

Back to basics: prepositions, schema theory, and the explanatory function of the dictionary

Abstract

For most foreign language learners the category of prepositions are notoriously difficult to master. In this paper it will be shown how most dictionaries fail their target audience in describing and explaining the semantics of prepositions. Proceeding from Lakoff's assumption that it is easier to learn, remember and use a lexical item if one knows how its meaning is motivated, and/or what niche it occupies within the ecology of the lexicon, a number of ways will be explored in which dictionaries can enhance the explanation of the semantics of prepositions with the support of the descriptive and explanatory mechanisms offered by hyper media technologies.

Keywords: prepositions, cognitive semantics, image schemas, hyperdictionaries, hypermedia technologies

1. Introduction

In most of the languages in which they occur, adpositions (= prepositions and postpositions) form a closed, but highly polysemous lexical category. They are also notoriously difficult to master for a second or foreign language learner. In this regard, Gethin and Gunnemark (1996:18) note in their book, **The Art and Science of Learning Languages**, that "Prepositions are famous for being used in their own special and 'different' way in each language, and cause great difficulties to students all over the world."

The adpositions of English, and more specifically the English prepositions, are a case in point. Because of their difficulty, they usually get extensive coverage in pedagogical grammars (cf., for example, Dirven and Geiger 1989, and Lindstromberg 1998).

Gethin and Gunnemark (1996:18, 95) isolate two factors as causes for the difficulty in mastering the meaning and use of prepositions, viz. the basic nonequivalence in the way in which languages, even closely related ones, encode spatial concepts, and bad learning habits. Taylor (1988:299), on the other hand, pinpoints the problem to the way in which prepositions are treated in a number of pedagogical and reference grammars. Failing to come up with a few core definitions that account for the full range of the meanings and uses of prepositions, authors usually come to the conclusion that the meaning and use of prepositions is something essentially arbitrary and idiomatic, and that it simply has to be learnt by heart.

In this paper I will argue that most monolingual dictionaries foster the same impression by merely describing the various senses of prepositions in the form of extensive lists. If we accept that monolingual dictionaries have a dual function in being both reference works that should afford users quick and easy access to the linguistic characteristics of the lexical items they address, and pedagogical texts that should explain these characteristics to the user-learner (cf. Geeraerts 1990:195; Neubauer 1980:1-2; Wiegand 1989:539-543), then current practices call for a number of theoretically and pragmatically justified improvements.

In section 2 of this paper I will outline the various cognitive-linguistic variables that motivate, to a large extent, the meaning and uses of the set of English prepositions. This will set the scene for the analysis in section 3 of some of the ways in which printed English monolingual dictionaries (as pedagogical texts) fail their users in explaining essential aspects of the meaning of prepositions. In section 4 I will explore a number of ways in which lexicographers can capitalize on the new hypermedia technologies to improve the explanatory function of dictionaries.

2. Theoretical and pragmatic considerations

From a pedagogical point of view, I will accept Lakoff's premise (cf. Lakoff 1987:438) that it is easier to learn, remember and use a lexical item if one knows how its meaning is motivated and/or what niche it occupies within the ecology of the lexicon. (Cf. also Swanepoel 1990.)

The latter part of this premise refers to the generally accepted assumption that the vocabularies of languages form closely knit semantic networks, and that to learn the meaning of a lexical item, one must also learn how it slots into such a network. The concept of motivation alluded to in the first part of the premise, refers to the fact that the individual senses and meaning structure of most lexical items are not arbitrary, but can be shown to follow from a number of variables, variables that "explain" why lexical items have the senses and the meaning structure that they have.

In their stative and nonstative spatial use prepositions serve to locate one entity (the Figure or Trajector) with respect to another entity (the Landmark or Reference Object) in three-dimensional space. In other words, prepositions profile a conventionalized relation between two entities against a base of physical space (cf. Taylor 1988:303).

As has been extensively shown in research on prepositions within the framework of cognitive grammar, their individual senses and meaning structure are highly motivated, i.e. can be shown to follow from a number of cognitive-linguistic variables. More specifically, and in a top-down fashion, their individual senses and intracategorical meaning structure can be shown to follow from the following:

- (i) their nature as prototypically structured polysemous categories, and more specifically, from a well-defined set of parameters within which their sense extensions are located
- (ii) the set of basic image schemas against which their individual senses have to be interpreted
- (iii) the online representations of spatial cognition from which these schemas evolve.

