THE SEMANTICS OF CHANGE VERBS:
A FUNCTIONAL-LEXEMATIC STUDY OF THEIR PARADIGMATIC AXIS IN ENGLISH[1]

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INTRODUCTION

The purpose of the present article is to offer an overview of my research into the verbal domain of CHANGE which I am currently carrying out for the Lexicon Research Group created by Prof. Leocadio Martín Mingorance in the 80's and 90's while he was working at the universities of Granada and Córdoba. Such a group works along the lines of his Functional-Lexematic Model (FLM) of lexicological and lexicographic description. Therefore, in what follows I will only present a necessarily abbreviated exercise in what is a more extensive study of the domain of CHANGE on a contrastive basis (English and Spanish), and while I will adopt to that end the standard theoretical view and methodological procedures that can be found in other similar contributions by members of this group, I will also try to throw into relief the validity of the FLM from a complementary, more cognitive-semiotic angle.[2]

1. THEORETICAL BACKGROUND

In the past decade Prof. Leocadio Martín Mingorance created an influential model of lexicological description which he called Functional-Lexematic (eg. Martín Mingorance, 1984, 1987, 1988, 1990, 1994) drawing on Coseriu's Lexematics (Coseriu, 1977) and S.C. Dik's Functional Grammar (Dik, 1978 & 1989). Since then it has undergone some refinement and has been applied variously (as in Cortés, 1994 & 1997; Faber & Mairal, 1994, 1997a, 1997b, fc.; Felices, 1991; Jiménez, 1994; Mairal, 1994, 1997; Marín, 1997; Martín Morillas, 1984; Sánchez, 1994) and to lexicological description of a number of languages (eg. Calañas, fc.a/b; Negro, 1997). In what

follows a certain degree of familiarity with this model is of necessity assumed if the results and discussion presented are to be properly understood.

In the wake of functional structuralism, ultimately going back to the Trier-Porzig fruitful polemics of the 1930's, the meaning of lexical units is regarded by the FLM as the intersection of their paradigmatic and their syntagmatic axis, ie. of their sense (a function of selection) and the set of collocationally restricted, syntactico-semantic combinations they may establish. Such an intersection is now conceived as having a conceptual schematic purport.[3] This is no surprise, since, as M. Mingorance put it, lexical meaning should be regarded as "lying at the interface of the linguistic *and the extralinguistic* worlds" [my emphasis] (M. Mingorance, 1990) and —I suggest there is no harm in adding— as a meeting point for multidisciplinary study (Wotjak, 1995) which (1) at system level expresses a comparatively stable —but by all means not invariant— potential awaiting textual actualisation and which (2) is moulded by and inherits its value from previous discoursal conceptualisations (hence the relevance of textual analysis to lexical definitions)[4]. Indeed it itself makes up an intersubjective knowledge configuration which should ideally[5] be furnished with a maximum of cultural-cognitive information (eg. M. Morillas, 1992; Pérez Rull, 1997) which is not only linguistically motivated but also linguistically manifested, ie. one should realize all the complexities entailed by the "organization of *the different types of meaning* in a hierarchically-structured manner [my emphasis]" (Martín Mingorance, 1990:228) should be realized.

Another feature of the FLM is that it is possible to conceive of the lexicon as a repository of units which (in encoding lexico-conceptual domain structure and possessing a cultural-symbolic purport —reflective of language use—) encapsulate the kind of information/knowledge characteristic of second-order, intersubjective, conceptual non-perceptual projections (as opposed to first-order, perceptual, projections; Martín Morillas, 1998) in a (macro)*textually oriented* way (therefore coherent —also in the technical sense of "relevant" current in cognitive pragmatics and text-linguistics; Givón, 1995; Sperber & Wilson, 1986; etc.), especially given the dynamic nature of linguistic competence actually presupposed by the FLM.

One should perhaps not lose sight of the fact that detailed onomasiological —relational/structural— description of lexical organization does not ensure an entirely appropriate understanding of conceptual structure, unless one is willing to grant such description a semiotic (interpretive, properly dynamic) presuppositional/explanatory status and to address its practical implications. The very use of natural language components instead of abstract features would seem to confirm the complex embeddedness of all discourse/text: language, lying at the base of discourse, would ultimately turn out to be describable only in terms of the perhaps more tightly constrained and somewhat minimized discourse/textual —even tropological—[6] structure (interpretable constructions/knowledge frames) encapsulated in lexical entries, especially as far as the elusive lexical structure of abstract vocabularies is concerned (*cf.* Lyons, 1977: 258-259). Indeed, one may mention here the large number of lexemes in the dimensions or groups of our structurings that are at first glance undifferentiated by indentation or hierarchy. I suggest that a more comprehensive theory of lexical structure (a cognitively-motivated one) should perhaps be invoked to complement, rather than replace, the standard one, inasmuch as this relates to the abstract area of the lexicon by modelling on the concrete lexicon alone, with its comparatively more functional definitions and ostensible descriptions. A good candidate is, in my judgement, a lexico-

conceptual approach capable of incorporating (if need arises —and it does so often), the cognitive and cultural models underlying terms, beyond lexically rooted —yet indispensable— predicate schemata [which so neatly —or nearly— overlap with the symbolic-form level (Martín Morillas, 1992; Martín Morillas & Sánchez García; Faber & Mairal, 1997b)],[7] since:

> It is quite conceivable that a successful and convincing componential or prelexical analysis is proposed for one or more lexical items while, *at the same time*, it is recognized that the item or items in question have meanings *that go well beyond* the analyses given [my emphasis] (Seuren, 1988).

It would then appear that any attempt to understand the relation between lexical structure and conceptual space (as organised by the mental lexicon) in terms of a neatly fitted window into the mind will inevitably be off target, as such a "conduit metaphor" —whereby linguistic (lexical) structure is the virtually sole key to the black box of our thought process (despite invaluable efforts to schematize what are basically structural axes) presupposes an old-fashioned naive semantic realism incapable sometimes of appropriately accounting for certain important aspects of lexical meaning, especially the actual relation between cultural, abstract or evaluative lexical units / lexical concepts to the structure of reality.

The FLM produces bottom-up lexemic analyses, ie. operates from the word to the concept —this is why I believe the approach should be considered to be lexico-conceptual: its cognitive adequacy points to the fact that definitions enjoy a culturally conditioned relative stability but they should not be treated as conceptual invariants. In the FLM, conceptual categories stem from sheer language analysis, but I suggest the latter is a textual act itself, ie. interpretive (explainable in coherent/relevant ie. cognitive-pragmatic terms). The procedure thus emerging —instrumental in dimension formation and lexical differentiation— is a cyclical interdependent one in actuality.

