3]

Those linguists who argue for an encyclopedic conception of semantics tend to see concepts as fuzzy and open-ended; for them categorization, which shows prototype effects, is preferably carried out on an experiential basis. Those who argue for the restricted view, see concepts as well-defined discrete entities within a system. In this paper we take sides with the non-restrictive view, but with two essential differences. We see the use of words as the key indicator to encyclopedic semantics, and we do conceive of words as entering into systemic relations with other words, but not in terms of lexical fields in the traditional structuralist sense. In fact, we will contend, it is relational systems that give us the key to both knowledge and lexical organization, at least to the extent that these two run parallel or are co-dependent.

1. A NETWORK CONCEPTION OF ENCYCLOPEDIC SEMANTICS

Haiman (1980) and Langacker (1987), among others, have made a convincing case about the necessity of an encyclopedic conception of semantics. Haiman shows that the difference between dictionaries and encyclopedias is simply artificial and argues for a denotative view of knowledge. Langacker sees the encyclopedic nature of linguistic meaning as a function of the encyclopedic nature of contextual meaning. For him, the speaker, in forming a conventionalized notion, abstracts away from many specific events whose knowledge structure is fairly elaborate. It is inevitable that we use all this knowledge whenever required for interpretation. Imagine, for example, that the sentence *The cat is on the mat* became conventionalized to describe the moment when a wrestler defeats a tiger by pinning its shoulders to the floor of the ring. The conventionalized expression would be related to an schematic conception of tiger-pinning, an event which would invoke a large number of other knowledge domains (wrestlers, wild felines, shows, etc.). Later, Langacker attempts to deal with the problems of the open-endedness and the accessibility of encyclopedic knowledge. He answers in terms of centrality and network orga-

[3] There is a long tradition for lexical field theory in Europe; for an influential account see Coseriu & Geckeler (1981).

nization (see also Langacker, 1990: 266ff). First, he claims, not all facets of our knowledge have equal status, and semantic specifications form a gradation, some being central and some peripheral. Centrality correlates with the extent to which a specification is conventional, generic, intrinsic, and characteristic: non-conventional specifications can be conventionalized over time; generic specifications (eg. our knowledge that cats chase mice) are more central than non-generic ones (eg. the knowledge that my neighbour is allergic to my cat); a property is intrinsic if it makes no reference to external entities (eg. shape for physical objects, in contrast to size which involves comparison with other objects or a scale of measurement); finally a specification is characteristic to the extent that it is unique to the class designated by an expression (again, shape is more characteristic of the class of cats than colour).

Second, Langacker suggests that linguistic expressions are not containers for meaning.[4] Not everything that I know about cats is invoked when I hear the word *cat*. Concepts are simply «entrenched cognitive routines» which are «interrelated in various ways facilitating their coactivation [...] but nevertheless retain enough autonomy that the execution of one does not necessarily entail the activation of all the rest» (Langacker, 1987: 162). In this vein, Langacker sees the entity designated by a symbolic unit as a point of access to a network, and its semantic value as the set of relations in which this access node participates. This conception would allow us to explain, for example, how we can relate *cat* and *cheese* without postulating that the concept of 'cheese' figures directly in that of 'cat': we attribute to cats the property of chasing mice, and to mice the property of eating cheese.[5]

Langacker makes no specific proposal as to what a relational network should look like; nor does he discuss the number and kind of relations in a net-

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[4] At its present stage of development Fillmore's frame semantics (see Fillmore, 1985; Fillmore & Atkins, 1992, 1994), in the same way as traditional schema theory, is formulated in terms of the container metaphor (ie. a concept seen as a container for meaning). This does not mean that frame semanticists do not share the network conception; only that the set of techniques to establish networks has not been developed.

[5] There is experimental support for the view that concepts are not simply stored in a unitary fashion in long-term memory, but rather constructed in working memory. This explains different context effects which vary from occasion to occasion and from individual to individual (see Barsalou, 1987). It is also interesting to note that Langacker's proposal is fully compatible with Fauconnier's theory of mental spaces. These are small conceptual packets which people construct provisionally as needed for the cognitive activity in which they are engaged (see Fauconnier, 1994). If knowlege is organized in terms of networks with layers of activation, a mental space would simply be a portion in a network, whose structure is determined by the nature of the long term store. Then, the extent of the portion to be activated would depend on the nature of the cognitive task or the stimuli involved (eg. lexical clues in communication through language).