Researchers working within the paradigm of cognitive grammar have posed a rich set of theories to account for the way in which human spatial cognition maps onto the concepts encoded by prepositions (cf. Landau and Jackendoff 1993 and Sinha and Thorseng 1995 for references). Furthermore, various aspects of these theories have been supported by linguistic, neurological, psychological and psycholinguistic research (cf. Gibbs and Colston 1995). In

the following paragraphs I will outline the basic assumptions of three such theories with respect to (i) - (iii) above, viz. that of Johnson (1987), Landau and Jackendoff (1993), and the prototype theory of polysemous lexical items, specifically as expounded in Geeraerts (1989).

Contrary to the modular approach taken by Landau and Jackendoff (1993), I will accept the cognitive approach that there is no specific and separate language module, but that the same set of cognitive mechanisms that determine the nature and function of our spatial representations are those at work within the domain of language. From the above-mentioned theories the following three levels of spatial representations (SR's) can be deduced:

(1) **SR3: Linguistic conceptual level**

1 *Primary spatial meaning*

a. Geometrical properties and (non)stative relations

b. Literal meaning extensions:

- Special functional meaning
- Conventionalized conceptualizations of reference objects
- Force-dynamic properties
- Extensions from stative to non-stative (places → paths)/
- Image-schematic transformations

2 *Nonliteral extensions*

a. Metaphorical extensions (TIME, STATE, AREA, MEANS/MANNER, CIRCUMSTANCE, CAUSE/REASON)

3 *Use as grammatical markers*

(2) **SR2: Image schemas (PATH, CONTAINER, LINK, etc.)**

(i) (Geo)metrical and kinesthetic information

(ii) Logical properties

(3) **SR 1: On-line representations of the objects (in the world) and the spatial relationships between them**

The theories of Johnson (1987) and Landau and Jackendoff (1993) converge with regard to SR1. Representations on this level are the output of our ability to perceive (by way of vision, audition and the haptic (touch) faculty) objects and their locations and motions in space. Information from SR1 feeds into the motor system where it is used to initiate and guide bodily behaviour as we position ourselves in the world surrounding us, interact with objects and navigate our way in space.

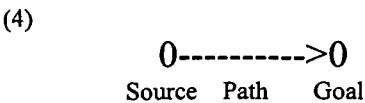
Whatever the exact content or form of representations on this level, we would expect them already to be an abstraction from what serves directly (in the world) as input to our faculties. But given the on-line connection between this level of spatial representation and the motor system, one would expect that this level of representation, although abstract, will be rich enough in information to perceive specific objects and their locations and motions in space so that we can successfully interact with them, and be able to navigate our way in the spaces we occupy at any time.

SR2 captures what is specific to the theory of image-schemas, specifically that set forth by Johnson (1987) and Lakoff (1987). The basic tenet of Johnson's theory of knowledge acquisition is that we acquire knowledge in the form of so called "image schemas" which arise from, and are, therefore, grounded in our everyday physical and bodily interaction with the world around us. For example, from our earliest childhood on we are constantly moving away from one entity along a path to another entity in various bodily activities that we undertake (getting out of bed and going to the bathroom; going from home to school or work). From this recurring bodily experience emerges a source-path-goal schema as a conceptual structure that recurs in a number of very common activities we undertake.

Johnson (1987: 29) notes that such an image schema can be thought of as a "recurrent (mental-PHS) pattern, shape, and regularity in, or of these activities", and as such should be seen as a cohesive (non-propositional) knowledge structure reflecting recurrent groupings of objects and relations in physical, social, cultural, and intellectual experience. As mental structures they not only organize our past experiences, but they are fundamental to the way we understand new experiences and, as such, "lend pattern and order to our actions, perceptions and conceptions" (Johnson 1987:29). In essence, they form the link between perception and reason, but they are directly meaningful as they are repeatedly experienced by the body and its modes of functioning.

Besides the source-path-goal schema, various other schemas figure prominently in schema theory, e.g. the container-contained schema, the link schema, the part-whole schema, the force-dynamic schema, the centre-periphery, the front-back and up-down schemas, the contact schema, and the surface schema (cf., for example, Dean 1992: 62, Gibbs and Colston 1995 and Lakoff 1987).