It also be accepted that field membership is open and indeterminate (Lyons, 1977: 268), as would certainly be shown by a comparative study of different structurings of the same domain, which does not mean to say that one should not be able to have —indeed, investigate— membership criteria. Were such a study undertaken, it would also show that it is actually as difficult to decide on membership in a determinate way as it is to decide on the exact make-up of a semantic metalanguage of conceptual undefinables or primitives (Wierzbicka, 1995, 1997). These are in fact reflected in our fields, if one wishes to look at them from a lexico-conceptual standpoint, rather than from a merely structuralist lexical one (so that "domain" is a more appropriate label than "field"). This is apparent, for example, in *worsen* [to experience a negative change (of value-*0*) along a qualitative scale / to become worse], the only member of the group *to worsen* (*in general*) and therefore its overriding noeme —a perceptual unit in the apprehension by the mind of a form that purports to be universal (hence its primitive/archinoemic status as archilexeme).

A particular problem related to that of domain membership is that of polysemy, of course, for which the FLM follows the usual procedure of identifying the various senses of the same lexeme by using numbers. Now, curiously enough, sometimes the extended sense of a given lexeme has been found to be onomasio-logically prior to the central, more basic one. This is the case of *grow2* (to increase in number, value,

importance or degree) and *grow1* [to develop and increase in size (organism or part of organism)], the latter being included in a more general, less restricted or specialised group. This is so in view of the paradigmatic character of this kind of lexical organisation.

As for the definitional structure of lexemes, this is seen as a process, an activated scenario (a constructed prototypical frame, that is to say, the state of affairs is taken as a cognitive fact, following Dik, 1989).

Thus, in definitions, there is a variety of different types of salient information focalised by such differentiating parameters as the following, which in the FLM can be said to constitute a case of allegiance to both text and grammar, albeit a lexically-based type of grammar (field-grammar; Cabello de Alba, 1997): *nuclear meaning, subject, direct object,* (*and their semantic functions, ie. frame participants: agent, affected entity or patient*)*, adverbial modification, pragmatic features.* Therefore, compositionality of lexical meaning is not renounced but advocated. Pragmatic aspects, be it in the way of collocational range or in the way of style/register features, are also incorporated in the lexical entry. This is due to the fact that sometimes these are the only distinctive parameters, as is shown by the entry assigned to *augment* [to increase (of things already well-developed) (formal) (technical)] which is through that expedient contrasted with *increase*, its hyperonym.

Dictionaries constitute a body of knowledge and the basis of rearranged definitions. Thus the theoretically-unmotivated methodological inconsistencies of ordinary dictionaries are overcome. Definitions are segmented and components rearranged to fit parameters. In my opinion, definitions —its sheer availability and its actual posited structure— presuppose cultural information models (Martín Morillas & Sánchez, fc.).

Components are represented in natural language and "are compared and contrasted [among lexemes after the inductive data-collecting process and chunking] in order to find those which are [felt to be] the most appropriate and semantically the least complex" (Faber & Mairal 1997c: 223), ie. whose total meaning is included in theirs.

2. THE LEXICO-CONCEPTUAL VERBAL DOMAIN OF CHANGE: AN OVERVIEW.

2.1 DOMAIN LEVEL

The overall organization of the domain can be seen in the table (see Appendix).

There we notice that two major epistemological categories are central in our experience of what is in the event an essentially kinetic and effective process or action: they are quantity and quality. Indeed, they account for most of the verbs in the domain and are instrumental in bringing it about in the first place, more so given its borderline status with respect to other perhaps more central ones such as EXISTENCE, POSITION, POSSESSION and MOVEMENT, with which it is very closely connected. In fact they can be said to be available (implicit) at system level for eventual activation in discourse, when the specific lexical inventory of change verbs is accessed by a natural language user. They correspond to two main sets of percepts which pervade our dealings with the entities and phenomena usually subject to change, in other words, which are construed by the mind in first coming to terms

with experience of the change-relevant undifferentiated perceptual change continuum in the phenomenal world: *quanta* and *qualia*. These two are essential concepts dealt with by scholars working in the framework of the Philosophy of Mind and are of undoubted interest to cognitive scholars, especially insofar as they lend themselves to schematization. For our purposes, they are interesting in that perception of them would —not undisputably, to be sure— seem to constrain the use and knowledge of the two most important lexico-conceptual superdimensions, ie. lexicalised conceptual space, (quantitative and qualitative change) of a total of four identified within the domain by adopting a typically functional-lexematic bottom-up (ie. data-driven) method, together with the other two —manifestly not so important— of general and regulative change.[8] Qualitative change is the only one that is axiologically loaded to a great extent (for an excellent discussion of axiology in semantic domains, see Felices, 1991, 1997).

Of these four sets only quantitative and qualitative change verbs are structured in two dimensions, positive (⇩) and negative (⇧), since the orientational metaphors "more/better is up" and "less/worse is down" studied by cognitive linguistics could be said to obtain in both of them.[9] As for general and regulative change, their orientation is neutral: in the former case, involving no apparent orientation/direction; in the latter, involving neutralization of tendencies that may depart from a desired norm and which might invoke either or both spatial orientations operating at the same time in the dimension (itself a term of spatial denotation) —hence the inverted position of the two arrows, which in this case apply simultaneously.

The third file in the table indicates the negative or positive sign of the two subdimensions within each dimension, which are thus analysed for the causativity classeme.