work (his 'cognitive routines'). In other words, his explanation lacks the notion of system. Someone might say that the notion is not necessary, but then a relational network would simply be a highly idiosyncratic, random set of associations, which would be against the principle of economy in at least to ways: first, it would be highly variable, which would hinder communication; second, it would not allow to abstract away predetermined patterns of association which are essential for some conceptual operations like those based on analogy, operations which are relevant for understanding language.[6]

But before we deal with the number and nature of network relations in encyclopedic semantics, we need to enquire into the nature of the access nodes. These need to fulfil the requirements of centrality specified by Langacker (being conventional, generic, intrinsic and characteristic). Then we shall contend that the prototypical structure of these nodes and the more marginal features are accessed relationally.

2. Conceptual schemas

Lack of space will prevent us from giving but a sketchy account of internal conceptual structure. We shall start by discussing the notion of 'cognitive model' proposed by Lakoff (1987ab,1989). We shall see the connection between this notion and Langacker's observations as set out above. Lakoff bases his proposal on previous empirical research by cognitive psychologists on prototype effects (Rosch, 1978). These are «scalar goodness-of-example judgements for categories» (Lakoff 1987a: 63), which have commonly been taken as indicators of conceptual structure or as representations. Against this view, Lakoff argues that prototype effects do not result from a prototypical arrangement of information in our minds, but from other sources. He identifies five, which he calls 'idealized cognitive models': earlier frame or schema theories (these are 'propositional models'), image-schemas, metaphor, metonymy, and symbolic models (that is, direct form-meaning pairings).

Lakoff does not seem to define the concept of idealized cognitive model. However, from his treatment of the subject one may assume that it is a conventionalized pattern of belief or of communication used in understanding.

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[6] For example, if we establish the part-whole relation as a relational arc in a network (see section 3 below), it will help us see that the relationship between a man's body and a foot is analogous to the relationship between a horse and a hoof. This analogy operation is essential to understand an utterance like *John, keep your dirty hoofs off the carpet!*.

This wide-ranging definition enables us to put together, as Lakoff does, what we can call *operational models* like metaphor and metonymy, which are dynamic, with *non-operational models* like image-schemas, mental frames, and symbolic models, which are static. Another difference must be noted between the models listed by Lakoff: while image-schemas are fairly abstract knowledge constructs, like orientations, paths, containers, force, part-whole relationships, etc. (see Johnson, 1987; Lakoff, 1989, 1993, for details), the other models seem to be more concrete. This would lead us to distinguish between *abstract* and *non-abstract cognitive models,* an idea which will not be pursued here but which may find enough support in Lakoff and Turner's (1989) treatment of proverbs as generic structures and in Turner and Fauconnier's proposal of generic mental spaces (see Fauconnier & Turner, 1994; Turner & Fauconnier, 1995).

Now, both operational and abstract models are based on the description of non-operational propositional models (frames or similar structures): thus, the source and target domains of a metaphor (traditional vehicle and tenor) are propositional models; the same applies to metonymy[7] and to generic mappings (like proverbs[8]); then, image-schemas can be enriched by means of the associated non-abstract propositional elements.[9] For this reason, we need a thorough description of propositional models before we can deal with the others in greater detail. Our proposal will be based on the notion of *conceptual schema.*

We shall define a conceptual schema as a knowledge construct which consists of a set of general defining conditions (or *definers)* which are variously instantiated from individual to individual and from occasion to occasion depending on the contingencies of its use. Whereas the defining conditions are necessary and sufficient conditions for the item to be such, the instantiations are subject to prototypicality degrees. These prototypical associations can be

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[7] Take a metonymy in which the word *bread* stands for the idea of nourishment, as in *Peace will not give bread to the people.* In order to be able to explore all the implications of this metonymy we need to have access to the information that bread is a basic kind of food, that it is cheap and can be obtained easily, and the associated idea that bread is the last thing a person would like to be deprived of; taking away the bread from people is a denounceable practice.

[8] Take Lakoff and Turner's (1989) example *Blind blames the ditch,* where the blind person represents any person who, when faced with a difficulty he cannot cope with (the ditch), blames the difficulty rather than his own incapacity .