On the SR2-level two aspects of the representation of image-schemas as distinguished, viz. their geometrical and kinesthetic properties and their "logical" properties. The graphic representations commonly used in cognitive grammar primarily encode the crucial geometric and/or kinesthetic properties of an image schema. For example, the source-path-goal schema is represented as (4):



Graphic representations such as these iconically capture, as a Gestalt, the structural elements of this schema, viz. that it consists of a source (starting point), a destination (endpoint), a path and a direction, organized in a specific configuration. Each schema also has an associated "basic logic". That of the PATH-schema Lakoff (1987:275) describes as follows: "If you go from a source to a destination along a path, then you must pass through each intermediate point on the path; moreover, the further along the path you are, the more time has passed since starting".

According to Deane (1992:58-59), following Anderson and Talmy, a kinesthetic representation such as (4), forms the basis on which we analyse the movement of objects and living things in terms of forces, causes, actions and motivations. Such images do not only underlie our conceptualization of motion, but also the conceptualization of psychological motives.

Some of the other schemas mentioned above are spatial images that encode configurational information: shapes, angles, and relative distance, and they form the basis of spatial perception.

What is of importance here, is the fact that the primary spatial senses of prepositions are directly understood in terms of these image schemas. Fillmore (1994: 27) notes that

"knowing how to use the preposition *in*, in its most basic location-specifying meaning, requires having access to a conceptual structure that we can refer to as *containment* ... Knowing the preposition *on* and how to use it ... requires a schema involving *surface contact* and *support*. Speakers of English also know implicitly that these same conceptual structures are also exploited for understanding other prepositions and preposition-complexes in English, such as *into* and *out of* alongside of *in*, and *onto* and *off of* alongside of *on*."

To the above one can add that all nonstative senses of prepositions are directly understood in terms of the path-schema as their individual literal senses pertain to specific parts of/highlight structural elements of this schema.

Image schemas thus form the backdrop against which the literal stative and nonstative senses of prepositions are interpreted. This brings us directly to the level of SR3.

It has often been noted that the various subsenses of the prepositions of English cannot be captured in one or more core definitions consisting of a set of necessary and sufficient attributes (cf. Taylor 1988:300-301) as they are prototypically structured polysemous lexical categories. As Geeraerts (1989 and 1990) points out, prototypical categories in general

- cannot be defined by means of a single set of criterial and sufficient attributes, i.e. their various literal and nonliteral senses cannot be captured in a single core definition
- exhibit a family resemblance structure, i.e. their semantic structure takes the form of a radial set of clustered and overlapping meanings
- exhibit degrees of category membership and structural salience
- are blurred at the edges.

The set of English prepositions for the most part exhibit these characteristics. As in most dictionaries, the literal spatial sense of a preposition is taken to be the prototype or structurally most salient sense that profiles a very specific configuration of the figure and the landmark. From these prototypical senses meaning chains extend of closely related/overlapping, but distinct subsenses, giving rise to a multidimensional structure. Senses at the periphery might well have little in common with each other, or with the central sense, but they are related to these senses via the intervening members of the meaning chain (cf. also Taylor 1988:301 and Geeraerts 1990).

In cognitive semantics various representational formats are used for the diagrammatic representation of the prototypical meaning structure of lexical categories, viz. the radial set model of Lakoff, the schematic network of Langacker and the overlapping sets model of Geeraerts. (Cf. Geeraerts 1995 for a discussion of these representational formats, and Sandra and Rice 1995 for the psychological claims they are associated with.)

What SR3 captures, is the range of subsenses that are typically distinguished for prepositions and/or the semantic relations that hold between the subsenses of prepositions, but it is represented in a way that resembles the ordering of the senses of polysemous prepositions in dictionaries. These are broadly divided into their literal, nonliteral, or so-called "figurative", extensions, and their use as functional case markers (cf. Landau and Jackendoff 1993: 231-232). Lets look briefly at each of these.

(i) (Geo)metrical properties

Landau and Jackendoff (1993: 223-229) show that the literal stative and non-stative senses of the English prepositions are constituted of a very limited number of geometric properties and distinctions relating to the figure and landmark, and the relationships between them.

Between figure and landmark there exists a basic asymmetric relationship, an asymmetry that results from principles of spatial organization, which require that an object be anchored (or located) relative to some other object. As a result landmarks should have properties that facilitate search, e.g. be large, stable and distinctive, familiar or culturally significant.