2.2 SEMANTIC HIERARCHY: DIMENSION / SUBDIMENSION / GROUP LEVEL

The following is an overview of the structure of the domain in which a complete list of dimensions, subdimensions and groups that have been established is provided, in conjunction with some considerations that have been felt relevant. For lack of space, I only present in more detail Dimension 1, which sets the trend, as it were, of the whole domain, and Dimensions 2 and 5, which are represenive of what happens in the focal or central superdimensions (see above) and thus contain a large number of lexemes, due to the saliency of the concepts they lexicalise.[10]

2.2.1 Dimension 1:

1A. CHANGE IN GENERAL [-*causat.*]: To experience a change in general / to become different

1B. CHANGE IN GENERAL [+*causat.*]: to cause a change in general / to cause to become different

This dimension contains general change verbs: *change, modify, transform, convert, alter, vary, switch, commute*.[11] They all denote "alterity" as the key definitional parameter, since (co-)hyponyms in the hierarchy modulate, in one way or another, the prototypical general meaning encapsulated by the archilexeme (*change*), irrespective of whether the subdimension is unmarked (A) or marked (B) for causativity, ie. of whether or not it reflects causality of change. None the less, some lexemes do

not have quite the same meaning in the non-causative and causative subdimensions; thus *speed* means "go at high speed" [Movement] in the former, but "increase the speed, rate of movement or progress, or action of sth/sb" [Change] in the latter. This ought then to be classed as a case of polysemy rather than what I wish to call *dimensional phase* (a case in which *the same* predicate appears in different classematically-determined subdimensions).

Modulating parameters exhibit, as is usually the case, a change-related circumstantial-role (ie. adverbial) character responsible for the focalisation that takes place in individual lexemes. They include *purpose* (in order to be more acceptable: *modify*), *manner* (eg. drastically: *transform*), *result* (or *effect*) (taking on a new character: *transform*), *origin* (chemical or physical agencies: *metamorphose*), *aspect* (in genetic nature: *mutate*), *duration* (at a particular moment: *get*).

Become (analysed in terms of *transform*, which acts as its definiens) is not the archilexeme. Otherwise —especially given the linking, relatively empty, function of copular/intensive structures—, the whole domain would be made to hinge on the adjective or nominal classes, rather than on the best candidate to encapsulate the archilexematic notion Change: the verb *change* itself. Yet, *become* is present in the common conceptualized archisememe or archilexematic notion expressed by the (sub)dimension labels. This reflects the probable fact that speakers will connect this linking verb with a basic-level category either image-schematically or pragmatically (frequency, communicative effect) and then maybe, via transitive hyponymy, with *change* (after all, any instance of *become* is also an instance of *change* —to [experience] a change in a certain way). This would explain why *change* is at once less basic (less familiar) and more basic (general or structurally simple) *than become*. Our decision concerning the relational structure holding between these two lexemes seems justified in view of the fact that

> Some words might be more basic than others in that they can be used to define a greater proportion of the total vocabulary or can be used to construct a more elegant and systematic set of interconnected definitions. [...] There is no reason to believe that the two senses of "basic" should be applicable to exactly the same lexemes (Lyons, 1995: 88).

In addition, *become* is in any case always present in a copular/intensive structure, linked to adjectives all of which ultimately refer back to the component concept "different". But when *become* must be specified as a lexical unit on its own (ie. not as part of the lexically complex expression[12] *become different*), it should appear as a hyponym of *change*.[13] The fact that *become* (ie. "come-to-*be*") really expresses a distinct phase in Existence, is taken to mean that the whole domain of Change is inextricably bound up with it, as it is with other domains too.

2.2.2 Dimension 2:

2A. Positive Quantitative Change [-*causat.*] : to experience a positive change (of value +0) along a quantitative scale (to become larger / more intense, etc.).

2B. Positive Quantitative Change [+*causat.*] : to cause to experience a positive change (of value +0) along a quantitative scale (to cause to become larger, more intense, etc.)

These are the groups identified in each of the above subdimensions, in which further subgroups could also be included:[14]

2.1 To increase (in general): *increase; increase*
2.2 To increase in size, number or importance: *expand, fatten, multiply, accumulate, appreciate; expand, emphasize, elevate, exalt, exaggerate, aggrandize, maximize, fatten, thicken, deepen, enrich, multiply, accrue.*
2.3 To increase in extent or scope: *extend; extend*
2.4 To increase in degree of development: *develop; develop*
2.5 To increase in intensity, energy or enthusiasm: *intensify; intensify.*
2.6 To increase in speed or rate of movement, progress or action: *accelerate, quicken; speed* (*up*).
2.7 To increase in strength or firmness: *strengthen, firm, straighten* (*out*); *strengthen, firm, straighten* (*out*).
2.8 To increase in texture or surface: *harden, sharpen; harden, sharpen*
2.9 To increase in colour or light: *colour1, brighten, lighten1; colour1, brighten, lighten1*
2.10 To increase in moisture, temperature or molecular stability: *heat, condense; heat, condense*.

Each of these groups contain an archilexeme which (except for 2.1) is defined in terms of *increase*. Therefore, they should be understood as hyponymous with respect to 2.1. The same is true of the groups in the other (sub)dimensions.

The main (non-pragmatic) focalising parameters across the groups above are:[15]

2.1: *attribute*[16] (number, value, importance or degree: *grow2*), *pragm. feat.* (formal/lit: *augment, wax*).

2.2: *manner* (by unfolding or spreading: *expand*), *attribute* (size/bulk/volume:*expand*; weight: *fatten*), *extent* (beyond its normal limits: *swell*), *cause/ reason* (as a result of burning/rubbing: *blister*), *result* (becoming almost solid: *congeal*) *time-span* (until there is a large quantity in one place: *accumulate*), *purpose* (for the benefit of sb: *accrue*), *pragm. feat.* (formal: *inflate, accrue*).

Some intralinguistic lexical gaps at dimension level can be identified, since very often one of the subdimensions has more lexemes (usually the causative one). This is the case of: *blister, accumulate, appreciate* [-caus]; *emphasize, elevate, exalt, exaggerate, maximize, enrich* [+caus.].

Double field membership is enjoyed by *accumulate* (Possession).

2.3: Members of this group all represent lexematic specifications of *extend* [to increase in extent (space/time) or scope, thus applying to more things (sth previously constrained)] and they are related to the "expand" group in that a physical attribute of the increase is focalised: space (*vs.* size/bulk/volume), as well as opposed to it in focus, time or scope. Apart from *attribute*, parameters include *manner* (by stretching to the limit, affecting more and more people: *spread*), *purpose/result* (so that it continues more time: *lengthen*), *time/condition* (when pulled in opposite directions: *stretch1*); *means/instrument* (by another thing of the same kind: *prolong*), *quantity* (unduly: *protract*), *pragm. feat.* (formal: *elongate*), (*selection*) *restriction*[17] (sth that is felt inadequate such as information or electric signals: *amplify*).