[9] A path-schema may illustrate this point. If I say *I'm ahead of John on my way to promotion, I* am talking about a situation in which John and I are moving along a path towards a destination (the promotion). The destination is the goal, and the movement means progress to achieve the goal. This is a fairly abstract characterization, but now compare *I'm miles ahead of John on the rocky road to promotion,* which is a propositionally enriched version of the former and requires, for interpretation, an exploration of the propositional model for the word *road.*

expressed in propositional terms, and, as will be shown below, constitute the basis for reasoning processes —like those studied by modern pragmatics— and explain prototypicality ratings. Moreover, the associations share a regular number of relational properties, to such an extent that it is possible to say that it is these properties that genuinely provide the basis for pragmatic reasoning in a cognitively economical way. It will be noted that whereas this proposal follows and elaborates on Langacker's view of encyclopedic knowledge, it runs partially counter to Lakoff's theory of cognitive models as the source of prototype effects. I see no problem in deriving prototype effects from what I have called operational models, like metaphor and metonymy. Indeed this *m u s t* be the case if the models represent mental operations. But it is not possible to say that a non-operational model —that is, a static cognitive representation— produces any effects. It is the actual instantiation process of prototypical associations —which, incidentally, is a mental operation— that does the deed.

In order to illustrate my view, let us take Lakoff's discussion of the concept of 'mother', which he treats as a cluster of cognitive models (Lakoff, 1987a:67ff).[10] Lakoff postulates an advantage of models over feature theories in that the former have an internal structure which features do not have. According to the classical theory of categorization it is possible to find a set of clear necessary-and sufficient conditions for 'mother' that will account for any use of the concept. It might be something like: a mother is a woman who has given birth to a child. But this condition does not cover the full range of cases. It is just one model —the birth model (cf. the expressions *biological mother, surrogate mother)*— which is accompanied by other models: the genetic model (cf. *donor mother),* the nurturance model (cf. *foster mother, adoptive mother),* the marital model (cf. *stepmother)* or the genealogical model (the closest female ancestor is the mother). All these individual models converge to form a cluster but when they diverge for cultural development reasons, people tend to view one as the most important (nowadays, the birth or nurturance models are usually more prominent). Lakoff (1987a: 69) points out that different models are used as the basis of extended senses of *mother,* as in the metaphor *Necessity is the mother of invention* (birth model), or in the derived verb in *He wants his girlfriend to mother him* (nurturance model) . Of course, the ideal model for *mother is* where all the other models converge.

Plausible though Lakoff's view seems at first sight, there are some fundamental problems with it. One is the lack of a system which regulates the con-

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[10] He opposes his treatment to feature bundles analyses like Coleman & Kay (1981) where, he points out, the authors make the mistake of identifying prototypes with representations —that is, of postulating that categories are represented in the mind in terms of prototypes—.

vergence of the different models of a concept. Another is that —contrary to his assumption— it *is* possible to state a set of necessary and sufficient conditions for the concept of 'mother', and in fact for most other concepts of our experience. This does not preclude postulating the existence of prototypical information in a concept and of prototype effects. A woman is a mother so long as she has (or has had) at least one child. It does not matter whether she has borne her own offspring, whether she feeds and cares for them, or whether she is married. We can only understand the concept of mother in relation to the concept of child, whatever the cognitive model that is brought to bear.[11] So, 'mother' and 'child' are mutually interdependent concepts and each of them becomes a 'necessary-and sufficient' condition for the other. In our own account, 'mother' invokes a schema with a general definer (ie. 'woman who has (had) (at least) a child'), which can be instantiated in different ways as needed. Consider the following utterances:

(1) My mother is in her menopause
(2) ?My mother has just shaved her beard
(3) My sister has had nine babies and is expecting her tenth
(4) A good mother will suckle her baby
(5) Mary is a mother without children
(6) She's always concerned about her children
(7) She's not my real mother because she adopted me
(8) My mother got divorced from my father
(9) ?My mother got divorced from my uncle
(10) A mother will always love her children
(11) ?A mother will always hate her children

As a female person (a woman), a mother shares all the attributes of a person and a female, which renders (1) consistent, but not (2). Now consider what having children involves: children, as any human being, are born (hence, example (3)), and nurtured (examples (4), (6), (10), but note the inconsistency in (11)) . A mother is usually married to a male person who acts as the father, which explains utterance (8). However, note that not any male person will do: an uncle is the brother of one of a child's parents, and one's mother cannot be married to him —in our monogamous society— as long as she is still married

[11] Even the marital model («the wife of the father is the mother») abides by this requirement. We cannot speak of father and mother (ie. parents) without children. Otherwise the marital relationship is simply one of husband and wife.

to the child's father. That is why utterance (9) is strange. Finally, consider example (5). This is not a counterexample —despite appearances— to our general definer. It is a sentence that demands special interpretative procedures: in order to give the sentence an interpretation we need to look for at least one of the stereotypical attributes of mother and apply them to «Mary» (perhaps she behaves like a mother with most children but does not have any of her own; this is Lakoff's nurturance model). In fact sentence (5) is proof that we cannot have a real mother without children, but we can find a woman who shares other attributes with mothers and call her mother by extension.

