The definitional practice of dictionaries
and the Cognitive Semantic conception of polysemy

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1 Gist of the argument

Cognitive Semantics has had a major impact on lexical studies: more than any other recent theory, it has in the last fifteen years led to a renewed interest in lexical research. But what about lexicography ? What is the relationship between Cognitive Semantics and lexicography ? And specifically, in the context of the present issue of this journal, what is the impact of Cognitive Semantics on the lexicographical treatment of polysemy ? In what follows, I will try to answer that question - succinctly and perhaps a bit sketchily, but also as fair as possible to both the theoretical, lexicological and the practical, lexicographical part of the comparison. I emphasize my attempt at fairness, because I deliberately want to avoid any form of theoretical imperialism. It is definitely not an assumption of this paper that theoreticians in principle have the answers, and that lexicographers simply have to follow. I have pointed out earlier (GEERAERTS 1997, 5) that there should be a relationship of mutual inspiration between both disciplines, and even though the present paper looks from lexicological theory to lexicographical practice rather than the other way round, I still hold the reverse perspective to be equally important.

In general, I will argue that a number of existing definitional and descriptive practices in the dictionary that are somewhat suspect from an older theoretical point of view receive a natural interpretation and legitimacy in the theoretical framework offered by Cognitive Semantics. More specifically, there are three aspects of the Cognitive conception of lexical semantic structure that have to be discussed: the importance of prototypicality effects for lexical structure, the intractability of polysemy, and the structured nature of polysemy. I will argue that each of these points inspires a specific conclusion for lexicographical practice, or at least, that it vindicates existing aspects of lexicographical practice.

- The *importance of prototypicality effects for lexical structure* blurs the distinction between semantic information and encyclopedic information. This does not entail that there is no distinction between dictionaries and encyclopedias as types of reference works, but rather that references to typical

examples and characteristic features are a natural thing to expect in dictionaries.

- The *intractability of polysemy* involves the absence of a coherent set of criteria for establishing polysemy; a more charitable way of wording things would be to say that distinctiveness between senses of a lexical item is to some extent a flexible and context-based phenomenon. Dictionaries, then, will use various definitional techniques to accomodate the flexibility of meaning.

- The *structured nature of polysemy* involves, basically, the radial set structure of polysemy. While lexicography has certainly never denied the existence of links between the various readings of a lexical item, Cognitive Semantics has added a number of new insights: the clustered nature of polysemic structures is now being analyzed in more detail than ever. For lexicography, this implies a recognition of the linearization problem that traditional dictionaries face.

The paper has a more or less deductive structure. I will first present the facets of Cognitive Semantics that I want to focus on. (I will not, however, try to present an overall introduction to the Cognitive approach: see TAYLOR 1995, UNGERER/SCHMID 1996, PALMER 1996, VIOLI 1997, DIRVEN/VERSPOOR 1998 for introductory volumes. The discussion in section 2 will be largely superfluous for readers familiar with Cognitive Semantics.) Next, I will identify the specific expectations with regard to lexicographical practice that may be deduced from this theoretical analysis, and then proceed to show that these predicted features are indeed part and parcel of actual lexicographical practice - in spite of what might be expected on the basis of other theoretical approaches to semantics. The paper closes with an attempt to place these observations in a wider context: the relationship between lexicography and Cognitive Semantics is not exhausted by the discussion of polysemy.

2 A primer of Cognitive Semantics

What are the structural characteristics of semasiological structures highlighted by Cognitive Semantics ? A good starting-point to define some of the topics central to Cognitive Semantics is provided by the well-known distinction between the level of senses and the level of referents (in logic-semantic parlance, between *intension* and *extension*).

Consider the word *fruit*. This is a polysemous word: next to its basic, everyday reading ('sweet and soft edible part of a plant, containing seeds'), there are various other readings conventionally associated with the word. In a technical sense, for instance ('the seed-bearing part of a plant or tree'), the word also refers to things that lie outside the range of application of the basic reading, such as acorns and pea pods. In an expression like *the fruits of nature*, the meaning is even more general, as the word refers to everything that grows and that can be eaten by people (including, for instance, grains and vegetables). Further, there is a range of figurative readings, including the abstract sense 'the result or outcome of

an action' (as in *the fruits of his labour* or *his work bore fruit*), or the somewhat archaic reading 'offspring, progeny' (as in the biblical expressions *the fruit of the womb, the fruit of his loins*)

Each of these readings constitutes a separate sense of *fruit*, but in turn, each sense may be thought of as a set of things in the outside world. The basic sense of *fruit*, for instance, corresponds with a set including apples, oranges, and bananas (and many other types of fruit). If you think of *fruit* in this central sense as a category, the set consists of the members of the category. These members are 'things' only in a broad sense. In the *fruit*-example, they happen to be material objects, but in the case of verbs, they could be actions, or situations, or events; in the case of adjectives, they could be properties; and so on. Also, the 'things' featuring in the set need not exist in the real world. The set contains all real and imaginary apples and oranges (etc.) that *fruit* could possibly name, in the same way in which *goblin* will have a set of members associated with it, regardless of whether goblins are real or not.

Given the distinction between the intensional and the extensional level of semasiological analysis, we can now describe three structural characteristics that receive specific attention within a Cognitive Semantic framework.

2.1 Differences of structural weight

Differences in salience involve the fact that not all the elements at one level of analysis have the same structural weight. On the semantic level, for instance, the everyday reading of *fruit* occupies a more central position than the archaic reading 'offspring' or the technical reading. Various indications may be adduced for this central position. For one thing, the central reading more readily springs to mind when people think of the category: on being asked what *fruit* means, you are more likely to mention the edible parts of plants than a person's offspring. For another, the 'edible part' reading is more frequent in actual language use.