Interestingly, this group clearly shows how the syntagmatic and the paradigmatic axes of lexical meaning are interdependent, making it sometimes virtually impossible

to specify adequately the functional (ie. oppositional) criteria obtaining among lexemes without having resource to corpus and collocation studies, which are proving increasingly important as a natural complement of paradigmatic studies of semantic (lexico-conceptual) macrostructure (*vid.* Butler fc., Márquez 1998). The former are arguably the more important, the more specialized the lexical meanings treated are. A case in point is *enlarge2* [to extend in scope (interests, activities, capacities, opportunities], distinguished from *extend* only in terms of the lexical solidarities it enters into or the range of collocates it takes. Or consider the pairs of units *turn/go* (*vid.* appendix) and *broaden/widen*[18] —let alone the case of *amplify* (see above)— which are not wholly or satisfactorily distinguished by falling back on the lexicographic tradition and introspective methods (to extend, esp. a road or the scope of sth in width or level of generality / to extend esp. a road/river or the range of sth).

This group also provides an example of borderline cases, very frequent in the domain, which enables us to speak of double group membership (*spread*: to extend over an area, usu. by stretching to the limit or affecting more and more people). We may also speak of intra-dimensional gaps: *prolong, amplify* [+caus.].

2.4: This group, as we can tell from the definition of its archilexeme *develop*, contains lexemes which include the notion "fulfillment of potential" in its structured denotational continuum. Parameters: *degree* [degree to which sth (usu. a social or natural organism] fulfills its potential: *develop*), *manner* (in orderly process: *evolve*), *purpose/telicity* (towards the production of an intellectual, aesthetic result: *evolve*), *duration/telicity* (till reaching the state of being fit for use/enjoyment: *mature*), *inceptive phase* (to begin to grow: *germinate*). *Germinate* must be defined somewhat differently in both subdimensions, due to the rigours imposed by stepwise lexical decomposition [to begin to grow (a seed) / to begin to develop sth (a seed)]; yet its underlying frame/schema is the same. *Grow* can also be [+caus.] ("raise"), but in this sense it belongs to Action or to Existence, although double field membership may be also present here.

2.5: The parameter of *Figurative/manner* [(as if) by lifting it above the ordinary][19] —as well as, possibly, (*selection*) *restriction*— are the parameters that distinguish *intensify* and *heighten*. The latter is the definiens of *enhance* (*result*: making it more attractive/desirable) in the causative subdimension, which also contains *redouble*, a specification of *intensify* [distinguished by (*selection*) *restriction* (esp. efforts in trying to do sth)].

2.6: Parameters: (*selection*) *restriction* (esp. the rate of motion or progress of sth: *accelerate*), *figurative/manner* [(as if) being stimulated: *quicken*]; both are hyponyms of *speed* (*up*) in 2B where there are additional parameters: *result* (making it take place sooner: *hasten*), *manner* (impetuously: *precipitate*); and gaps (other than the last three): *rush, hurry*.

Some show double field membership as they are connected with Movement: *speed, accelerate, quicken, hasten*; with Existence: *hasten*; or with Action: *precipitate, rush, hurry*.

2.7: Parameters: *attribute* (strength/force/power: *strengthen*), *result* (not moving/changing: *steady*), (*selection*) *restriction* (sth usu. subject to fluctuation: *stabilize*), *result* [so that there are no bends, curves or curls: *straighten* (*out*)], *intensification*[20] (fully: *stretch2*), *time/condition* (when in effort or concentration: *tense*); *external force* (against attack: *fortify*), *manner* (by making them more active or operative: *energize*).

Most show possible double group membership: connection with "to improve condition" (eg. *invigorate, fortify*) or "to increase in extent" (eg. *tauten*).

2.8: In this group lexemes denoting a quality of a surface or of its texture are included. Parameters: *attribute* (hardness: *harden*), *result* (becoming difficult to bend/move: *stiffen*), (*selection*) *restriction* (of wood: *season*); *figurative/result* [(as if) making it a stone: *petrify*],

2.9: This group involves lexemes denoting a visual quality present in a process of changing colour or light, therefore more amply lexicalised in 2A. Parameters: *attribute* (colour/light: *colour1, lighten1*), *result* (becoming red or more red: *redden*), *reason/cause* (because embarrassment or annoyance: *colour2*), *manner* (by drawing: *shade* (*in*)), *means* (by exposure to heat: *brown*), *degree* (to a high degree: *brighten*), *figurative/result* [(as if) preventing sb from stumbling: *light*], *instrument* (with bright light: *illuminate*).

Gaps: *flush, colour2, blush, darken, shde* (*in*)*, brown, weather, clear*, [-caus.]; *dye, tint* [+caus.].

Double field membership: *brighten, lighten, light, illuminate* (connection with Light; *vid.* Faber & Pérez 1993).

2.10: Parameters: *attribute* [temperature: *heat* (*up*)], *degree* [moderately: *warm* (*up*)], *purpose* [esp. to obtain a pleasant feeling: *warm* (*up*)], *result* (becoming a solid: *solidify*), *cause* (because of a reduction in temperatures: *freeze*); *intensification* (very much or for a long time: *soak*), *purpose* (to make it softer or easier to clean: *soak*), *intensification/duration* (until they are extremely wet: *drench*).

Intra-dimensional gaps can often be bridged by means of lexically complex expressions that could be incorporated to the domain if a lexico-conceptual rather than a word domain is intended (cf. the notions of *lexical field* and *word field* in Lipka, 1990:152), eg. *get wet* for *wet* in 2B. Such gaps include here: *wet, soak, drench, heat* [+caus.].

Drench is a hyponym of *wet* rather than of *soak*, due to the presence of the purpose parameter in the latter.

2.2.3 Dimension 3.

3A. Negative Quantitative Change [-*causat.*]: to experience a negative change (of value -*0*) along a quantitative scale (to become smaller, less intense, etc.).

3B. Negative Quantitative Change [+*causat.*]: to cause to experience a negative change (of value -*0*) along a quantitative scale (to cause to become smaller, less intense, etc.).