From the foregoing discussion we see that a conceptual schema consists of a set of necessary-and-sufficient conditions, plus their related prototypical associations.[12] This is the *prototypical core* of the schema. Prototypicality is a matter of degree, which means that some conceptual associations are more central to the concept than others. As conceptual associations become more and more peripheral, the user finds it increasingly difficult to make the connection with the concept. This bears not only on prototypicality judgements, as found by Rosch and her co-workers, but also on coherence phenomena, as we shall show below.

Let us illustrate this point. Think of a party. You would expect a party to be defined as a hosted social gathering where the participants (the guests) expect to have fun by taking part in any of a number of merry-making activities. These specifications constitute the definers for 'party'.[13] Thus, a party cannot be a party if there is only one person —except perhaps in the strange case of an individual acting out different roles and pretending to be different people—, or if there is not some form of intended merry-making activity, or if there is not a host (it might be the case that we find a number of people who meet together by chance and decide to have fun by singing, dancing, telling jokes and so on; in this case each of the participants is self-invited and belongs in the party as long as he or she is accepted by the others).[14] If, for example, one thinks of pos-

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[12] Cf. Lipka (1992: 118), where he argues in favour of an integration of feature semantics and prototype semantics, a proposal that most proponents of either theory would flatly reject. Lipka points out that prototype theory cannot account for abstract concepts, connotative features, deictics, relational words and syntagmatic relations, but that it is particularly suited for the description of concrete extralinguistic objects. The reader will be able to see that our descriptive model is able to deal with all these aspects of meaning. To this, we add the possibility of explaining reasoning processes and coherence phenomena.

[13] Still since any event takes place in a certain location and time, these would be more general defining parameters which are prototypically instantiated (eg. in the evening, in a room).

[14] There are many other forms of merry-making social events, like going to the theatre, a football match, or a ball. There is only one single activity associated as a necessary-and-sufficient

sible instantiations for the merry making definer, one may come up with such prototypical possibilities as games, dancing, music, people performing tricks, and other forms of entertainment. However, would you expect to find a minstrel or a jester? These concepts have a merry-making connection with the party schema, but it is only a feeble one, since they invoke a medieval context, which is strange to our present knowledge about parties. They are part of the periphery of the schema.

Another characteristic of conceptual schemas is that they are always basic-level categories, that is, categories which are in the middle of the conceptual hierarchy.[15] Superordinate and subordinate concepts are treated as depending on the basic-level term. We cannot understand concepts such as 'parent', 'animal', 'event', and other general ones unless we abstract away from a number of instances, like 'dog', 'cat', 'horse', etc., for 'animal', or 'mother' and 'father' for 'parent', or 'party', 'death', 'accident' for 'event'. In the same way, a 'poodle' as a type of dog, a 'Siamese' as a type of cat, and a 'stallion' as a type of horse share most of their features with the basic category except for a few which become specially relevant when the specific category rather than the basic-level one is invoked.

It must be noted that our treatment of conceptual schemas as a formalization of encyclopedic knowledge stands up to the requirements of centrality and accessibility postulated by Langacker. A semantic specification in terms of definers and prototypical instantiations is conventional, generic, intrinsic and characteristic. At the same time, it only requires the activation of selected knowledge items as needed by the ongoing cognitive activity (eg. language use). Now, we want to note one further virtue of the account: economy of activation. This is achieved because the instantiation process is regulated by means of relational arcs which allow the user to explore the internal nature of the concept or to relate it to other concepts on an external basis. Relational activity also accounts for what is usually called the periphery of a concept.

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condition with each of these events: the performance of plays, two teams contending under certain rules, and dancing, respectively. But we typically have more; for example, a number of short skits for the theatre, a cheerleader show for a football match, or hired entertainers for a ball.

[15] Basic-level concepts were discovered by Brent Berlin, Eleanor Rosch and her co-workers. They found that the most cognitively basic concepts, like those designated by *cat, chair, car,* are not like logical primitives, but have a rich internal structure. Among a large number of other properties, the basic level is the level at which most of our knowledge is organized, and therefore at which subjects are fastest at identifying entities that belong with the concept (see Lakoff, 1989: 106-108; Taylor, 1989: 46-51, for further discussion).