In addition, the 'edible part' reading is a good starting-point for describing the other readings. It would probably be more easy to understand the expression *fruit of the womb* (if it is new to you) when you understand the 'edible part' reading than the other way round. The basic reading, in other words, is the center of semantic cohesion in the category; it holds the category together by making the other readings accessible. Three features, in short (psychological salience, relative frequency of use, interpretative advantageousness), may be mentioned as indications for the central position of a particular reading.

Centrality effects are not restricted to the level of senses, however, but may also be invoked at the referential level. When prompted, Europeans will more readily name apples and oranges as types of fruit than avocados or pomegranates, and references to apples and oranges are likely to be more frequent in a European context than references to mangos. (This does not exclude, to be sure, cultural differences among distinct parts of Europe.)

The terminology used to describe these differences of structural weight is quite diverse, and the description in the foregoing paragraphs has featured such (intuitively transparent) terms as *salience*, *typicality*, and *centrality*. The most technical term however is *prototypicality*: the central reading of an item or the central subset within the extensional range of a specific reading is the prototype. The linguistic literature on prototypes is by now vast. Apart from the introductory works mentioned above, see MANGASSER-WAHL (2000) for an interesting overview of the development of the approach.

2.2 Demarcation problems

The elements at one particular level of the semasiological analysis need not necessarily be clearly distinguishable with regard to each other. As an illustration, let us consider the question whether the central sense of *fruit* can be delimited in a straightforward fashion. Such a delimitation will take the form of a definition that is general and distinctive: it is general in the sense of naming characteristics that are common to all fruits, and it is distinctive in the sense of being sufficient to distinguish the category 'fruit' (in the relevant sense) from any other category. (If a definition is not distinctive, it is too general: it will cover cases that do not belong in the category to be defined.)

Now, many of the characteristics that one might be inclined to include in a definition of the central reading of *fruit* do not have the required generality: they are not necessarily sweet (lemons), they do not necessarily contain parts that are immediately recognizable as seeds (bananas), they are not necessarily soft (avocados). There are, to be sure, a number of features that do have the required generality: all fruits grow above the ground on plants or trees (rather than in the ground); they have to ripen before you can eat them, and if you want to prepare them (rather than eat them raw), you would primarily use sugar, or at least use in them in dishes that have a predominantly sweet taste. Taken together, however, these features do not suffice to prevent almonds (and other nuts), or a vegetable like rhubarb (which is usually cooked with sugar), from being wrongly included into the category that is to be defined.

We have to conclude, then, that the central sense of *fruit* cannot receive a definition that is both general and distinctive. If we shift the attention to the referential level, similar effects may be observed: the borderline of categories is not always clearly delineated. For instance, is a coconut or an olive a fruit ?

Definitional difficulties like the one just illustrated are enhanced by the existence of various kinds of tests for distinguishing between vagueness and polysemy - and specifically, by the fact that the existing tests may yield results that are to some extent divergent with regard to each other. To briefly illustrate the main point, and without discussing all specific tests that have been suggested, three types of criterion can be distinguished.

First, from the *truth-theoretical* point of view taken by QUINE (1960,129), a lexical item is polysemous if it can simultaneously be clearly true and clearly false

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of the same referent. Considering the readings 'harbour' and 'fortified sweet wine from Portugal' of *port*, the polysemy of that item is established by sentences such as *Sandeman is a port* (in a bottle), *but not a port* (with ships).

Second, *linguistic tests* involve acceptability judgements about sentences that contain two related occurrences of the item under consideration (one of which may be implicit or deep-structural); if the grammatical relationship between both occurrences requires their semantic identity, the resulting sentence may be an indication for the polysemy of the item. For instance, the identity test described by ZWICKY/SADOCK 1975 applies to constructions that were assumed in the Chomskyan 'standard theory' to involve transformations such as conjunction reduction and *so*-reduction, which require the semantic identity of the items involved in the reduction. (It may be noted that constructions such as these are nowadays no longer discussed in transformational terms. However, as the current term 'identity-of-sense anaphora' indicates, the idea that there are semantic restrictions on the construction remains intact.) Thus, *at midnight the ship passed the port, and so did the bartender* is awkward if the two lexical meanings of *port* are at stake; disregarding puns, it can only mean that the ship and the bartender alike passed the harbour (or, perhaps, that both moved a particular kind of wine from one place to another). A 'crossed' reading in which the first occurrence of *port* refers to the harbour, and the second to wine, is normally excluded. Conversely, the fact that the notions 'vintage sweet wine from Portugal' and 'blended sweet wine from Portugal' can be crossed in *Vintage Noval is a port, and so is blended Sandeman* indicates that *port* is vague rather than polysemous with regard to the distinction between blended and vintage wines.

Third, the *definitional criterion* (as informally stated by ARISTOTLE in the *Posterior Analytics* II.xiii) says that an item has more than one lexical meaning if there is no minimally specific definition covering the extension of the item as a whole, and that it has no more lexical meanings than there are maximally general definitions necessary to describe its extension. Definitions of lexical items should be maximally general in the sense that they should cover as large a subset of the extension of an item as possible. Thus, separate definitions for 'blended sweet fortified wine from Portugal' and 'vintage sweet fortified wine from Portugal' could not be considered definitions of lexical meanings, because they can be brought together under the definition 'sweet fortified wine from Portugal'. On the other hand, definitions should be minimally specific in the sense that they should be sufficient to distinguish the item from other non-synonymous items. A maximally general definition covering both port 'harbour' and port 'kind of wine' under the definition 'thing, entity' is excluded because it does not capture the specificity of port as distinct from other things.