Groups and lexemes:

3.1 To decrease (in general) : *decrease*; *decrease*
3.2 To decrease in size, importance or number : *lessen, shorten1, reduce*; *lessen, shorten1, reduce*
3.3 To decrease in extent or scope: *narrow* (*down*)*, shorten2*; *narrow* (*down*)*, shorten2*
3.4 To decrease in degree of development: *wither*; *wither*
3.5 To decrease in intensity, energy or enthusiasm: *weaken*
3.6 To decrease in speed or rate of movement, progress or action: *slow* (*down*); *retard*
3.7 To decrease in strength or firmness: *loosen2, soften*; *loosen2, soften*

3.8 To decrease in texture or surface: *flatten*; *flatten, blunt*
3.9 To decrease in colour or light: *discolour*; *discolour*
3.10 To decrease in moisture, temperature or molecular stability: *dry, cool, liquefy2*; *dry, cool,evaporate, liquefy2*

2.2.4 Dimension 4:

4A. POSITIVE QUALITATIVE CHANGE [*-causat.*]: to experience a positive change (of value *+0*) along a qualitative scale (to become better).

4B. POSITIVE QUALITATIVE CHANGE [*+causat.*]: to cause to experience a positive change (of value *+0*) along a qualitative scale (to cause to become better).

Groups and lexemes:

4.1 To improve (in general): *improve; improve*
4.2 To improve physical or psychological health: *cure, recover, gain*; *cure, revive, rejuvenate, revivify*
4.3 To improve condition or appearance: *clean, freshen* (*up*)*; revitalize, clean, freshen* (*up*)*, enhance*
4.4 To improve with the passage of time: *age2*; [no lexeme]

2.2.5 Dimension 5:

5A. NEGATIVE QUALITATIVE CHANGE [*-causat.*]: to experience a negative change (of value *-0*) along a qualitative scale (to become worse).

5B. NEGATIVE QUALITATIVE CHANGE [*+causat.*]: to cause to experience a negative change (of value *-0*) along a qualitative scale (to cause to become worse).

Groups and lexemes:

5.1 To worsen (in general): *worsen*
5.2 To worsen physical or psychological health: *weaken, faint*; *infect*
5.3 To worsen condition or appearance: *bruise, spoil, decay, crumple* (*up*)*, steam* (*up*)*; affect [injure, spoil, corrupt, degrade, blemish, dirty, crumple* (*up*)*, steam* (*up*)*]*
5.4 To worsen with the passage of time: *age1; age1*

5.1: Parameters: *attribute* (quality: *worsen*), *pragm. feat.* (*usage: frequency*)-*cum-result/attribute* (esp. making it more inttense or bitter), *manner* (by taking away sth important: *impoverish*). Gaps: *aggravate* and its hyponyms *exacerbate, impoverish* [+caus.].

5.2: Parameters: *attribute* (health: *weaken*), *result* (becoming ill: *sicken*), *manner/speed/time* (gradually: *sicken*), *pragm. feat.* (old-fashioned: *sicken*), *means* (through confinement: *rot2*), *result* (feeling unhappy: *languish*), *reason/cause* (because of wanting sb/sth: *languish*), *intensification* (very much: *languish*), *telicity* (to the point of losing consciousness for a short time: *faint*); (*selection*) *restriction* (land, water, air: *poison2*). In *swoon* there is also perhaps a *result* factor (and fall down) which connects it with the MOVEMENT domain.

Both 5A and 5B are interesting in that they are not at all symmetrical, ie. all their respective members contain nothing but gaps; thus, *weaken, faint* (and their hyponyms *sicken, rot2, languish; swoon*) [-caus.], and *infect1* and its hyponym *poison2* [+caus.].

5.3: Parameters: *attribute* (in condition: *bruise*), *pragm. feat* (*usage*: *freq*.)-*cum-* (*selection*) *restriction* (esp. part of the body), *result* (without breaking the skin: *bruise*), *cause* (because of being hit: *bruise*), *result* (becoming somehow useless: *spoil*), *pragm. feat* (*usage*: *freq*.)-*cum-manner/speed/time* (esp. gradually: *deteriorate*), *reason/cause* (as a result of a bad situation: *suffer*), *manner* (in a visible way: *decay*), *figurative/manner* [(as if) by a gradual natural chemical process: *decay*], *place* (in the place where it has been left: *moulder*);

5B (see Appendix) is governed by its archilexeme *affect* (to worsen the condition or appearance of sb/sth).[21] Parameters: *prag. feat* (*usage*: *frequency*)-*cum-*(*selection*) *restriction* (esp. body tissue or sb in group: *injure*), *attribute* (condition: *spoil*, nature (physical or moral): *corrupt*, quality of character: *degrade*, appearance/beauty/perfection: *blemish*, appearance: *dirty, crumple, steam*), *manner* (deliberately, by injustice: *injure*, leaving marks: *dirty*), *result* (less sound, effective...: *injure*; useless: *spoil*; smaller/bent: *crumple*, steam-covered: *steam*).

The first subgroup (1.1) involves *injure* and its dependent lexemes: *harm, disable, sprain, strain, hurt, wound, prejudice.* Parameters: *manner* (inflicting pain: *harm*; making it normal life impossible: *disable*; twisting: *sprain*; causing hard work: *strain*), *pragm. feat.*(*usage*: *frequency*)-*cum-figurative/manner* [(as if) wounding: *hurt* —a lexeme very close to the "wound" subgroup], (*selection*) *restriction* (chances of succeeding: *prejudice*). As can be seen in the definitions, *maim, cripple and mutilate1* are distinguished by *intensification, manner and result.*

In the second (1.2) we find verbs related to *spoil: deteriorate, rust, damage, mess1, vitiate*. Parameters: *manner/speed/time* (gradually: *deteriorate*), *manner/instrument* (covering with dust: *rust*), *manner* (without destroying value: *damage*), (*selection*) *restriction* (sth carefully made/done/planned: *mess1*), *attribute* (value: *deteriorate*, goodness/effectivity: *vitiate*), *prag. feat.* (*usage*: *register*) (formal: *vitiate*). "damage" verbs are distinguished by (*selection*) *restriction, manner, attribute, intensification, prag. feat* (*usage*: *frequency*)-*cum-manner, quantity, result.*

The third (1.3) has *corrupt* and its hyponyms: *pollute, taint, adulterate, falsify, defile, pervert, debauch, poison1*. Parameters: *pragm. feat.* (*usage*: *frequency*)-*cum-* (*selection*) *restriction* (esp. water/air: *pollute*, esp. food/drink: *adulterate*), *result* (dirty/impure/dangerous: *pollute*, unacceptable: *pervert*, destroyed: *poison1*), *pragm. feat.* (*usage*: *frequency*)-*cum-manner* (esp. by relating them to sth. unpleasant: *taint*), *manner* (adding sth of lower quality: *adulterate*, misrepresenting: *falsify*), *attribute* (purity: *defile*, behaviour: *pervert*, sexuality: *debauch*), *pragm. feat.* (*usage*: *register*) (old, informal: *debauch*), *figurative/manner* [(as if) using poison: *poison1*]. *Contaminate, infect2, deprave* are further specified due to: *manner/instrument*, (*selection*) *restriction, means/instrument, intensification, result and forced action-cum-result* parameters.