3. RELATIONAL ARCS

There is one basic qualitative difference between the concepts of 'mother' and 'party'. The former is non-complex; the latter is complex. Relational systems only work with non-complex basic-level concepts. Complex concepts enter relational networks only as composites of non-complex basic-level concepts. Consider again the case of 'party'. As a complex concept we can say that it consists of a number of social (interactive) activities (handshakes, hugs, kisses, singing, dancing, etc.) and a number of entities related to the activities (tables, chairs, snacks, drinks, the host and guests, etc.). This constellation of elements provides the first level of instantiation of the schema definers. Once a basic-level element is instantiated, it becomes a potential candidate for further levels of conceptual activation, a process which we can call —when it takes place— *schema extension,* and which leads internally —through recurring activations— into increasingly peripheral levels of the concept or externally into other separate concepts. Thus, relational arcs can be either internal or external to a conceptual schema. We shall distinguish tentatively the following relational types:

INTERNAL RELATIONS

We study internal relations in terms of actions, processes, positions and states:[16]

—Actions:

Actions are states of affairs where a certain entity performs some kind of activity which is under its control. The activities involved have some sort of effect on other entities. We distinguish five relations under this relational type:

> Agentive: an entity performs a controlled activity which is typically associated with it: a judge decides cases in a law court, a carpenter works the wood, a sportsman does sports, a cat chases mice, a murderer kills people, an ass brays, etc. One basic form of linguistic realization of this semantic relation is *does/is done by.*

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[16] Here we follow Dik's (1989) typology of «states of affairs» . Actions and processes share the feature [+dynamic]. Positions and states are [-dynamic]. Actions and positions are [+control]. Processes and states are [-control]. Using this general typology is justified to the extent that states of affairs are mental constructs in Dik's theory and have a clear conceptual parallel.

Factitive: an entity performs a controlled activity which is typically associated with it and as a result of the activity another entity comes into existence: a shoemaker makes shoes, a builder builds houses, a baker makes bread, a cabinet-maker makes furniture, a musician composes music, etc. One basic form of linguistic realization of the factitive relation is *makes/is made by.*

Purposive: agentive and factitive relations between entities are sometimes conceived as mediated by an instrumental entity. For example, a carpenter works the wood with a number of tools (like a hammer, a saw, pliers, and so on), a baker uses an oven to make bread, etc. We can also relate the instrument with the action: a hammer is used for hitting, a saw is used for cutting, a stove is used for cooking, an oven is used for baking (eg. bread), etc. One basic form of realization for this relation is *is used for/is performed by means of.*

Causative: here either an entity or an event is responsible for the coming about of an event. For example, a hurricane causes destruction, a mosquito-bite gives you an itch, a heart attack may cause death, heat causes iron to expand, etc. One basic form of realization is *causes/is caused by* .

Resultative: here an entity is the necessary result of a controlled activity. We can set this in contrast to what happens in factitive relations, where entities are not the necessary result of an activity. Thus, ash necessarily results from burning some material (eg. wood, paper), but shoes do not necessarily result from the activity of a shoemaker. In this case, one basic form of realization is *produces/is produced by.*

—Processes:

Processes are dynamic states of affairs where the activity performed by an entity is beyond its control. We distinguish two relations:

Processual: when an entity is typically or necessarily seen as involved in a certain activity over which it has no control. For example, a river flows, people live, lightning happens during thunderstorms, the Earth revolves around the Sun, etc. One basic form of realization is *does.*

Originatory: when a certain entity becomes another related entity with some distinguishing features. This relation is applied to such pairs as ice/water, seed/plant, grape juice/wine, boy/man, girl/woman, cub/lion, etc. As a basic form of realization we have *originates in/is converted into.*

—Positions:

Positions are non-dynamic states of affairs controlled by one of the participant entities. There is only one relation:

Positioner: an entity is related to another entity and it is up to one of the two entities to decide whether the relation holds. For example, a mother has children, a rich man has riches, a husband has a wife, etc. The basic form of realization here is *has/is had by.*

—States:

A state is a non-dynamic state of affairs where no participant entity has any control over it. We distinguish the following relations:

Material: an entity is described as being the material of which another entity is typically made: table/wood, tyre/rubber, statue/stone, tombstone/marble, etc. A basic form of realization is *is made of/is the material of.*