Now, the existence of various polysemy tests is non-trivial to the extent that they need not always (in contrast with the *port*-example) yield the same results. In the case of autohyponymous words, for instance, the definitional approach does not reveal an ambiguity, whereas the Quinean criterion does. In fact, given that *dog* is autohyponymous between the readings 'Canis familiaris' and 'male Canis familiaris', the latter definition is not maximal, because it defines a proper subset

of the Canis familiaris' reading; the sentence *Lady is a dog, but not a dog*, on the other hand, is not ruled out. Such divergences between polysemy tests occur on a larger scale: see GEERAERTS (1993), and the further discussion in TUGGY (1993), and specifically CRUSE (2000). Following up on the lead provided by GEERAERTS (1993), CRUSE (2000) systematically explores various configurations of divergence and convergence of the polysemy tests. From the point of view of the present article, this line of discussion is important because it lends further support to the recognition that there is not necessarily a unique and optimal solution to drawing dividing lines around and between the meanings of a lexical item.

2.3 Multidimensional structural relations

The relationship that exists between the various elements at each level of the analysis is not restricted to the quantitifiable phenomena described in section 2.1: the links between those elements may also be described in a more qualitative way. On the level of senses, in particular, it appears that the relationship between the meanings of a word may be described in terms of a more or less limited set of basic conceptual links. The senses of *fruit*, for instance, do not exist in isolation, but they are related in various ways to the central sense and to each other. The technical reading ('seed-containing part') and the sense illustrated by *the fruits of nature* are both related to the central meaning by a process of generalization. The technical reading generalizes over the biological function of the things covered by the central meaning, whereas the meaning 'everything that grows and that can be eaten by people' focuses on the function that those things have for human beings. The figurative uses, on the other hand, are linked to the other meanings by a metaphorical link, but notice also that the meaning 'offspring' is still closer to the central sense, because it remains within the biological domain. The overall picture, in short, takes the form of a cluster of mutually interrelated readings.

This observation is, of course, a familiar and time-honoured one in lexical semantics: the terminology used to describe the links among senses originated with diachronic semantics in the late 19th century, with the very birth of lexical semantics as a separate subdiscipline of linguistics. What is new in Cognitive Semantics, though, is the emphasis on the overall structure of the related meanings rather than on the individual links: an emphasis on the multidimensional nature of the overall structure, and an emphasis on the cohesive role of prototypical centers within such structures. In fact, multidimensional analyses of the semantic structure of lexical items are a common feature of Cognitive Semantics: they are a crucial feature of the *radial set* model of semantic structure that has become popular through the work of BRUGMANN (1981) and LAKOFF (1987) and many others. Apart from prototype theory as described above and the conceptual metaphors introduced by LAKOFF/JOHNSON (1980), the radial set model of semantic description may indeed be the most widely known feature of Cognitive Semantics.

2.4 Summarizing the position of Cognitive Semantics

The semasiological model arising from the previous pages may be summarized in the graphical format of Figure 1. Without in any way being exhaustive, the picture shows how a word like *fruit* can, on a first level of analysis, be associated with various senses. On a second level of analysis, each of those senses is itself associated with a set of referents. These sets are represented in a form that resembles the representation with Venn-diagrams that is usual in mathematics. Examples of entities at the referential level are included only in the set associated with the sense 'edible part'. This is, of course, a matter of graphical economy rather than principle. At each level, specific structural characteristics have to be taken into account. Of the three basic characteristics mentioned above, two have received a graphical expression in the picture. The differences of centrality and structural weight among the elements at each level are indicated by drawing them in different sizes and by topologically ordering them in a way that reflects the cline from center to periphery. The structured nature of the relations between the elements is indicated by an explicit identification of the relevant links. (Again for reasons of graphical economy, this is restricted to the level of senses.)

- Figure 1: see page 19 -

We have now reached the point where we can summarize the specific approach taken by Cognitive Semantics in just a few points.

· It was suggested above that there is an outspoken homology between the structure of the referential level and the structure of the semantic level: the same structural characteristics shape both levels. This suggests that both levels are less far apart than has traditionally been thought. The structuralist view of lexicology in particular tends to suggest that only the semantic level (the level of senses) is worthy of linguistic analysis. By contrast, the so-called Cognitive Semantic conception that has meanwhile arisen in opposition to this earlier structuralist view, stresses the fact that the referential level has to be included in the analysis.

· While structuralist approaches to semantics tend to be reluctant to take into account differences of structural weight and demarcational fuzziness, Cognitive Semantics readily accepts these phenomena as relevant aspects of semantic structure.

· Linking up with prestructuralist semantics, Cognitive semantics puts a new emphasis on the multidimensional, clustered nature of semasiological structures.

3 From theory to practice

Now, what would be the consequences for lexicographical practice ? Or rather, if the Cognitive conception of semantic structure is by and large correct, what could we expect to find in actual dictionaries ? The three characteristics highlighted in the previous paragraph lead to the following hypotheses.

1 If it is correct that the referential level of semantic structure is part and parcel of a proper semantic description, we may expect dictionaries to include references to that level - in spite of the traditional, strict distinction between between the semantic and the encyclopedic level of description. In particular, we may expect dictionaries to refer to prototype instances of categories or to typical (rather than general) features of the members of those categories.

2 If it is correct that the description of meaning has to come to terms with fuzziness, demarcation problems, and non-uniqueness, we expect dictionary definitions to use definitional methods that take into account these characteristics. Instead of definitions that rigidly take the form of separately general and mutually distinctive features, we expect the intrusion of unorthodox definitional methods such as enumerations, disjunctions, and the cumulation of near-synonyms.

3 If it is correct that semantic structures predominantly take the form of a multidimensional radial set structure, we may expect dictionaries to face a linearization problem: how can the multidimensional nature of the semantic structures be mapped onto the linear order of the dictionary ?

