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Polysemy's paradoxes

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Abstract

This article reviews some recent publications dealing with the phenomenon of polysemy, and addresses some of the questions which they raise. According to a generally accepted definition, polysemy is the association of two or more related senses with a single phonological form. In many respects, the definition is highly problematic. Important foundational questions concern the nature of word senses, how they can be identified, enumerated, and characterized, the manner in which they may be related, and the psychological reality of these constructs. A further question concerns the kinds of linguistic units that are candidates for a polysemy analysis. Also not to be overlooked is that fact that the phonological pole of a linguistic unit is likely to exhibit variation no less than the semantic pole. In spite of the many theoretical and descriptive problems associated with polysemy, it is remarkable that speakers of a language are rarely troubled by it. The paradox is traced back to way in which polysemy is conceptualized by linguists, against the backdrop of 'idealized cognitive models' of language. The article concludes with some observations on a usage-based approach to issues raised.

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1. Introduction

Although formal semanticists may choose to disregard polysemy for purposes of 'expository convenience' (Cann, 1993, p. 8), it is widely acknowledged that polysemy is endemic in natural languages. As such, it has been a central concern in lexical semantics, lexicography, translation studies, and natural language processing. The study of polysemy has been particularly prominent in so-called Cognitive Linguistics.

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Indeed, it is probably no exaggeration to say that a major impetus for the development of Cognitive Linguistics, in the 1980s and beyond, came from Brugman's account of the polysemy of *over* (Brugman, 1981) and from Lakoff's (1987) re-presentation of it.

Amongst some recent publications devoted to polysemy are the collected volumes by Ravin and Leacock (2000) and Cuyckens and Zawada (2001). Ravin and Leacock (henceforth R&L) assemble contributions from a range of theoretical and applied perspectives; especially informative is the editors' introduction, with its survey of older and more recent approaches. The Cuyckens and Zawada volume (henceforth C&Z), in contrast, restricts itself to Cognitive Linguistic approaches, the volume having emerged from the fifth International Cognitive Linguistics conference in Amsterdam, 1997.

Rather than summarize and comment separately on each of the chapters in these volumes (many of which would require a journal article in themselves), I will take the opportunity to address some of the more basic issues in the study of polysemy, as I see them. In doing so, I will refer to relevant contributions in some other recent collections, such as Foolen and van der Leek (2000), Pütz et al. (2001), and Bybee and Hopper (2001).

2. Issues in polysemy research

Taylor (1995, p. 99) defined polysemy as “the association of two or more related senses with a single linguistic form”. Though seemingly unproblematic, and indeed endorsed by C&Z (p. ix), this definition raises a number of conceptual and methodological questions.

First, the definition presupposes that we have a clear idea what kind of entity the ‘sense’, or ‘meaning’ of a linguistic form is (in the following, I will use ‘meaning’ and ‘sense’ interchangeably), also that we have procedures for reliably identifying such entities and criteria for determining whether, and in what way, these entities, once identified, are related. We also need to address the cognitive status of the meanings and the meaning relations thus identified. Are the different senses permanently stored in a person's mental grammar? Are the sense relations also represented? Are at least some meanings of a polysemous form generated online, in the processes of production and reception? A further set of questions concerns the linguistic forms to which the meanings attach. Traditionally, polysemy is regarded as a property of words (and in the following I will initially restrict myself to this aspect). However, other linguistic forms, such as bound morphemes, morphosyntactic categories, and even syntactic constructions, may also be candidates for a polysemy analysis.

2.1. ‘Senses’ and ‘uses’

You consume a steak differently from how you consume an ice cream, yet both activities can be called *eating*. Humans, with two legs, move differently from cats, with four legs, yet the verbs *run* and *walk* can be used of both. Alsatians and poodles

look very different, yet *dog* is an appropriate name for both of them. *On* designates a different spatial relation in *a book on the table* and *a mirror on the wall*. It would be extravagant, one might suppose, to associate each usage context of a word with a distinct meaning; after all, the range of uses of any item is potentially open-ended, and the idea of words being associated with an open-ended number of meanings is somewhat disturbing. To avoid this result, semanticists and lexicographers have taken meanings to be abstractions over usage events, specific uses being contextual elaborations of the abstract senses. The view was succinctly expressed by Katz:

Meaning must be an abstraction from the variable features of the things referred to by the term: the meaning of a word must represent only the invariant features by virtue of which something is a thing, situation, activity, event or whatever of a given type. Otherwise no word could ever be used again with the same meaning with which it is used at any one time, since there is always some difference in what is referred to from one time to the next. (Katz, 1972, quoted in R&L, p. 10 and in C&Z, p. xi)

The abstractions need to meet two requirements. First, they need to capture what is common to a range of already encountered uses. Inevitably, the abstract meanings filter out quite a lot of context-specific detail. At the same time, the abstractions need to be sufficiently rich in detail in order that the range of possible uses can be properly circumscribed. It is incumbent, then, on the analyst to frame word meanings at just the right level of abstraction— schematic enough so as to cover all the encountered uses, but sufficiently detailed so as to exclude impossible uses.

For many words (it might even be the case for most, or even for all words), these two requirements cannot simultaneously be met. To be sure, one can imagine an abstract sense of *run* which captures what is common to instances of rapid two-legged motion on the part of humans, and which will differentiate running from walking, crawling, skipping, and so on. But if we modify the abstract sense so that it covers other uses of *run*, as when the word is applied to cats, noses, water taps, streams, car engines, commercial enterprises, and politicians seeking election, we risk letting in all manner of expressions which lie outside the bounds of linguistic convention. We need an account of *run* which not only sanctions the above-mentioned uses, but which also excludes the possibility of our saying that blackbirds run, or that a microwave oven runs. It is here, of course, where polysemy comes to the rescue. We identify a number of lower-level generalizations, each of which is valid for a subset of a word's uses. The issue then becomes the identification and proper characterization of these lower-level generalizations, and the possible relations between them.

Often, there does not appear to be a unique solution. One reason for this is that different contexts may require us to zoom in, as it were, at different levels of abstraction. Cruse ('Aspects of the micro-structure of word meanings', in R&L) illustrates on the example of the word *knife*. If, at the dinner table, observing Billy fingering his food, I ask whether he has a knife, I am using *knife* to refer to a kind of

eating implement, and Billy could truthfully answer ‘no’ even though he has a penknife in his pocket. The example suggests that *knife* has at least two distinct (and incompatible) senses: the eating implement as opposed to the penknife. On the other hand, if I am working in the garden and need to cut some string to tie up the tomatoes, and ask *Have you got a knife, by any chance?*, I am using *knife* in a more general sense. In principle, any kind of knife will do (although, obviously, some kinds, such as plastic picnic knives, might not be particularly suitable for the task).

As C&Z (p. xv) point out, cognitive linguists have often been accused of advocating ‘rampant polysemy’. Thus Meex (‘The spatial and non-spatial senses of the German preposition *über*’, in C&Z) identifies five kinds of relations associated with the preposition, which, when instantiated in spatial, temporal, and abstract domains, give rise to no fewer than 39 ‘usages’. This proliferation of senses may, however, be justified to the extent that a detailed study of a word will require the analyst to focus, not only on more general meanings, but also on sub-senses which abstract over restricted ranges of uses and whose properties cannot be fully predicted from a more abstract sense. The point is emphasized by Queller (2001) in his study of a specific set of uses of *over*, namely, those involving the expression *all over*. In *There was water all over the floor*, *over*, it would seem, has the covering sense exemplified in *There’s a table cloth over the table*, while *all* has its standard quantifying sense. Yet we would tend not to say that there were red squares ‘all over the table cloth’, nor, indeed, that the table cloth was ‘all over the table’. According to Queller, the relevant sub-sense of *all over* has to do, not so much with ‘maximal coverage’, but with ‘chaotic dispersal’. This sub-sense is not simply a function of already recognized senses of *over* and *all*, it has special properties of its own. Another sub-sense is exemplified by *He had guilt written all over his face*. At issue here is the uncontrolled expression of emotion which interferes with a person’s intention to present a front of composure or nonchalance. Hence it would be odd to say that a person had pleasure, or rage, ‘written all over their face’. Note that this usage involves, not just the expression *all over*, but the phrasal expression *NP have [emotion] written all over NP’s face*. Some uses of *all over* might even need to be accorded the status of learned formulaic phrases, as when a lecturer says of a student’s work, *This essay is all over the place*, meaning that the essay jumps from topic to topic, and lacks a coherent structure.