Container: an entity is seen as three-dimensional and described as either typically or necessarily holding another entity in its interior: sea/water, bottle/wine, vein/blood, etc. A basic form of realization is *contains/is contained by.*

Partitive: this is a very productive relation in English; here an entity is described as consisting of other entities, some of which are necessary conditions for the entity to be such: head, limbs, and trunk/body, board and legs/table, barrel, hammer, and trigger/pistol. A basic form of realization *is is a part of/consists of.*

Locative: an entity is typically associated with a certain location: game/woods, ghost/castle, kangaroo/Australia, tiger/jungle, sheep/fold, etc. A basic form of realization is is *found in/ is the place for a.*

Attributive: an entity is either necessarily or typically ascribed a certain property: rubber/elastic, rock/hard, rope/long, tree/tall, mountain/high, etc. A basic form of realization is the attributive use of is for adjectives, and *is a property of* for nouns.

EXTERNAL RELATIONS[17]

Only internal relations respond to the typology of states of affairs in terms of the features described above. External relations allow us to look at any concept in terms of other concepts which are not part of its internal make-up. The-

[17] Structural linguistics has dealt with external relations in depth (eg. Cruse, 1986). Usually, the authors make very fine distinctions which we have avoided here not only for the sake of simplicity but also because we intend our account to be cognitively plausible. See, for example, the next note below.

refore, these relations are not defining in any sense. Rather, they are a manifestation of the several intellectual operations that we are able to perform on concepts. One of this operations is paradigmatic; the others are syntagmatic:

Paradigmatic:

—Classifying: an entity is seen as belonging to a hierarchy of hyperordinates. The entity will share some of its less idiosyncratic attributes with its hyperordinate; the other attributes or properties will be the most relevant or salient for the concept. By way of illustration, the reader may refer to the concept of 'dog' and the different breeds (poodle, greyhound, mastiff, husky, Alsatian, Pekinese, bulldog, boxer, foxterrier, pointer, beagle, setter, etc). A basic form of realization is *is a type of/is classified into.*

Syntagmatic:

—Identifying: when two concepts are very similar they can be used in some contexts almost interchangeably. Eg. menace/threat, rich/wealthy. A basic form of realization is the equative use of is, or also *is like.*

—Contrasting: when two concepts are seen not in terms of their similarities but of their differences, which become relevant for the use they are put to. For two concepts to be contrasted they need to belong to the same domain of reference in terms of the classifying or the partitive relations. Thus, we find that contrasts like arm/leg, teacher/carpenter, penguin/ostrich, mastiff/poodle, head/trunk, root/branch, etc. are workable, while it is more difficult and even pointless to contrast nose/limestone, finger/socket, table/floor, among others. A basic form of realization is *is in contrast to.*

—Opposing: when one concept is seen as incompatible with another concept with which it shares a number of attributes and they do not belong to the same domain of reference in terms of the classifying or parttive relations, we say both concepts are opposed: rich/poor, dead/alive, young/old, kill/resurrect, construct/destroy, love/hate, etc[18]. One way of realizing this relation is the expression is *the opposite of.*

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[18] Statements like *I neither love nor hate her, or John is neither rich nor poor,* in contrast to **John is neither dead nor alive,* which is impossible, tend to show that sometimes there is some middle ground between two opposing concepts. It is in order to explain these cases of use that we talk of incompatibility rather than converseness or contradictoriness (terms which are used by structuralists like Lyons, 1977, and Leech, 1981). Two concepts are incompatible to the extent that they cannot stand together as the statement of one would cancel out the other: *ceteris paribus,* if you are

—Analogising: this relation holds when a concept is seen as sharing some noteworthy characteristic with another concept, usually in terms of the other relations. For example, take the analogy heart/pump: the heart circulates blood through the body, in much the same way as a pump circulates liquid (or gas, or air) through another system. The purposive relation (the purpose of the heart shares some features with the purpose of a pump) makes it reasonable for us to refer to the heart as a pump and to say that the heart pumps blood through the body. Or take the analogy foot/hoof. A foot is to a man's leg what a hoof is, say, to a horse's leg; they share a functional and a physical similarity (they serve to stand on, walk, run, etc., and they are found at the end of the leg). It is the partitive relationship that is involved here.[19] One basic form of realization of this external relation is *is analogous to.*

4. Cognitive domains and coherence

A network of internal relations constitutes the cognitive domain of a concept. These help to define the concept in prototypical terms as they instantiate the general definers, which provide not only the necessary and sufficient information to define the concept non prototypically, but also a coherent and well-arranged specification for the instantiation process to take place in an orderly manner. On the other hand, external relations permit the introduction of semantically related terms into a given schema; they are also helpful in providing expressive alternatives to avoid repetition of a term for a concept (eg. *The brats stoned the* cat, *and the poor* animal *died);* they are also of use to provide us with points of connection between different concepts. The activation of internal and external relational arcs generates sets of propositions which are the basis for reasoning and inference patterns.