In the following subsections, these expectations will be confronted with actual examples. It will be shown that the expectations are basically correct.

3.1 Prototypicality effects in lexical structure

Consider the following definitions (of separate meanings or idiomatic expressions) from the NEW SHORTER OXFORD ENGLISH DICTIONARY (cd-rom version, 1997).

abiogenesis The production of organic matter or compounds, other than by the agency of living organisms; esp. the supposed spontaneous generation of living organisms.

baritone *A 1* The male voice between tenor and bass, ranging typically from lower A in the bass clef to lower F in the treble clef; a singer having such a voice; a part written for such a voice.

cup *b* An ornamental vessel, typically of silver and comprising a bowl with a stem and base, that is offered as a prize in a competitive event.

defoliate Remove the leaves from; cause the defoliation of, esp. as a military tactic.

dwarf *A 1 b* Any of a mythical race of diminutive beings, typically skilled in mining and metalworking and often possessing magical powers, figuring esp. in Scandinavian folklore.

hear! hear! An exclam. calling attention to a speaker's words, e.g. in the House of Commons, and now usu. expressing enthusiastic assent, occas. ironical derision.

heart *5* A central part of distinct conformation or character, e.g. the white tender centre of a cabbage, lettuce, etc.

honours of war Privileges granted to a capitulating force, e.g. that of marching out with colours flying.

model *2 a (fig.)* A person or thing resembling another, esp. on a smaller scale.

tea *5* A meal or social gathering at which tea is served. Now esp. (a) a light afternoon meal, usu. consisting of tea, cakes, sandwiches, etc. (also more fully afternoon tea, five o'clock tea); (b) (in parts of the UK, and in Australia and NZ) a main meal in the evening that usually includes a cooked dish, bread and butter, and tea (also more fully high tea)

tee A conical metallic structure, usually hung with bells, surmounting the pagodas of Myanmar (Burma) and adjacent countries.

thimblerig A sleight-of-hand game or trick usually played with three inverted thimbles and a pea, the thimbles being moved about and bystanders encouraged to place bets or to guess as to which thimble the pea is under.

In each of these definitions, words such as *especially*, *e.g.*, *typically*, *usually* and *often* introduce descriptive features that are not general but that rather identify typical (prototypical, if one likes) characteristics or instances of the category. Within a structuralist conception of semantics, this would be inadmissible, because these elements belong to the 'encyclopedic' level rather than the semantic level. In actual practice, however, this prototype-oriented definitional technique can hardly be called exceptional in the context of the dictionary as a whole. The expression *esp.*, for instance, is used no less than 28335 times in 18274 entries in the dictionary as a whole.

Does this mean, by the way, that the difference between dictionaries and encyclopedias is a spurious one ? The question asks for a brief excursion. An early discussion of the question between HAIMAN (1980) and FRAWLEY (1981), with a further reply by HAIMAN (1982), provides a good starting-point for delimiting the Cognitive point of view (for a more recent discussion of the theoretical question, see the contributions in PEETERS 2000). On the one hand, the theoretical basis for a distinction between dictionaries and encyclopedias cannot be provided by the structuralist approach (as in LARA 1989): it is a crucial aspect of Cognitive Semantics that the distinction between the two levels of description is not as strict as presupposed by the structuralist doctrine. On the other hand, there is a practical difference between dictionaries and encyclopedias that need not be abolished: there is a difference in scope and content between, say, the

ENCARTA or the NEW SHORTER OXFORD ENGLISH DICTIONARY, or between the ENCYCLOPAEDIA BRITANICA and the OXFORD ENGLISH DICTIONARY, and no cognitive linguist would argue against the distinction.

This distinction basically resides in two features. Macrostructurally, the encyclopedia focuses on proper names, nouns, and maybe a number of other elements from open word classes, whereas the dictionary includes all word classes (typically excluding all or most proper names). Microstructurally, the encyclopedia focuses on expert information as provided by scientific, technical, or professional experts, whereas that information is only one of the types of semantic description that the dictionary may include, together with the more everyday uses of the words.

But if Cognitive Semantics accepts this distinction, how can it justify it ? As a theoretical background for the distinction between the type of information typically included in encyclopedias and that included in dictionaries, we need a 'sociosemantic' theory: a theory about the distribution of semantic knowledge within a linguistic community. Scientific, technical, professional information is, in fact, primarily information that is produced and certified by a specific group of people - the experts, who are recognized by the community as such and on whom the community relies when expert knowledge is at stake. Although no such 'sociosemantic' theory is as yet available with any reasonable degree of comprehensiveness, a starting-point is provided by PUTNAM'S theory of the 'division of linguistic labour' (1975), which explicitly distinguishes between *extensional concepts* (the expert's knowledge) and *stereotypes* (the basic semantic knowledge that language users are supposed to possess if they are to count as full-grown members of the linguistic community). A combination of Putnam's approach with prototype theory is not impossible (see GEERAERTS 1985, 1987): if a prototypically organised concept combines all the various nuances with which a lexical item may be used within a linguistic community, then extensional and stereotypical concepts are particular members of the full prototypical set of applications of an item. Extensional concepts are characterized by their expert nature, whereas stereotypes represent the minimal amount of semantic knowledge that the language user is supposed to possess if he is to count as mastering the language. Roughly speaking, stereotypes are likely to coincide with the most common, most central senses within a prototypical cluster: what people are primarily supposed to know are the central readings of the cluster.

This recognition of a possible theoretical combination of prototype theory and a theory of the division of linguistic labour yields a theoretical framework for reference works that naturally provides a place for both the encyclopedia and the dictionary (see GEERAERTS 1985, 1987). In fact, three basic types may be distinguished.