In view of the special properties of quite low-level generalizations, it may often not be possible to determine exactly how many different meanings a word actually has, a point persuasively argued by Geeraerts (1993) and Tuggy (1993). Symptomatic of this state of affairs is the fact that dictionaries can differ with respect to the number of senses that they list. My *Collins English Dictionary* lists 13 senses for the verb *open*, while my Longman’s *Dictionary of Contemporary English* lists only five. It is not just that larger dictionaries make finer distinctions than smaller ones. As Fillmore and Atkins (‘Describing polysemy: The case of “crawl”’, in R&L) demonstrate, the senses identified in one dictionary do not always map into the senses identified in another dictionary. Neither is this kind of disagreement restricted to the lexicographers. Brugman’s (1981) study of English *over* spawned a veritable cottage industry of *over*-studies (see Lakoff, 1987; Vandeloise, 1990; Deane, 1993; Dewell,

1994; Kreitzer, 1997; Tyler and Evans, 2001, amongst others). At issue has been the proper level of abstraction at which the word's uses are to be described and the manner in which the different senses are related, as well as the question whether any single sense has privileged status as the word's 'basic' sense. As the papers by Queller (2001) and Hallan (2001) (to be discussed below) demonstrate, the debate is far from over.

2.2. How to state meanings

A definition of polysemy in terms of two or more related meanings requires that these meanings, whatever the level of schematicity at which they are identified, be properly characterized. The common practice of our dictionaries is to state a word meaning in the form of a paraphrase, that is, by means of another word, or group of words, whose meaning is supposedly synonymous with the meaning being defined, or in the form of a description of the kinds of things the word can be used to refer to.¹ Thus, Cruse, in the paper already referred to, offers the definition of *knife* as 'an implement with a blade and a handle used for cutting'. Cruse then points out that the definition—which at first sight looks reasonable enough—fails to distinguish *knife* from *saw* and *chisel*. It is not so much that the proposed definition lacks some differentiating features. The issue, as Cruse points out, is that the 'blade' referred to in the definition has to be a 'knife-type blade', the handle is a 'knife-type handle', and the cutting that the knife is used for is 'cutting knife-wise'. The very circularity of these explanations suggests that, in order to understand the word *knife* at all, you have to have had real-world experience of knives and of the practice of using knives. The definition of *knife* as 'an implement with a blade and a handle used for cutting' strikes us as reasonable only because we are already familiar with what knives are like and with the activities in which knives are used.

Problematic aspects of paraphrase definitions are nicely illustrated by Miller and Leacock ('Lexical representations for sentence processing', in R&L). They report an experiment in which children were presented with dictionary definitions of unfamiliar words and were asked to use the words in sentences of their own making. One child, asked to use the word *erode*, came up with the sentence *Our family erodes a lot*. This looks bizarre, until we realize that the definition of *erode* that had been given was 'eat out'. One might be inclined to use this example to argue that definitions need to be formulated much more carefully and precisely. This, certainly, is the line taken by Goddard ('Polysemy: A problem of definition', in R&L). Framing his definitions in Wierzbicka's Natural Semantic Metalanguage, and searching for maximally general senses of the kind advocated by Katz, Goddard argues against polysemy accounts of *wrong* (adjective) and *love* (verb), claiming that to recognize multiple senses for these words would be 'false and unnecessary'. Miller and Leacock take a different tack. They maintain that a dictionary entry should contain, not only a statement of the 'concept' that a word designates, but also a 'contextual

¹ Paraphrase definitions raise the question of synonymy and its associated problems. See Taylor (2002) for some discussion.

representation' for the word. We need information on the kinds of constructions a word can occur in, the words it typically collocates with, and the pragmatic-communicative values associated with the word.

Other contributors to the volumes under discussion have explored other alternatives to paraphrase definitions. These include frame-based accounts of meaning and meaning variation (Martin, 'A frame-based approach to polysemy', in C&Z) and the use of pictographic representations. Thus, Meex illustrates various uses of *über* with little drawings, of the kind popularized by Brugman (1981), while Huumo ('Scalar particles and the sequential space construction', in C&Z) uses Langacker-type drawings to depict the roles of processing time and event time in the various senses of *already* and *still*. Perhaps the most interesting exploration of non-propositional alternatives to definitions, however, is to be found in the papers by Gibbs and his colleagues on the 'embodiment' of meanings (Gibbs and Matlock, 'The psycholinguistics of polysemy', Beitel et al., 'The embodied approach to the polysemy of *on*', both in C&Z).