The fourth (1.4) is headed by *degrade*: *coarsen2, debase.* Parameters: *attribute* (behaviour: *coarsen2*), *result* (less polite: *coarsen2*), *pragm. feat.* (*usage*: *frequency*)-*cum-attribute* (esp. worth/dignity: *debase*).

In the fifth (1.5) *blemish* includes *mar* and *disfigure.* Parameters: *pragm. feat.* (*usage*: *frequency*)-*cum-attribute* (esp. appearance/perfection: *mar*), *result* (less attractive/enjoyable: *mar*, barely recognizable: *disfigure*), *pragm. feat.* (*usage*: *register*) (literary: *mar*).

The sixth (1.6) denotes "make dirty": *dirty: soil, sully, foul, mess2* (*up*). Parameters: *place* (on the surface: *soil*), *result* (reduced value: *sully*, untidy: *mess2*), *pragm. feat.* (*usage*: *register*) (lit.: *sully*; formal: *foul*), *intensification* (very much: *foul*), *pragm. feat.* (*usage*: *frequency*)-*cum-instrument* (with waste: *foul*). *Deface, stain, tarnish* contain the following distinguishing features: (*selection*) *restriction* (wall/notice/painting: *deface*), *pragm. feat.* (*usage*: *frequency*)-*cum-manner/instrument* (esp. by writing marks on it: *deface*), *instrument* (with mark impossible to remove: *stain*), *pragm. feat.* (*usage*: *frequency*)-*cum*-(*selection*) *restriction* (esp. metal), *result* (loss of brightness: *tarnish*).

Crumple (*up*) [-caus.] shows how norm-governed figurative usage codified in an extended metaphorical sense can be incorporated to the basic sense in the definition (to worsen in appearance becoming smaller and bent or looking suddenly sad (of a face). Otherwise the problem could be solved by assigning two senses and making the lexeme a polysemous one.

As for instances of double membership, it is easy to see that a number of these lexemes —esp. at the lower levels— show connections with the MAKE/DO domain implying destruction.

5.4: Only one lexeme (*age1*). Parameters: *figurative/cause/time* (with the passage of time), *pragm. feat.* (*usage*: *frequency*)-*cum-cause* (esp. suffering), *pragm. feat.* (*usage*: *frequency*)-*cum-intensification* (esp. much).

2.2.6 Dimension 6:

6A. REGULATIVE CHANGE [-*causat.*]: to experience a change towards an accepted state that is free of unwanted variation as a whole (to become standard).

6B. REGULATIVE CHANGE [+*causat.*]: to cause to experience a change towards an accepted state that is free of unwanted variation (to cause to become standard).

This dimension is motivated by the category typified by *normalize*, the only lexeme appearing in 6A and 6B, perhaps the most basic of the three in 6B (the other two in the latter being *standardize* and *regularize*. The basic nature of *normalize* is iconically reflected in its definition: [(...) accepted state that is free of unwanted variation as a whole with respect to a norm (socially accepted principle) or a given concept of *normality*]. Probably for this reason it is the only lexeme to make up 6A. *Standardize* in 6B is defined in terms of the superordinate term *normalize* (acting as archilexeme in the subdimension) and is included in the sense/definition of *regularize*, its hyponym.

The definitions of all three members contain the clue to what was stated at the outset: Dimension 6 implies neither positive nor negative change, and is also neutral as to quantitative and qualitative articulation of the change substance continuum. Its parameters include: *telicity* (towards an accepted state...: *normalize*), the embedded parameter *norm-governed neutralization* (free of unwanted variation as a whole with respect to a norm (socially accepted principle) or a given concept of normality: *normalize*); (*selection*) *restriction* (esp. things of a type), which makes *standardize* enter into "a type of" (hyponymic) relationship with *normalize*, and *result* [so that it conforms to a legal/official or usual type (arrangement/pattern)].

3. CONCLUSION

Summing up, in the group *To worsen condition or appearance* [*+caus.*], verbs codify relevant information about the kind of negative qualitative change wrought in the condition or appearance of sth/sb: (1) the *attribute* of the change (ie. what property —condition, appearance, dignity, behaviour and the like— of the entity is affected); (2) the *manner* in which such a change is effected or (3) the *instrument* employed to perform it; as well as (4) the *result* produced (what is the entity like after the change) are the focal areas or elements mostly focalised in the group. Other generally less relevant elements are also codified, such as (5) pragmatic features (frequency with which the item is employed) and —especially in the lower levels— (6) restriction of entity affected, (7) intensification of change and —marginally— (8) place or esp. manner in a figurative world. This is indeed small wonder, as the most relevant or salient categories/aspects of an experience (such as change) is what a given culture codifies intersubjectively in its language/lexical structure. Agentive initiation (in which a controlling entity is involved) being usually presupposed, ie. left unspecified, it is then constituent questions of the change frame/schema, such as "what exactly (in condition/appearance) changes/is worsened?", "how does it change/is it worsened?" and "what does it become after changing/being worsened" that are addressed by (i.e. that determine) such lexicalization. Roughly the same holds for other groups: in 5.2 (*To worsen physical or psychological health*), for instance, with the addition of some marginal factors such as (1) cause/reason of ill health, (2) manner/speed/time in which ill health supervenes; and (3) telicity (terminal point/result of ill health). Surely these are all fundamental considerations in the aetiology of disease?

These conclusions also hold for the whole domain, again with some added marginal elements such as extent, quantity, degree, inception, etc. This confirms the centrality of the group studied in detail above (5.3 in 5A & 5B) and of the whole dimension 5 at domain level.

Clearly enough, definitions, so important in vocabulary delimitation and selection (domain membership), also show what connections seem to hold or can intersubjectively be ascertained among the various domains, dimensions and groups. Connections are then established via definitions as part of complex schemata that lay the foundations for knowledge representation in terms of a relational macronet. As has been shown, definitions also help establish some lexemes as borderline cases on the fuzzy edges of the categories they embody.