- Technical, professional, scientific expert knowledge is treated in encyclopedias and terminological dictionaries.

- The full prototypically organised set of senses of a lexical item, including nuances and less frequent or more specialized readings, is treated by large-

scale dictionaries, of the size represented by (to name just a few) the NEW OXFORD DICTIONARY OF ENGLISH or MERRIAM WEBSTER'S COLLEGIATE DICTIONARY, and any dictionary beyond that size.

·   Standard desk dictionaries can be related to the notion of stereotype: they make a selection from the full prototypical set by presenting only the most central, most frequent senses.

Closing the excursion, we may conclude that a Cognitive Semantic conception of the relationship between semantic and encyclopedic knowledge does not preclude a theoretical justification for the distinction between dictionaries and encyclopedias as different types of reference works.

3.2 The intractability of polysemy

Definitional demarcation problems show up in the fact that dictionaries appear to use definitional techniques that are 'unorthodox' from the point of view of a traditional conception of meaning. Consider the following set of entries, again from the NEW SHORTER OXFORD ENGLISH DICTIONARY. (The entries are rendered in a reduced form: etymologies, quotations, dates, and a number of labels have been left out.)

primer   **I**
1 A prayer-book or devotional manual for the laity.
2 An elementary textbook (orig. a small prayer-book) used in teaching children to read.
b A small introductory book on any subject; *fig.* something introducing or providing initial instruction in a particular subject, practice, etc..
c (A child in) an elementary class in a primary school.
3 A size of type. Chiefly & now only in *great primer*, *long primer*.
primer   **II**
1 a = *priming-wire*.
b A cap, cylinder, etc., containing a compound which responds to friction, electrical impulse, etc., and ignites the charge in a cartridge etc.
2 A substance used as a preparatory coat on previously unpainted wood, metal, canvas, etc., esp. to prevent the absorption of subsequent layers of paint or the development of rust.
3 A person who primes something.
4 *Aeronaut.* A small pump in an aircraft for pumping fuel to prime the engine.
5 a *Biochem.* A molecule that serves as a starting material for a polymerization.
b *Zool. & Physiol.* A pheromone that acts initially on the endocrine system, and is thus more general in effect than a releaser.
primer   **III**
1 First in order of time or occurrence; early; primitive.
2 First in rank or importance; principal, chief.

In almost half of the fourteen senses or subsenses presented here, we find definitional techniques that would seem to be inadmissible if one assumes that meanings have to be defined in terms of necessary and sufficient, general and distinctive characteristics. To begin with, we find disjunctions in I 1 ('A prayer-book *or* devotional manual for the laity'), in I 2b ('something introducing *or* providing initial instruction in a particular subject, practice, etc.'), in II 2 ('A substance used as a preparatory coat on previously unpainted wood, metal, canvas, etc., esp. to prevent the absorption of subsequent layers of paint *or* the development of rust'), in III 1 ('First in order of time *or* occurrence'), and in III 2 ('First in rank *or* importance'). From a traditional point of view, disjunctions are barred from definitions, because they fail to capture the common aspects of the category to be defined.

In a similar way, open-ended enumerations should be avoided: they may illustrate or partially demarcate a category, but they do not define it, if you assume a rigid conception of definitions. In the examples, however, quite a number of open-ended enumerations appear: in I 2b ('something introducing or providing initial instruction in a particular subject, practice, *etc.*'), in II 1 a ('A cap, cylinder, *etc.*, containing a compound which responds to friction, electrical impulse, *etc.*, and ignites the charge in a cartridge *etc.*'), in II 2 ('A substance used as a preparatory coat on previously unpainted wood, metal, canvas, *etc.*').

Finally, we may note that the juxtaposition of near-synonyms is yet another way of loosening up the definitions. In the example III 1, the near-synonyms *early* and *primitive* do not have exactly the same meaning (what is early is not necessarily primitive, and vice versa). At the same time, they add something to the analytical definition; in particular, the near-synonym *primitive* adds a nuance of lack of sophistication that is not explicit in the definition 'First in order of time or occurrence'.

Lexicographical practice, in short, appears to be in accordance with the lexicological observation that the distinction between meanings need not be clear-cut. This fact has not escaped the lexicographers themselves, to be sure: among others, see AYTO (1983), STOCK (1983), HANKS (1994). In the neighbouring field of computational lexicography, similar voices may be heard: KILGARRIFF (1997).

3.3 The structured nature of polysemy

Let us consider the first seven senses of the adjective *fresh* in the OXFORD ENGLISH DICTIONARY, 2nd edition. (In the overview below, the definitions are sometimes rendered only partially. Some meaning nuances have been left out.)

> **I** New, recent
> **1. a.** New, novel; not previously known, used, met with, introduced, etc. **b.** In weaker sense: Additional, another, other, different, further.
> **2.** Recent; newly made, recently arrived, received, or taken in.
> **3.** Making one's first acquaintance with a position, society, etc.; raw, inexperienced; unsophisticated, 'green'.

II. Having the signs of newness.

4. Of perishable articles of food, etc.: New, in contradistinction to being artificially preserved; (of meat) not salted, pickled, or smoked; (of butter) without salt; (of fruits, etc.) not dried or preserved in sugar or the like

5. Of water: Not salt or bitter; fit for drinking.

6. Untainted, pure; hence, possessed of active properties; invigorating, refreshing. Said *esp.* of air

7. Retaining its original qualities; not deteriorated or changed by lapse of time; not stale, musty, or vapid.

The article exhibits a linear ordering of the meanings, with a higher-order, taxonomical structure of three levels. Even a cursory inspection of the definitions reveals that the hierarchical ordering does not make explicit all the relations that exist among the different senses.