Consider the uses of *on* exemplified in *The vase is on the table* and *Pam is on a diet*. On the face of it, the two uses have little in common; for example, it is far from obvious how, or indeed whether, the second use could be construed as a metaphorical extension of spatial *on*. Gibbs explores the idea that *on*-relations are understood in terms of a cluster of 'image schemas' (Johnson, 1987), specifically, the images of covering, constraint, pressure, support, and visibility. Subjects were invited to sit on a table and to contemplate their bodily experience of being 'on' the table in terms of these schemas. Subsequently, they were asked to evaluate 37 expressions involving spatial and non-spatial *on* with respect to these somatic schemas.² Subjects found the task to be a meaningful one, even for the non-spatial uses (such as *on a diet*). More importantly, the way in which the 37 uses of *on* clustered in terms of image-schema responses correlated significantly with the way in which another group of subjects grouped the expressions in terms of their semantic similarity. (Concerning *on the table* and *on a diet*, the uses shared similar values on the constraint and pressure schemas, but rather different values on the remaining three.)

2.3. Sense storage vs. sense generation

The fact that a word may be used with a number of different senses does not entail that each of the senses is separately stored by a speaker; at least some of the senses could be generated on-line, in accordance with general principles of meaning extension. A similar issue arises in morphology, with respect to regular vs. irregular forms (cf. Jackendoff, 2002, p. 388). A person needs to learn that the past tense of *buy* is *bought*, not **buyed*. (The fact that several of the irregular pasts terminate in [ɔ:t], such as *caught*, *brought*, and *fought*, may well strengthen the association of *bought*

² Gibbs' experiments recall the 'semantic differential' procedure employed many years ago by Osgood et al. (1957; see also Taylor 1995, pp. 139–40). Osgood's technique for the 'measurement of meaning' involved asking subjects to rate concepts as diverse as 'mother' and 'democracy' on scales such as fast-slow, hard-soft, and weak-strong. In view of the image schematic nature of these dimensions, it would be an interesting project to revisit Osgood's research in light of more recent work by Johnson and Gibbs.

with past, but it does not remove the need to specifically learn this form.) On the other hand a person does not need to learn that the past tense of *walk* is *walked*; the form can be generated in accordance with a general pattern. Even so, it is not excluded that a person may store a regular form, especially if it has been entrenched through frequent use. Indeed, it is only on the basis of stored regular forms that the general pattern can emerge in the first place.

Do there exist general principles of meaning extension, which, like regular morphological processes, can be applied across the board to the appropriate items? Metaphor and, especially, metonymy come to mind as obvious candidates. There is no need to list ‘customer who ordered a ham sandwich’ as a sense of *ham sandwich* (as in *The ham sandwich left without paying*), since this sense can be generated by a general principle of metonymy. Moreover, since the metonymic sense is restricted to a very specific kind of situation, it is hardly likely to become widely entrenched through frequent use (expect, perhaps, in the lexicon of restaurant workers). General patterns of extension are also illustrated by the various senses of *school* and *museum* (building vs. institution), *book* and *newspaper* (text vs. physical object), *chicken* and *lamb* (animal on the hoof vs. edible flesh), *Plato* and *Shakespeare* (the person vs. their writings). In these cases, the related senses are likely to be encountered quite frequently, and are therefore candidates for separate storage. At the same time, the patterns of meaning extension, which are instantiated on quite a few lexical items, are also likely to achieve some degree of cognitive representation in their own right. Like productive morphological rules, they are able to apply across the board to any items meeting their specifications.