From the foregoing, I think one can safely state that the functional parameters present or, rather, interpreted as present in definitions on the basis of the inductive inferences one draws when facing lexicographic/corpus data (definitions, examples, textual chunks) serve to highlight an aspect ofthe FLM which has gone unnoticed on many an occasion: that definitions are textually oriented, given the indisputably constant, historically determined flux of the (lexico-semantic) synchronic system, and that therefore the dictionary/lexicon is *construed* by the linguist as a complex architecture of semiotic status,[22] and if it is not to be taken as a fixed data base, is then to be conceived as an interpretive construct of, to be sure, a predominantly stable (if formalised, inherently probabilistic[23]) level of intersubjectivity for which a model such as the FLM should be adopted as heuristic tool (Martín Mingorance, 1988), at least if one really is willing to accept that we are all "active

experiencers and interpreters" of the world and use "creative *linguistic* and *conceptual* systems" (Faber & Mairal, 1997b:12; [their emphasis]), that is, if one accepts that lexical entries/units are not only the end-product of an interpretation of percepts but also act as their starting point.

APPENDIX:

The Domain of Change

SUPERDIM.	GENERAL		QUANTITATIVE				QUALITATIVE				REGULATIVE	
Orientational /Scalar. (DIM)	0		⇧		⇩		⇧		⇩		⇩ ⇧	
Caus. (SUB DIM)	-	+	-	+	-	+	-	+	-	+	-	+

Extracts from the domain of CHANGE verbs
(1) *become* in the subdimension *to experience a change in general*:
become to transform into the stated kind of entity / state / feeling.
   turn (*into*) to become suddenly.
   go to become sth. not so good.
   grow to become over a period of time.
   get to become, esp. at a particular moment (inf.).
   fall1 to become, passing into a certain negative temporary state/condition (asleep, ill, pregnant, silent, etc.)

(2) The "affect" group in the qualitative negative causative subdimension.
(5.3 B) *To worsen condition or appearance* [+*caus.*]
1. *affect* to worsen the condition or appearance of sb/sth.
   1.1 *injure* to affect sb/sth (esp. a body tissue or sb. in a group) deliberately by doing an injustice or something bad to their appearance, health, or success, so that they become less sound, effective, successful or useful.
      1.1.1 *harm* to injure sb/sth by inflicting pain, suffering or loss.
      1.1.2 *disable* to injure sb physically/mentally, making it impossible for them to live normally.
         1.1.2.1 *maim* to disable sb badly, making part of their body permanently useless, through violence.
            1.1.2.1.1 *cripple* to maim sb by injuring or causing the loss of their leg or arm. way.
            1.1.2.1.2 *mutilate1* to maim sb severely, usu. by having part of their body violently removed.
      1.1.3 *sprain* to injure an ankle/wrist/knee, etc. accidentally by a sudden, violent twisting motion.
      1.1.4 *strain* to injure sth (esp. a muscle), by making it work too hard.

1.1.5 *hurt* to injure (a body, feelings) esp. (as if) by inflicting a not very serious wound.

    1.1.5.1 *bruise* to hurt part of the body without breaking the skin, usu. producing a mark on it.

1.1.6 *wound* to injure sb's body by using some kind of weapon or instrument.

    1.1.6.1 *bite* to wound sb with your teeth.

    1.1.6.2 *cut* to wound sb making an opening in their body with a knife/sharp object.

        1.1.6.2.1 *nick* to cut slightly.

        1.1.6.2.2 *scratch* to cut sb with your nails or sth (esp. part of body) slightly with sth sharp or rough.

        1.1.6.2.3 *stab* to cut sb by pushing a knife into their body.

        1.1.6.2.4 *gash* to cut inflicting a large deep wound.

        1.1.6.2.5 *slash* to cut in a violent way.

        1.1.6.2.6 *lacerate* to cut badly and deeply.

1.1.7 *prejudice* to injure sb's chances of succeeding in sth.

1.2 *spoil* to affect the condition of sth making it somehow useless.

    1.2.1 *deteriorate* to spoil sth, esp. gradually and sometimes affecting its value.

    1.2.2 *rust* to spoil sth by covering it with rust (the substance that forms on iron and steel when wet).

    1.2.3 *damage* to spoil sb/sth physically without destroying their value, attractiveness or efficiency.

        1.2.3.1 *sabotage* to damage secretely sth (equipment, vehicles, etc.) that belongs to an enemy or opponent.

        1.2.3.2 *impair* to damage sth (esp. capabilities, senses), deteriorating or diminishing it in value or strength.

        1.2.3.3 *mutilate2* to damage sth violently / completely by removing part of it.

        1.2.3.4 *desecrate* to damage sth holy/sacred deliberately esp. by using it in an inappropriate way.

        1.2.3.5 *ruin* to damage sth severly.

        1.2.3.6 *devastate* to damage most of a place or area.

        1.2.3.7 *ravage* to damage sb/sth, very badly, almost destroying them.

    1.2.4 *mess1* to spoil sth (sth carefully made, done or planned).

    1.2.5 *vitiate* to spoil the goodness or effectivity of sth (formal).

1.3 *corrupt* to affect the nature of sth or the moral condition of sb.

    1.3.1 *pollute* to corrupt sth (esp. water/air) by causing them to become dirty, impure, dangerous for people/animals.

        1.3.1.1 *contaminate* to pollute sth (esp. water/air/food) by adding sth to make it impure.

            1.3.1.1.1 *infect2* to contaminate sth by means of sth that spreads disease (esp. bacteria).

    1.3.2 *taint* to corrupt sb/sth, esp by relating them to sth unpleasant.

    1.3.3 *adulterate* to corrupt sth (esp. food or drink) by changing or adding sth of lower quality.

    1.3.4 *falsify* to corrupt the authenticity of sth by misrepresenting it.

1.3.5 *defile* to corrupt the purity of sth.

1.3.6 *pervert* to corrupt sb's behaviour causing it to become unacceptable.

    1.3.6.1 *deprave* to pervert sb extremely, making them find obscene or prurient satisfaction in sth else.

1.3.7 *debauch* to corrupt sb sexually (old-fashioned, informal).

1.3.8 *poison1* to corrupt sth causing it to degenerate/be destroyed (as if) using a substance that causes structural/functional damage.

1.4 *degrade* to affect sb/sth (character, etc.) in quality.

1.4.1 *coarsen2* to degrade sb's behaviour making it less polite.