- The senses 1-3 within group I are related by similarity, with sense 1 probably as the prototypical center of the group. Roughly, sense 1 can be paraphrased as 'new according to the perspective of a beholder'. Sense 2 is 'new as such, newly produced'. Sense 3 may receive the paraphrase 'new in a specific context, new in a given position or function'. The senses within group II are likewise related by similarity, but 7 seems to be a more encompassing one than the others: if 7 is paraphrased as 'retaining its originally optimal character', then both the 'pure and strong' reading of 6 and the 'optimal for consumption, still in possession of all its nutritional value' reading of 4 are specializations of 7. Sense 5 'fit for drinking', on the other hand, belongs together with 5. In short, the linear order within group I and within group II does not have an identical value, or at least, the semantic relations within each group are more specific than can be expressed by a mere linear ordering.

- The relationship between group I and group II is a metonymical one: having the features of newness is a causal result of being new, in whatever sense. However, such a metonymical relationship also appears within group I. The nuance 'raw, inexperienced, unsophisticated' that appears after the colon in definition 3 is as much a 'sign of newness' in sense 3 as the meanings 4-7 are signs of newness in the sense defined by 2. We see, in other words, that the same type of relationship is not always treated in the same way. This also holds for the relationship of semantic specialization that links 7 to 4, 5, and 6. Notice, in fact, that reading 1b is a semantic specialization of 1a. The things that are fresh in 1b are not just novel from the point of view of the beholder, they are novel in comparison with a set or series of similar things.

All in all then, the semantic structure of the item is a multidimensional one. A further, more detailed analysis would undoubtedly reveal more dimensions, but at this point, it may be sufficient to take into account the three dimensions that came to the fore in our cursory analysis: the relationship of similarity between 1, 2, and 3; the relationship of specialization that exists between 7 and 4,5,6 on the one hand and between 1a and 1b on the other; and the metonymical relationship between 2 and 7, and between 3 and 3' (where 3' refers to the reading 'raw,

inexperienced, unsophisticated'). The overall picture can be graphically represented as in Figure 1. (The vertical line represents the similarity relationship, the horizontal line the metonymical relationship, and the diagonal line the relationship of specialization.)

- Figure 2: see page 20 -

The point, to be sure, is not that the linear order in the OXFORD ENGLISH DICTIONARY should be condemned as an inadequate rendering of the underlying semantic structure. The point is rather that *any* traditional form of linear ordering cannot do full justice to the multidimensional nature of semantic structures. In an earlier article (GEERAERTS 1990), I called this the lexicographical *linearization problem*: the fact that lexicographers compiling traditional dictionaries have to project a multidimensional, clustered semantic structure onto the linear order of the dictionary. In that article, I presented a detailed analysis of the word *vers* (the Dutch counterpart of English *fresh*) and its treatment in the WOORDENBOEK DER NEDERLANDSCHE TAAL (the Dutch counterpart of the OXFORD ENGLISH DICTIONARY), and analyzed the various mechanisms (like hierarchical groupings, labels, and cross-references) that lexicographers may employ to circumvent the problem.

The main point then, as now, was not a practical but a theoretical one: if the linearization problem is indeed a recurrent problem for practical lexicography, then a lexicographical metatheory had better start from a linguistic theory that explicitly recognizes the underlying semantic multidimensionality.

4. The wider picture

The discussion in the previous pages suggests that the conception that Cognitive Semantics has of polysemy and semantic structure is consonant with the actual practice of dictionaries. I deliberately use the word *suggests*, because the few examples taken into consideration here could hardly tell the whole story. Even so, what Cognitive Semantics seems to offer to lexicography is a conception of semantic structure that is perhaps in a number of respects more realistic than what many other semantic theories (in particular, theories of a structuralist persuasion) can provide. This recognition does not, however, exhaust the interaction between Cognitive Semantics and lexicography. There are at least three further points that should be mentioned to put the present contribution in a wider context.

First, the previous discussion was restricted to the way in which Cognitive Semantics encompasses a theoretical perspective that so to speak vindicates an existing definitional practice. However, Cognitive Semantics may also suggest ways of dealing with the links between the senses of lexical items that go beyond common practice. SWANEPOEL (1992, 1998) and VAN DER MEER (2000), for

instance, argue for devoting more explicit attention to the motivational link between core senses and figurative subsenses. Such motivational links could specifically involve conceptual metaphors in the Lakovian sense (VAN DER MEER, SWANEPOEL), or even image schemata (SWANEPOEL). Interestingly, VAN DER MEER's suggestion is part of a critical appraisal of the NEW OXFORD DICTIONARY OF ENGLISH, which is perhaps the first dictionary to refer explicitly to prototype theory as the basis of its organizing principles (cp. HANKS 1994). Up to a point, then, VAN DER MEER's comments can be read as the suggestion that an even greater influence of the Cognitive approach could be lexicographically useful.

Second, there are aspects of lexicography that Cognitive Semantics has touched upon, but that fall outside the scope of the present paper, focusing as it does on problems of polysemy. In particular, frame theory has proved a highly stimulating framework for the description of verbal meaning, both theoretically and lexicographically: see FILLMORE/ATKINS (1992, 2000) for the more theoretical side of the approach, and compare the description of the Berkeley FrameNet project <http://www.icsi.berkeley.edu/~framenet> for the lexicographical applications.

And third, to complete the picture, it should also be mentioned that there are important aspects of current lexicographical practice that Cognitive Semantics has only marginally touched upon, in spite of the fact that the lexicographical approach has proved extremely rewarding for lexical analysis at large and for the study of polysemy in particular. Specifically, a collocational approach to polysemy, identifying different meanings through differences in collocational patterns, is a methodological focus for many current lexicographical projects (see a.o. MOON 1998). However, although the use of corpus materials is ardently advocated by a number of linguists working in the tradition of Cognitive Semantics (GEERAERTS/GRONDELAERS/BAKEMA 1994, BARLOW/KEMMER 2000), collocational methods to get a grip on polysemy are not (yet) among the standard equipment of cognitive linguists.