On the other hand, ‘irregular’ meaning extensions, which, like irregular morphological forms, have of necessity to be learned, are legion. (This is not to say that the irregular extensions will entirely lack motivation. As with the irregular past tenses, it may be possible to establish associations with meaning extensions exhibited by other lexical items). An idiosyncratic fact about *run* is that the verb has vastly more metaphorical uses than *walk*, *jog*, *swim*, and other manner of motion verbs. Whereas *high* can be applied to a wide range of physical and non-physical entities (*high wall*, *high temperature*, *high price*), its near synonym *tall* has relatively few non-spatial uses (*tall tale*, *tall story*). Although *go* is widely used as a change of state verb (*The milk went sour*, *The lights went red*, *The fire went out*), it cannot be used of any change of state (**The child went tired*, **The water went hot*).³ Sometimes, even, a meaning extension would appear to be unique to a particular form. A possible example is the collision sense of *into* (*I drove into a wall*), a use which has no parallels amongst the other directional prepositions of English (Jackendoff, 2002, p. 342).

Returning to the analogy with morphology, it should be noted that the distinction between regular and irregular morphological processes is not in fact a clear-cut one. To be sure, *theses*, as the plural of *thesis*, is irregular vis-à-vis the major plural formation process. Yet within the sub-category of the ‘Greek plurals’ (*crises*, *bases*,

³ Note the idiosyncratic sense of *The child went hungry*. The expression does not mean that the child became hungry as meal time approached. It conveys chronic neglect on the part of the caregivers.

analyses, etc.) the form is perfectly regular. Minor patterns of semantic extension are addressed by Fellbaum ('Autotroponomy', in R&L) with reference to verbs like *last*, *behave*, *smell*, and *cost*. *The children behaved* conveys that the children behaved well; different ways in which the children behaved may, however, be stated in an adjunct phrase (*The children behaved well/badly*). Similarly, *This product will last* conveys that the product will last a long time; again, the duration, whether long or short, may be explicitly stated (*This product will last a long time/only a short time*).

2.4. Polysemy networks

A defining feature of polysemy is that the various meanings of a word should be related. Usually, this involves claiming, for any pair of meanings, that one is more 'basic' than the other, that it is the 'source' from which the other meaning is an extension. If the relation between a source meaning and its extension is applied recursively, it becomes possible to represent the different senses of highly polysemous items in the form of a network, with chains of extended senses radiating out from a single central sense. This procedure is adopted by Fillmore and Atkins (for English *crawl* and French *rampier*) and by Selvik ('When a dance resembles a tree: a polysemy analysis of three Setswana noun classes', in C&Z).

How should these polysemy networks be evaluated? Suppose different scholars were to come up, independently, with alternative network accounts of the same set of data. On what basis is one network to be assessed as 'better', or 'more correct', than the other? One approach might be to appeal to overall elegance and economy. Another approach might be to appeal to cognitive reality. Are the different senses of a polysemous word, and the relations between them, indeed represented in the speaker's mental grammar in the manner suggested by the network? Are the multiple senses of a polysemous item acquired in the manner suggested by the radial model, from the central sense outwards? Currently, the matter is hotly debated, with inconclusive results (see e.g. Sandra and Rice, 1995; Croft, 1998; Sandra, 1998; Tuggy, 1999; as well as Brisard et al., 'Processing polysemous, vague, and homonymous adjectives', in C&Z). Consider, as an extreme option, the possibility that a person could use a word fully in accordance with the norms of the language, simply on the basis of their having learned a set of usage patterns. If such were the case, meaning relations would be figments of the analyzing linguist's imagination, corresponding to nothing at all in the user's mental grammar. Hallan (2001) notes that the earliest uses of *over* to emerge in child language involve the expressions *over here/over there* and *fall over*. There is no obvious relation between these two (on network accounts, very marginal and distantly related) uses; presumably, they will have been learned as idiosyncratic facts about the word. To all intents and purposes, *over* for a young child will be homonymous, not polysemous.

An interesting question now arises. In time, the child will acquire further uses of *over*. These may be able to provide the conceptual links between the first learned uses, so allowing a radial network, in all its complexity, to gradually take shape. *Over*, we might suppose, will cease to be homonymous and will become polysemous. It is doubtful, however, whether the changed status of *over* will have any con-