1.4.2 *debase* to degrade sb esp. in worth or dignity.

1.5 *blemish* to affect the appearance, beauty or perfection of sth.

1.5.1 *mar* to blemish sth, esp. the appearance/perfection of sb/sth, making it less attractive or enjoyable (literary).

1.5.2 *disfigure* to blemish sb/sth so that they are barely recognizable.

1.6 *dirty* to affect the appearance of sth by leaving marks on it.

1.6.1 *soil* to dirty sth on the surface.

    1.6.1.1 *deface* to soil (a wall/notice/painting), esp. by writing marks on it.

    1.6.1.2 *stain* to soil sth with a mark that is difficult if not impossible to remove.

        1.6.1.2.1 *tarnish* to stain sth (esp. metal) so that it loses its brightness.

1.6.2 *sully* to dirty sth so that its value is reduced (literary).

1.6.3 *foul* to dirty sth very much, esp. with waste (formal).

1.6.4 *mess2* (*up*) to dirty sth making it untidy at the same time.

1.7 *crumple* (*up*) to affect the appearance of sth by making it smaller and bent.

1.8 *steam* (*up*) to affect the appearance of sth by making it covered with steam.

Notes

1. This article is part of the research project currently directed by Dr. Ricardo Mairal Usón (UNED), called *Desarrollo de una lógica léxica para la traducción asistida por ordenador a partir de una base de datos léxica inglés-español-francés-alemán multifuncional y reutilizable*, subsidized by the Spanish *Ministerio de Educación y Ciencia, DGICYT,* Code Number: PB 94-0437.

2. Special thanks must go to P. Faber, who first tackled the task of provisionally organising the domain into dimensions and definitions. Although a summary of the new rearranged version is offered here (adding up to nearly 600 verbs), her first draft was certainly of great help.

3. Unfortunately, the schemata arising from the convergence of the paradigmatic and the syntagmatic axes of change verbs, themselves linking up with change-relevant cognitive models, cannot be dealt with in the space available and will be the theme of a future contribution.

4. Consider the following script-like, less strictly functional, features incorporated in the definition of *dwindle*: to lessen progressively (as if) approaching a vanishing point in size/importance/esp. quantity over a period of time (usu. so that it decreases in value).

5. But this does not mean that it should necessarily be incorporated in the compilation of an onomasiological dictionary.

6. Ie. understanding abstract items in terms of concrete ones in a motivated way.

7. When structuring domains, some inadequacies that may now and then arise in trying to reflect the exact transition from lexeme to lexeme —not always accounted for by stepwise lexical decomposition— can be avoided by propositional models that reflect such instances of lexical transition as the ones diagrammatically presented by Bolinger (1975:212).

8. To my mind, the possibility that lexical structure (the actual shape of a semantic domain as lexicologists structure them, and meaning (its ontological status) may also be governed or constrained by more or less intersubjective cognitive models operative during production and processing of discourse coherence has not received enough serious attention by such lexical linguists, yet cannot be overstressed (cf. Martín Morillas & Sánchez García, 1997).

9. In fact, the four dimensions thus formed can be posited as points of articulation for what would seem to be very *basic-level* categories in the change domain on the level of conceptual structure. The other two (general and regulative change —see below) could then be taken as two instances of more peripheral lexicalization areas, given their general (*superordinate*) or marginal (*subordinate*) nature (the latter dimension being a particular case of the former) —hence their reduced size. This we can see if we look at the six dimension archilexemes: *change, increase, decrease, improve, worsen, normalize/standardize*.

10. Especially dimension 5 is very heavily lexicalised with respect to dimension 4 (both belonging to "qualitative change"), even much more so than dimension 2 with respect to dimension 3 (both belonging to "quantitative change", the former containing a slightly larger number of lexemes). This would confirm the fact that negativity is salient in our culture (Faber, 1992).

11. These and similar examples within groups (see below) are only illustrative of the first level of hyponymy in the semantic hierarchy. Examples corresponding to non-causative and to causative subdimensions are separated by means of a semicolon (;).

12. Also note that phrasal and other lexically complex expressions, albeit basic in some sense, have been for now excluded. Yet they should be included at further stages in the research, "if we do not just think about a lexical semantic investigation in terms of the study of part of the lexicon as such, but as a reflection of underlying conceptualizations" (Verschueren 1981:318). This is also the present writer's view, ie. along internalist-experientialist lines, but complementary with, in fact, hinging upon intensionalist ones such as those of the MLF (Martín Morillas, 1997).

13. We do find other instances of *become* in a copular structure as part of the archilexematic notion at domain or dimension level in other cases such as FEELING (*feel*: to become aware of sth other than sight, having a sensation; Faber y Mairal, 1994:202).

14. Items in each group label should be regarded as attributes of the same (complex) concept/schema (expressed by the label). This explains why more than one item (expressing quality or type of change brought about) is usually present in the same label. Groups are ordered from abstract to concrete.

15. Unless otherwise indicated, the factors/parameters that follow hold for both subdimensions.

16. Ie. the property typically associated to a given kind of change.

17. Hereafter used for "entity affected", an equivalent form in the [+caus.] change subdimensions.

18. Definitions:
    broaden to extend, esp. a road or the scope of sth in width or level of generality.
    widen to extend esp. a road/river or the range of sth.

19. This, together with similar cases (see below), is a case of *modulation* or compression of senses in otherwise polysemous lexemes, ie. the figurative component is then promoted or demoted when contextual selection/interpretation is at work (Cruse, 1986), especially due to the partly uncertain character of polysemy.

20. This is a pervasive classeme in semantic domains. See Portero (1996).

21. The presence of this lexeme here can struck one as peculiar; yet it has often been described as a (change-denoting) operative (AGENT, PATIENT) verb in the literature. I would argue that it is in fact an operative-factitive (CAUSE, EFFECT) verb (*cf.* Lyons, 1977:491).

22. *Cfr.* Anderson (1990) for the relevance of inferencing in a not dissimilar constructivist view of "full-blooded" lexical meaning.

23. For instance, along the lines of chaos/catastrophe theory (such as one can find in W. Wildgen's work, eg. Wildgen, 1994, and of the research currently carried out by E. Bernárdez's group into text theory and lexical organization (eg. Bernárdez, 1995), which in the last resort would presumably end up by pointing up the ultimate fractal nature of natural language and all linguistic endeavour (Briggs, 1992; see also Sánchez, 1994-95 & 1996).

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