In short, although Cognitive Semantics appears to offer an exciting perspective for the further development of lexicography and lexicographical theory, the real interaction has clearly only started to emerge.

References

AYTO 1983 = JOHN AYTO: On specifying meaning. In: REINHARD R.K. HARTMANN, ed.: Lexicography. Principles and practice. London 1983, 89-98.

BARLOW/KEMMER 2000 = MICHAEL BARLOW, SUZANNE KEMMER, eds.: Usage-based models of language. Stanford 2000.

BRUGMAN 1981 = CLAUDIA BRUGMAN: Story of 'over'. MA Thesis. Berkeley 1981.

CRUSE 2000 = D. ALAN CRUSE: Aspects of the micro-structure of word meanings. In: YAEL RAVIN, CLAUDIA LEACOCK: Polysemy. Oxford 2000, 30-51.

DIRVEN/VERSPOOR 1998 = RENÉ DIRVEN, MARJOLIJN VERSPOOR: Cognitive exploration of language and linguistics. Amsterdam 1998.

FILLMORE/ATKINS 1992 = CHARLES FILLMORE, BERYL T.S. ATKINS: Towards a frame-based lexicon: the semantics of 'risk' and its neighbours. In: ADRIENNE LEHRER, EVA FEDER KITTAY: Frames, fields, and contrasts. New essays in semantic and lexical organization. Hillsdale 1992, 75-102.

FILLMORE/ATKINS 2000 = CHARLES FILLMORE, BERYL T.S. ATKINS: Describing polysemy: the case of 'crawl'. In: YAEL RAVIN, CLAUDIA LEACOCK: Polysemy. Oxford 2000, 91-110.

FRAWLEY 1981 = WILLIAM FRAWLEY: In defense of the dictionary. A response to Haiman. In: Lingua 55, 53-61, 1981.

GEERAERTS 1985 = DIRK GEERAERTS: Les données stéréotypiques, prototypiques et encyclopédiques dans le dictionnnaire. In: Cahiers de Lexicologie 46, 27-43, 1985.

GEERAERTS 1987 = DIRK GEERAERTS: Types of semantic information in dictionaries. In: ROBERT ILSON, ed.: A Spectrum of Lexicography. Amsterdam 1987, 1-10.

GEERAERTS 1990 = DIRK GEERAERTS: The lexicographical treatment of prototypical polysemy. In: SAVAS L. TSOHATZIDIS, ed.: Meanings and Prototypes. Studies in Linguistic Categorization. London 1990, 195-210.

GEERAERTS 1993 = DIRK GEERAERTS: Vagueness's puzzles, polysemy's vagaries. Cognitive Linguistics 4, 223-272, 1993.

GEERAERTS 1997= DIRK GEERAERTS: Diachronic prototype semantics. Oxford 1993.

GEERAERTS/GRONDELAERS/BAKEMA 1994 = DIRK GEERAERTS, STEFAN GRONDELAERS, PETER BAKEMA: The structure of lexical variation. Meaning, naming, and context. Berlin 1994.

HAIMAN 1980 = JOHN HAIMAN: Dictionaries and encylopedias. In: Lingua 50, 329-357, 1980.

HAIMAN 1982 = JOHN HAIMAN: Dictionaries and encylopedias again. Discussion. In: Lingua 56, 353-355, 1982.

HANKS 1994 = PATRICK HANKS: Linguistic norms and pragmatic exploitations, or why lexicographers need prototype theory, and vice versa. In: Ferenc Kiefer, Gabor Kiss, Julia Pajzs, eds.: Papers in Computational Lexicography. Budapest 1994, 89-113.

KILGARRIFF 1997 = ADAM KILGARRIFF: I don't believe in word senses. In: Computers and the Humanities 31, 91-113, 1997.

LAKOFF 1987 = GEORGE LAKOFF: Women, fire, and dangerous things. What categories reveal about the mind. Chicago, London 1987.

LAKOFF/JOHNSON 1980 = GEORGE LAKOFF, MARK JOHNSON: Metaphors we live by. Chicago, London 1980.

LARA 1989 = LUIS FERNANDO LARA: Dictionnaire de langue, encyclopédie et dictionnaire encyclopédique: le sens de leur distinction. In: FRANZ JOSEF HAUSMANN, OSKAR REICHMANN, HERBERT ERNST WIEGAND, LADISLAV ZGUSTA, eds.: Wörterbücher. Dictionaries. Dictionnaires. Berlin, New York 1989, I 280-287.

MANGASSER-WAHL 2000 = MARTINA MANGASSER-WAHL: Von der Prototypentheorie zur empirischen Semantik. Frankfurt-am-Main 2000.

MOON 1998 = ROSAMUND MOON: Fixed expressions and idioms in English. A corpus-based approach. Oxford 1998.

PALMER 1996 = GARY B. PALMER: Toward a theory of cultural linguistics. Austin 1996

PEETERS 2000 = BERT PEETERS, ed: The semantics-encyclopedia interface. Oxford 2000.

PUTNAM 1975 = HILARY PUTNAM: The meaning of meaning. In: HILARY PUTNAM, Mind, language, and reality. Philosophical papers II. Cambridge 1975, 215-271.

QUINE 1960 = WILLARD V.O. QUINE: Word and object. Cambridge, Mass. 1960.

STOCK 1983 = PENELOPE F. STOCK: Polysemy. In: REINHARD R.K. HARTMANN, ed.: LEXeter '83. Proceedings of the Exeter lexicography conference. Tübingen 1983, 131-140.