sequences at all for the way in which the child continues to use the already learned expressions *over here* and *fall over*. Should we conclude, then, that the distinction between polysemy and homonymy is of no significance? The idea might seem outrageous. With polysemy, the various senses of a word are related to each other. Polysemy is motivated, and to the extent that patterns of meaning relatedness occur throughout the lexicon, polysemy introduces a degree of redundancy into the mental grammar. With homonymy, the various senses are unrelated. Homonymy is an accidental phenomenon, and may be more appropriately thought of, not as a single word having two or more unrelated senses, but as two or more unrelated words happening to share the same phonological form. But in terms of a person's linguistic performance, the distinction may well be of little significance. As is well known, various tests have been proposed which are supposed to determine whether two uses of a word instantiate the same meaning or different meanings. These 'polysemy tests' are discussed in Geeraerts (1993) and are briefly reviewed in R&L (pp. 3–5). Whatever the drawbacks of these tests—and these have been amply discussed by Geeraerts—they do at least demonstrate that in certain, admittedly rather artificial contexts, the contrast between 'one meaning' and 'multiple meanings' does have linguistic repercussions. However, to my knowledge, no tests have ever been proposed for diagnosing polysemy as opposed to homonymy. A speaker's metalinguistic awareness of whether two senses of a word are related or not most likely has no consequences at all for the way the person uses the word. It is sufficient simply that the speaker has learned the appropriate facts of usage.

These issues are relevant to an evaluation of Selvig's paper on the Setswana noun classes. The three noun classes (or 'genders') that are investigated (classes 3, 5, and 7) comprise nouns of many different semantic types. Selvig assumes that the noun classes are polysemous (rather than homonymous, or, indeed, inherently meaningless) and proposes elaborate radial networks linking their various sub-senses. She also presents psycholinguistic evidence that speakers are able to assign schematic meanings to nonsense words on the basis of their noun class prefixes. (Her experiments, however, addressed only the 'central', and arguably highly salient senses of the noun classes, not the more peripheral senses). On studying these radial networks, I could not suppress the suspicion that no matter what the facts of the matter might have been on the ground, it will always be possible for a diligent and ingenious linguist to come up with *some* account of how all sorts of heterogeneous senses might be related. I am not denying that noun class membership in Bantu lacks any kind of semantic motivation. There are certainly tendencies for nouns which share a common semantic content to belong in the same class. Thus, names of trees are in Class 3, names of languages in Class 7, and so on. (Similar clusterings are found in the gender classes of the Indo-European languages. Thus, in German, names for kinds of beer are all neuter, whereas names for other kinds of alcoholic drinks are masculine.⁴) Cultural models, as discussed by Palmer and Woodman (2000), may also

⁴ See Köpcke and Zubin (1983) on semantic and phonological motivations for gender assignment in German.

account for some ‘local’ clustering of nouns in the various classes.⁵ It does not follow, however, that speakers of a Bantu language construct, or need to construct, an overarching semantic structure—whether radial or otherwise—which accommodates all the members of a noun class. In terms of a speaker’s cognitive representation of the noun classes, noun class assignment could well be arbitrary, to a large extent. Speakers simply have to learn, and manifestly do learn, that *this* group of nouns all take a particular prefix, and trigger such-and-such a pattern of agreement markers.

2.5. What are the ‘linguistic forms’ with which meanings are associated?

One typically thinks of polysemy as a property of words. But there is no reason why other formal categories, such as bound morphemes, morphosyntactic categories such as tense or aspect, or syntactic categories such as constructions, may not also be polysemous. Several authors have extended the polysemy concept to these other categories. Smith (‘Why quirky case really isn’t quirky’, in C&Z) examines the semantic values of cases in Icelandic; Panther and Thornburg (2001) offer an account of the polysemy of the English nominalizing-*er* suffix; and Selvig, as we have seen, proposes a radial polysemy account of the Setswana noun classes.

Studies of polysemy focus on variation in the semantic value of a linguistic form, while assuming that the form itself remains constant. But just as a word can have an array of different meanings, so also it can have an array of different pronunciations. *Tree*, for example, can be pronounced with greater or lesser degrees of affrication of the initial cluster, the vowel can be diphthongized to varying degrees, and so on. We might want to abstract away from the details of these pronunciations and propose a phonological representation which captures the commonality of the variants. The abstraction corresponds, by and large, with a traditional phonemic representation. Some words, however, have a range of phonemically distinct pronunciations. An often cited example is *economics*: [ɛkə'nɒmɪks] or [ɪkə'nɒmɪks]; more radical variation is exemplified by the indefinite article: [ə], [æ], [éɪ], [ən], [æɪ].⁶ The picture that emerges, therefore, is of a linguistic unit—a word, let us say—which associates a range of distinct representations in phonological space with a range of distinct representations in semantic space.⁷

Variation in the form of a linguistic unit becomes even more evident when we turn to morphosyntactic categories, such as past tense in English. Semantically, the past

⁵ A topic that has not been explored, to my knowledge, is the possibility that membership in the Bantu noun classes—like gender assignment in German—may be subject to phonological, as well as to semantic motivation.