The authors furthermore show that the meanings of prepositions encode surprisingly little of the geometrical characteristics of the figure and the landmark, i.e. very few limitations are placed on what can be (geometrically defined) a figure or a landmark. The requirements on the landmark concern their nature as geometric types (volumes, surfaces, points and lines), their axial structure, and their quantity (i.e. the landmark can be schematized as a point, a container, or a surface, as a unit with axial structure, or as a single versus aggregate entity). There are even fewer restrictions on the figure. For the most part it is conceptualized as "point like", and only two specifications of figural geometry seem relevant: axial structure and quantity, i.e. it can be schematized at most as either a simple lump or blob (with no geometrical structure whatsoever), a unit with axial structure along at most one of its dimensions, or a single versus distributed entity.

With regard to the relation between figure and landmark, research shows that the stative prepositions do not represent relations in detail - only several degrees of relative distance between figure and landmark, and several kinds of direction are encoded (with visibility and occlusion being a subsidiary distinction).

The nonstative prepositions encode paths or trajectories to specify a figure's motion or orientation. One crucial geometric property is again axial structure, but the biggest class of prepositions (*via, to, toward, from, away from*) define a path relative to some region (as encoded by the landmark), including the notions of direction and orientation (cf. Landau and Jackendoff 1993:231).

All the geometric properties encoded by the meanings of the English prepositions are listed in Dirven and Geiger (1989:521). A few examples will suffice to clarify what the other sense extensions distinguished in SR3 refer to.

(ii) Special functional meaning

E.g. *at* in *at a desk* not only implies that one is located close to the desk, but also performing a characteristic action, like studying or writing.

(iii) Conventionalized conceptualizations of the reference objects

E.g. one can be in or on a bus, but only in and not on a car, i.e. in English small vehicles are only conceptualized as containers.

(iv) Force-dynamic properties of figure and landmark

E.g. the meaning of *on* involves the concept of vertically directed “support” between the figure and the landmark, but in *a fly on the wall* it primarily involves “attachment”.

(v) Extensions from stative to non-stative (places → paths)

E.g. stative: *He is in church.*; nonstative *He walked in.*

(vi) Image-schematic transformations

Image-schematic transformations capture sense extensions that occur across a number of prepositions. In some analyses the extensions from the stative to the nonstative readings of prepositions (cf. (v)) are also captured by an image-schematic transformation. The following are from Lakoff (1987:440-444):

(a) End-point focus transformation

Sam walked over the hill (path)/ across the street (path)

Sam lives over the hill (end of path)/across the street (end of path)

(b) Multiplex-mass transformation

There are guards posted along the road (multiplex (of points))

There is a fence along the road (mass (one-dimensional trajectory))

(Cf. Dewell 1994 for an analysis of the meaning of *over* in terms of a number of these image-schematic transformations.)

(vii) Metaphoric extensions

The nonliteral extensions of prepositions mainly involve metaphorical extensions from their literal (geometrical) senses to a number of clearly defined abstract target domains, viz. those of TIME, STATE, AREA, MEANS/MANNER, CIRCUMSTANCE, and CAUSE/REASON (cf. Dirven 1993,1995). In as much as the metaphorical extensions are projections from the literal spatial senses of the prepositions, and the latter is understood in terms of the set of image schemas, these image schemas also, in the final end, motivate the metaphorical meanings.

Obviously, not all adpositions have metaphorical sense extensions in all of these domains, but those above define the borders of the possibilities within which the existing ones fall in a language such as English. In as much as more of these prepositions have metaphoric extensions to the same target domain, e.g. CAUSE, each of them profile this concept in a different way, but consistent with the structural relations that their spatial meanings encode (cf. Dirven 1995). As Lakoff (1987:275) indicates, furthermore, causality is interpreted in

terms of the PATH-schema, thereby linking the set of prepositions, via the PATH-schema, to a whole set of idiomatic expressions that are metaphorically understood in terms of this schema, such as PURPOSES ARE DESTINATIONS; ACHIEVING A PURPOSE IS PASSING ALONG A PATH FROM A STARTING POINT TO AN ENDPOINT; COMPLEX EVENTS ARE A PATH (with initial states (the source), a sequence of intermediate stages (the path), and a final state (destination/goal)).

As indicated above, a complex network, therefore, exists between the literal and nonliteral senses of prepositions, the image schemas that motivate these senses, other abstract concepts, and the idiomatic expressions that are interpreted in terms of these concepts and schemas.

(viii) Grammatical markers

Lastly, there is the use of adpositions purely as grammatical markers, as, for example, in *Bill believes in capitalism* and *The letter was received by Bill* (cf. Landau and Jackendoff 1993:232).