SWANEPOEL 1992 = PIET SWANEPOEL: Linguistic motivation and its lexicographical application. In: South African Journal of Linguistics 10, 49-60, 1992.

SWANEPOEL 1998 = PIET SWANEPOEL: Back to basics: prepositions, schema theory, and the explanatory function of the dictionary. In: THIERRY FONTENELLE, PHILIPPE HILIGSMANN, ARCHIBALD MICHIELS, ANDRÉ MOULIN, SIEGFRIED THEISSEN, eds.: Euralex '98 Proceedings. Liège 1998, 655-666.

TAYLOR 1995 = JOHN TAYLOR: Linguistic categorization. Prototypes in linguistic theory. Oxford 1995 (2nd ed.).

TUGGY 1993 = DAVID TUGGY: Ambiguity, polysemy, and vagueness. In: Cognitive Linguistics 4, 273-290, 1993.

UNGERER/SCHMID 1996 = FRIEDRICH UNGERER, HANS-JÖRG SCHMID, An introduction to Cognitive Linguistics. London 1996.

VAN DER MEER 2000 = GEART VAN DER MEER: Core, subsense, and the New Oxford Dictionary of English. In: ULRICH HEID, STEFAN EVERT, EGBERT LEHMANN, CHRISTIAN ROHRER, eds.: Euralex 2000 Proceedings. Stuttgart 2000, 419-431.

VIOLI 1997 = PATRIZIA VIOLI: Significato ed esperienza. Milano 1997.

ZWICKY/SADOCK 1975 = ARNOLD ZWICKY, JERROLD SADOCK: Ambiguity tests and how to fail them. In: JOHN KIMBALL, ed.: Syntax and Semantics 4. New York 1975, 1-36.
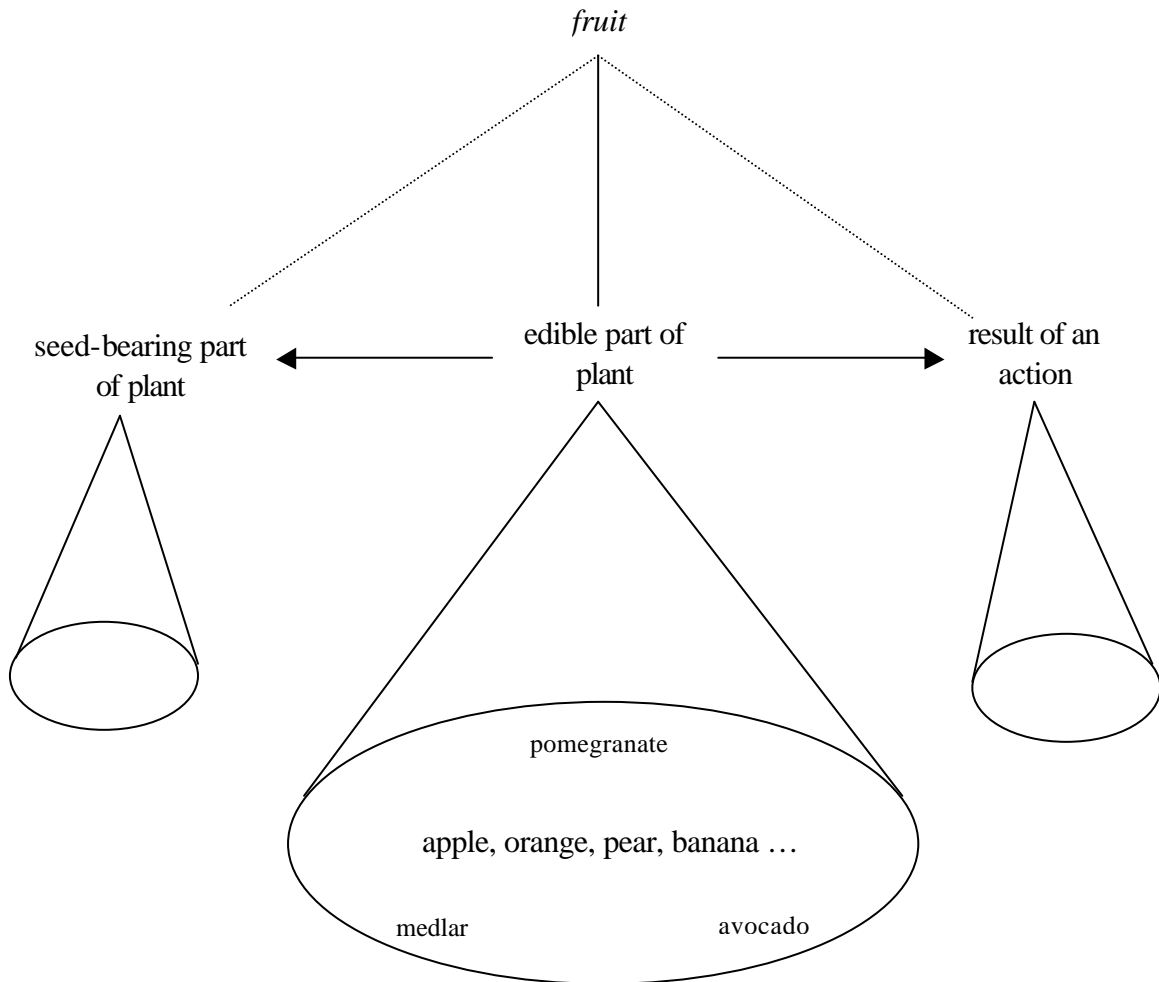
Figure 1

fruit

seed-bearing part
of plant

edible part of
plant

result of an
action

pomegranate

apple, orange, pear, banana …

medlar   avocado

Figure 2