⁶ Note that the Bantu noun class prefixes studied by Selvig do not always have an invariant phonological form. Noun class 3 in Setswana normally has the form *mo-*, except with roots commencing in *b*, hence *mo-bele* > *mmele* ‘body’.

⁷ Love (2002) points out that a word may also be associated with a range of different spellings. British speakers, for example, are liable to distinguish between ‘computer program’ and ‘radio programme’. Another example concerns the distinction between a ‘slipped disc’ and a ‘floppy disk’. As will be apparent, such examples raise the question of how to characterize the linguistic unit ‘word’ (a topic which I will not explore here).

tense has a number of values, including past time reference (*They found out this morning*) and hypotheticality (*Suppose they found out*). Phonologically, past tense can be realized by *-ed* or by irregular or suppletive forms. Phonological and semantic variation are independent, the suppletive form *went* having exactly the same range of semantic values (in its status as a past tense) as a regular form such as *walked*. In the case of constructional polysemy (consider the different roles of the subject nominal in the intransitive clauses *My mother drives well* and *My car drives well*), the different meanings are not associated with any specific phonological content at all, but with a syntactic pattern whose ‘slots’ can be filled by any material meeting the specifications of the construction.

Even further removed from the traditional concept of polysemy is the notion of ‘systemic polysemy’, proposed by Hendrikse (‘Systemic polysemy in the Southern Bantu noun class system’, in C&Z). Hendrikse is not concerned with the semantic values of any particular noun class, but with the semantics of the noun classes as a system. He shows, amongst other things, that the singular and plural classes do not neatly pair off one-to-one; rather, the singular and the plural classes constitute distinct sub-systems, whose semantics Hendrikse relates to the continuous vs. discrete, and uniplex vs. multiplex conceptualization of entities. Although the matter is not explored by Hendrikse, the systemic approach might be insightfully applied to a study of dynamic aspects of the system, in acquisition, diachronic change, and in contact situations. Research by Suzman (1996), for example, showed that children acquiring Zulu do not acquire the noun class system in one fell swoop. Initially, it seems, they make a broad two-way distinction between a human *u*-class (embryonic for class 1) and a non-human and inanimate *i*-class (embryonic for classes 5, 7, and 9). (Observe that the human-inanimate contrast correlates with a maximal phonological contrast between the non-low prefix vowels.) A further aspect worth investigation concerns the relative salience of the various classes within the system. Though I have no data to hand which might support this supposition, I should imagine that, in terms of both type and token frequency, class 3 is relatively infrequent vis-à-vis class 1, with which it shares a number of phonological commonalities.

3. Polysemy—whose problem?

In their introduction to their collected volume, R&L (p. 1) draw attention to a paradox. The paradox is that, whereas polysemy raises all kinds of theoretical and methodological issues for semanticists, and practical issues for lexicographers and for workers in natural language processing and automatic translation, speakers of a language rarely experience polysemy to be a problem at all.

This is strange, since, on the face of it, polysemy creates the potential for ambiguity. Moreover, the effects will be cumulative. A sentence containing n words each of which is m -times polysemous will in principle have $n \times m$ potential readings. It is commonly thought that context will serve to disambiguate the senses of a polysemous word. But if polysemy is ubiquitous, the disambiguating context will itself most likely also be many-ways ambiguous. It is not surprising, therefore, that

disambiguation is a major issue in natural language processing (see below). What *is* surprising is that for human language users, disambiguation, most of the time, is not an issue at all.

I want to suggest that the paradox may have its source in the way in which we conceptualize polysemy and, more generally, word meanings.

One of the firmest results to come out of the Cognitive Linguistics enterprise is the idea that concepts need to be understood against a broader knowledge configuration, variously studied as ‘frames’, ‘scenes’, ‘domains’, and ‘idealized cognitive models’ (Lakoff, 1987; Taylor, 1995). It may therefore be useful to apply the notion of cognitive model to our understanding of technical concepts of linguistic theory, in our case, the notion of polysemy.