An analysis of the internal structure of the meaning of prepositions in terms of radial sets gives one a analytical tool with which to plot the differences between prepositions in different languages (or even in the same language) that are roughly equivalent. As Taylor (1988:302-303) indicates, prepositions may fail to overlap in their meaning because of differences in their central, prototypical senses, or as a result of differences in the nature and extent of the meaning chains that radiate out from the central sense. (Cf. for a different approach Sinha and Thorseng 1995.)

Obviously, the geometrical relations encoded by the adpositions in a language are not all motivated by the image schemas as defined above. It is not clear, though, from Johnson (1987) whether the specific geometrical relations encoded (conventionally) by the adpositions in a language should or could all be defined as image schemas, or whether a clear distinction should be drawn between image schema proper and other geometrical constellations encoded by prepositions.

3. How dictionaries fail language learners

Against the background of the problems that the acquisition of prepositions cause foreign language learners (cf. Section 1), and given the fact that the set of English prepositions can be seen to be highly motivated by a number of cognitive-linguistic variables (cf. Section 2), one could justifiably ask whether and in what ways monolingual dictionaries assist user-learners to better understand and remember the meanings and uses of prepositions.

If the latter is dependent on the way that monolingual dictionaries explicate the complex intracategorical and intercategoryal meaning structures of the prepositions, and on the insight that they afford the user-learner of the cognitive-linguistic variables that motivate these structures, the answer must be: very little. What the user-learner is confronted with in most monolingual dictionaries are, for the most part, only extensive lists of the various senses and subsenses of each preposition.

This is amply illustrated, for example, in the treatment of a preposition such as *in* in **The Concise Oxford Dictionary**, **Collins Cobuild English Language Dictionary** and the **Longman Dictionary of Contemporary English**. All three these dictionaries treat *in* as a highly polysemous lexical item, and in all three of these an array of particular senses are distinguished for *in* according to its specific contexts of use.

In **The Concise Oxford Dictionary** the senses under the headword *in* are grouped within a single article according to its use as preposition (with 21 senses), as adverb (with 14 senses) and as adjective (with 3 senses). Although the sense distinctions for the three categories overlap in various ways, a total of 35 senses are distinguished. (The few senses of *in* in collocations will be left out in this discussion.)

In the **Collins Cobuild English Language Dictionary** (a learner's dictionary) the senses of *in* as preposition and as adverb are also treated in a single article. The sense descriptions for the two categories are conflated in those cases in which they largely overlap, otherwise separate senses of *in* are listed in its use as either a preposition or as an adverb. All in all a grand total of 56 senses are listed: 17 of these pertain to the literal spatial meaning of *in*; 5 subsenses of *in* relating to its use to express time is grouped together under 18; and the rest relate to the non-literal, metaphorical meaning extensions of *in*.

In most smaller dictionaries of the size of the those considered above, it is often practice that only the most salient senses of a lemma are listed. If, however, one considers the enumeration of senses given for *in* in the dictionaries mentioned above, it is clear that the compilers in their description of most of the literal and nonliteral senses strived for maximal coverage of all the subtle semantic nuances that this preposition can encode in various usage contexts.

In the **Longman Dictionary of Contemporary English** (also a learner's dictionary) the senses of *in* are treated in 3 separate articles, one each describing its meaning and use as preposition (22 senses), as adverb (15 senses) and as adjective (4 senses). A total of 41 senses are listed, with a few subsenses grouped together under some of the mayor ones.

In all three these dictionaries it is, therefore the case that the user-learner is confronted up front with a meaning description that consist of an exhaustive, and I would say disheartening, list of neatly separated, consecutively numbered lexical meanings - a description that fosters the impression that the meaning and usage of *in* is something essentially arbitrary and idiomatic and that it simply has to be learnt by heart.

Although the subsenses of *in* are in most cases adequately described by short definitions with an accompanying verbal illustration exemplifying the use of the lemma with the described sense, one could justifiably ask what descriptions like these further reveal directly to the user-learner about the intra- and intercategory meaning structure of a preposition such as *in*?