To give some illustration of the power of a relational account, consider how coherence relationships are established in the following text on the basis of conceptual associations:

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rich you cannot be poor; if your are young, you cannot be old, if you are destroying you are not constructing. Of course, two incompatible concepts can sometimes be put together if they are applied to different aspects of a state of affairs; for example, one can be too young for some activities and too old for others.

[19] To the extent that some analogy relations are innovative or non-conventional we will not include them in our account. However, it must be noted that many analogies are conventional and have become part of our way of organising our conceptual systems. For example, one prototypical property of honey (being sweet and tasty and therefore likeable) has become associated with the idea that there is something about some girls that make them desirable, as evidenced by expressions like *What a honey she is!.* Also, analogy lies at the base of conceptual metaphor.

> The prosecution continued to present testimony from police officers describing what they discovered at the murder scene and at O. J. Simpson's mansion. As expected, the defence launched an aggressive cross-examination, seeking to portray the investigation as inept and careless. The proceedings ended the week with the prosecution's introduction of the famous glove and cap found at the murder scene. (*Time*, February 27, 1995, pp. 7-8).

We shall take the definer for 'trial' to be the following:

A social event where a judge (or a jury) decides whether a person (the defendant) is guilty of a crime by considering whether there is enough valid evidence against him.

As a social event a trial consists of a number of activities performed by a number of participants[20] that takes place at a certain place and time (the courtroom during working hours). But, in principle, this locative instantiation is not to be necessarily performed by the language user for the interpretation of this text, neither as an explicature or as an implicature.[21] In a trial a judge (or a jury) judges on the grounds of valid evidence. This part of the internal structure of the definer is essential for the coherent interpretation of the text we are discussing. The task of the prosecution and of the defence (agentive arcs) is to present valid evidence, the former against, the latter in favour of the defendant. Consequently we understand that what the police discovered is brought forth by the prosecution against Simpson. Since some valid evidence can be produced by questioning witnesses (resultative arc), we assume that the police officers[22] were questioned by the prosecution and also by the defence. The defence cross-examined the same witnesses. Cross-examination is a form of questioning (classifying arc), with the purpose (purposive arc) of finding contradictions between witnesses; if carried out by the defence, we conclude that cross-examination is in favour of the defendant, which is confirmed by the text (inept and careless information is invalid evidence). There is an agentive connection between 'investigation' and 'police officers', on the one hand, and an identifying relation between 'investigation' and the findings achieved by the of-

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[20] The specification of activities and participants is performed by means of partitive arcs.

[21] An explicature is an explicitly communicated assumption. Any assumption which is communicated but not explicitly is an implicature. See Sperber & Wilson (1986: 176ff. for discussion on this distinction).

[22] A person can be a witness (purposive), and a policeman is a kind of person (classifying), therefore a policeman can be a witness.

ficers, on the other, that give further cohesion to the text. Finally, the glove and cap are presented by the prosecution (agentive arc) as proof that Simpson was at the murder scene (which we Know by implication). It will have been noted that the text is based mainly on explicatures which are consistent with the prototypical conceptualizatons provided by the relational arcs. But the last sentence ties in with the rest of the text by means of implicature. First, consider the explicatures: a glove and a cap are articles of clothing (classifying); people can wear articles of clothing (agentive); the murderer is a person (classifying); therefore, the murderer could have worn the glove and cap found at the murder scene. But this provides no connection with the rest of the text unless we infer (by implicature) that what is being suggested is that the glove and cap might have belonged to Simpson (positioner arc), and that that is why the prosecution introduced them as evidence against him.