Hardly anything. A mere listing of the numerous senses of prepositions, such as with *in*, fosters a "flat" (i.e. one-dimensional) interpretation of the concept of lexical polysemy, i.e. that polysemy merely refers to the fact that some lexical items have more than one meaning. The fact that polysemous items have **related** senses, and the exact nature of that relationship, is lost to the user-learner. Furthermore, there is very little and *systematic* effort up front (on the surface) in the structuring of and explicit marking/labelling in the meaning description that would give the user a direct clue as to

- (i) the complexity and nature of the internal structure of *in* as a prototypically structured polysemous item, specifically of the saliency relationships between subsenses, the nature of its family resemblance structure, the overlaps and minimal distances between the various subsenses and the distinction between its literal senses and the metaphorical extensions from these
- (ii) the many and varied kinds of sense relations that a preposition such as *in* shares with other members of the category of adpositions, and all other lexical items that essentially encode spatial relations and other metaphorical extensions from these
- (iii) partially on the basis of (ii), the set of parameters that define within the category of adpositions the possible (but not predictable) intra- and intercategory structure of individual members of the category.

There are, though, a few sporadic or ad hoc efforts in these description to capture some of these aspects of the meaning of *in*. For example, there are some internal grouping of senses (in some cases, though, the rationale for the grouping is difficult to determine); and sporadic references to antonyms and synonyms (within and beyond the class of prepositions) occasionally occur.

One could argue, though, that many of these structural aspects of polysemous lexical items are indicated implicitly by specific lexicographic conventions. In this regard Ilson (1987: 200) argues that the dictionary is "a dialectal unity of form and content: a lexicographic "convention of order and arrangement" ... is itself a statement about the content of what is ordered and arranged."

But then one could argue that this is lost on most user-learners. As research has shown (cf. Hartmann 1989), most of them lack the necessary reference skills and knowledge of these conventions to be able to reconstruct from the dictionary description a clear picture of the internal complexity of polysemous categories, such as *in*. Cowie (in Hartmann 1989:182) refers, in fact, to the widening gap between the sophistication of some features of dictionary design and the user's often rudimentary dictionary skills.

As Geeraerts (1990) shows in detail, lexicographers employ a set of very sophisticated lexicographic techniques to capture in printed dictionaries some of the aspects of the multi-dimensional structure of polysemous items. But, it is, for example, left to the dictionary user to figure out that the hierarchical structure imposed on the material by the grouping of senses, is not a taxonomical structure, and that the definitions that capture higher-level groupings of senses are in fact not essentialist definitions, but may be merely disjunctive definitions, or definitions based on similarity relations, not relations of strict identity. Finally, one can say of these descriptive devices what has been said of the use of illustrations in documents: they are worth a thousand words, but only if the reader understands them (cf. Schriver 1997:147).

If learners were to compare the three descriptions of *in*, they would most probably be baffled by a number of other characteristics of these descriptions, such as the discrepancy in the number and ordering of senses and the different treatment of the senses of *in* as respectively a preposition, adverb and adjective. Given the overlap in their semantics, one would surely be tempted to question the nature of the criteria on which these category distinctions are based in the first place.

At this stage a few amendments to the remarks above are necessary. First of all, it must be pointed out that none of these shortcomings have not been identified and commented on. Most of them follow from the medium, that is the printed dictionary, the alphabetic macro-structure, the pragmatic constraints of space, the genre-specific function of the dictionary as a reference work, and/or from the variety of lexicographical descriptive practices followed by the different dictionaries (of which some arise as a result of differences in linguistic theoretic assumptions).

Secondly, not all dictionaries are equally open to the points of "criticism" levelled above. A number of descriptive and explanatory techniques and devices are employed by lexicographers, although not always systematically and comprehensively, to overcome some of these problems.

4. Conclusion: Turning to the hyper media technologies

It should be evident from the foregoing that the explanatory function of dictionaries can only be maximized if one were to revert to a whole arsenal of descriptive and explanatory devices and techniques, but for which there is little room in printed dictionaries.

The use of hypermedia technologies for this purpose, therefore, seems an obvious solution. When one looks at the content and structure of the first generation electronic linguistic dictionaries on CD-Rom (e.g. the digitized versions of the **Oxford English Dictionary** and **Het Woordenboek der Nederlandsche Taal**), however, it is also evident that lexicographers have until now completely under-utilized the plethora of descriptive and explanatory mechanisms offered by the new hypermedia/multimedia technologies. With a few (sporadic) exceptions, little use is made in these dictionaries of mechanisms such as audio, video, animation, graphics and textual links between various information categories (e.g. links between verbal text and images, or between different kinds of data-elements in different files).

The constraints of time and space, do not allow me to dwell on this topic any further. But it is evident that to make the complexity of the meaning structure of prototypically structured polysemous items more transparent to the user will require that the use of these mechanisms and techniques, including existing lexicographical ones, the rich set of expository mechanisms developed in cognitive grammar, and those used in other pedagogical texts, be thoroughly researched.

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