5. Conclusion

The fact that the rich internal structure of a conceptual schema contains a core of instantiated prototypical elements explains why it is possible to state —contrary to Lakoff's assumptions— that we have mental representations in the form of prototypes, and that one source of prototype effects is found in instantiation processes —which are an intellectual activity—. Also, the existence of this prototypical core is not incompatible with a general semantic specification in terms of necessary and sufficient conditions. In fact, these provide the basis for orderly conceptual activation through instantiation (that is, for the construction of a network) and for the association of peripheral elements with a conceptual schema through core-compatible extension processes. Finally, we have seen how relational systems regulate instantiation, some coherence phenomena, and inferential patterns. In general, our discussion on conceptual schemas argues strongly for the possibility of formalizing a large part —if not all— of our encyclopedic knowledge and, as a result, for the inclusion of encyclopedic semantics in linguistic theory.

Bibliography

Barsalou, L. W. 1987. «The instability of graded structure: implications for the nature of concepts», in Neisser, U. (ed.), *Concepts and Conceptual Development. Ecological and Intellectual Factors in Categorization.* Cambridge: Cambridge University Press.

COLEMAN, L. & KAY, P. 1981. «Prototype semantics: the English verb *lie*». *Language* 57, no. 1, 26-44.

COSERIU, E. & GECKELER, H. 1981. *Trends in Structural Semantics.* Tubingen: Narr.

CRUSE, D. A. 1986. *Lexical Semantics.* Cambridge: Cambridge University Press.

DRESCHER, R. & HORNSTEIN, N. 1976. «On some supposed contributions of artificial intelligence to the scientific study of language». *Cognition* 4, 321-398.

FAUCONNIER, G. 1994. *Mental Spaces,* 2nd. ed. New York: Cambridge University Press.

FAUCONNIER, G. & TURNER, M., 1994. «Conceptual projection and middle spaces», UCSD Cognitive Science Technical Report 9401. San Diego.

FILLMORE, C. & ATKINS, B. T. S. 1992. «Towards a frame-based lexicon: the semantics of RISK and its neighbours», in Lehrer, A. & Kittay, E. (eds.), *Frames, Fields and Contrasts,* Hillsdale, NJ.: Lawrence Erlbaum.

FILLMORE, C. & ATKINS, B. T. S.1994. «Starting where dictionaries stop: the challenge of corpus lexicography», in Atkins, B.T.S. & Zampolli, A. (eds.), *Computational Approaches to the Lexicon,* Oxford: Oxford University Press.

FILLMORE, C. 1985. «Frames and the semantics of understanding», *Quaderni di Semantica,* vol. VI, no.2, pp. 222-254.

HAIMAN, J. 1980. «Dictionaries and encyclopaedias», *Lingua* 50: 329-357.

JOHNSON, M. 1987. *The Body in the Mind: the Bodily Basis of Meaning, Reason and Imagination.* Chicago: University of Chicago Press.

LAKOFF, G. 1987a. «Cognitive models and prototype theory», in Neisser, U. (ed.), *Concepts and Conceptual Development. Ecological and Intellectual Factors in Categorization.* Cambridge: Cambridge University Press.

LAKOFF, G. 1987b. *Women, Fire, and Dangerous Things: What Categories Reveal About the Mind.* Chicago: University of Chicago Press.

LAKOFF, G. 1989. «Some empirical results about the nature of concepts», *Mind & Language,* vol. 4, nos. 1 and 2, 103-129.

LAKOFF, G. 1993. «The contemporary theory of metaphor», in Ortony, A. (ed.), *Metaphor and Thought* (2nd. ed.), Cambridge: Cambridge University Press.

LANGACKER, R. 1990. *Concept, Image, and Symbol. The Cognitive Basis of Grammar.* Berlin, New York: Mouton de Gruyter.

LANGACKER, R. W. 1987. *Foundations of Cognitive Grammar, i, Theoretical Prerequisites.* Stanford: Stanford University Press.

LIPKA, L. 1992. *An Outline of English Lexicology* (2nd. ed.). Tubingen: Niemeyer.

ROSCH, E. 1978. «Principles of categorization», in Rosch, E. & Lloyd, B. B. (eds.), *Cognition and Categorization,* 27-48. Hillsdale: Lawrence Erlbaum .

SPERBER, D. & WILSON, D. 1986. *Relevance. Communication and Cognition.* Oxford: Basil Blackwell.

TAYLOR, J. R. 1989. *Linguistic Categorization. Prototypes in Linguistic Theory.* Oxford: Clarendon Press.

TURNER, M. & FAUCONNIER, G. 1995. «Blending and metaphor», to appear in Shen & Kasher (eds.), *Cognitive Aspects of Metaphor,* Routledge.