Three cognitive models seem to be relevant to our understanding of polysemy: the model of language as a semiotic system, the building block metaphor of syntagmatic combination, and the conduit metaphor of communication. These conspire towards the reification of meanings, especially of word meanings. We tend to think of word meanings as objects which can be contemplated independently of the linguistic means of their expression and which, when combined, allow the meaning of a complex expression to be computed from the meanings of its parts. However, in order for compositionality to go through, we need to associate each word with a range of meanings, only one of which is selected in the combination process. The fact that for most language users, polysemy, most of the time, goes unnoticed, and rarely gives rise to the expected ambiguities, suggests that the cognitive models may actually be hindering, not aiding, a proper understanding of the phenomenon.

3.1. *The semiotic model*

According to the semiotic model, a language is a set of linguistic signs (prototypically: words), each of which associates a phonological structure with a semantic structure. The model—central to Saussure’s (1964) conception of language—invites us to imagine an ideal semiotic system, in which each signifier is paired off with a unique signified (Taylor, 2002). The ideal is captured by the well-known slogan ‘one form, one meaning’. Polysemy (and synonymy) would represent deviations from the semiotic ideal, polysemy through the association of more than one meaning with a single form, and synonymy through the association of a single meaning with different forms. Indeed, in terms of the semiotic model, the existence of polysemy would severely undermine the communicative efficiency of a language. Through the association of more than one signified with a signifier, polysemy will generate ambiguity, which, if not properly resolved, may lead to communication failure. The existence of synonymy, on the other hand, would merely be an extravagant luxury, in that limited phonological resources are squandered on the designation of one and the same concept. And here we have another paradox. The presumably dysfunctional phenomenon of polysemy would appear to be endemic in natural languages, whereas the functionally harmless phenomenon of (full) synonymy is vanishingly rare (Taylor, 2002).

True to the semiotic ideal, linguists of many theoretical persuasions have sought to minimize the role of polysemy in natural languages. For Coseriu (1977), polysemes are a matter of usage norms, distinct from the unitary values that constitute the language system. For Kirsner (1993), words are “invariant signals of invariant meaning” (p. 85); polysemy effects arise through the use which speakers make of these linguistic signs. Wunderlich (1993) claims that polysemy, so called, is merely an effect of ‘conceptual’ elaboration of unitary (i.e. non-polysemous) ‘semantic’ representations. Van der Leek (2000) has taken a similar line, arguing that words designate ‘Platonic’ (that is, highly general and abstract) concepts, which participate in, but do not uniquely determine, context-specific construals.

On the other hand, it has to be recognized that the semiotic model is not in itself incompatible with the existence of polysemy.⁸ The ‘cost’ of polysemy—the possibility of ambiguities and the need to resolve them—may be offset by other factors, whose role may actually enhance a language’s semiotic potential. The number of established phonological structures in a language is going to be smaller by far than the number of conceptual categories that a person may wish to designate. Moreover, in view of the changing environment and changing concerns of language users, conceptual categories, and what count as members of these categories, are liable to undergo modification over time. The possibility that new meanings can accrue to existing word forms renders a polysemy-tolerant communication system ecologically more viable than a rigidly isomorphous system, in which each signifier is associated with a unique semantic representation, and vice versa (Geraerts, 1985).

3.2. *The building block metaphor*

According to the building block metaphor, complex expressions are formed by joining together smaller units; conversely, complex expressions can be exhaustively broken down into their component parts. The building block metaphor creates the expectation that the meaning of a complex expression will be a function of the meanings of its constituent parts, just as the phonological form of the whole will result from the alignment of the phonological forms of its constituents. The metaphor requires that each constituent building block have a fixed and determinate semantic and phonological content which it contributes to the whole.

The metaphor is pervasive in our deliberations on language and its structure, and may well be unavoidable in our study of complex expressions (Langacker, 1991, p. 186).⁹ The reader may have noted that my earlier remarks on *all over* were initially

⁸ Langacker, on the opening pages of Langacker (1987, p. 11), is able to endorse the Saussurean conception of the linguistic sign, yet is also able to maintain (p. 50) that polysemy constitutes the normal, expected state of affairs in lexical semantics.

⁹ As Langacker (1991, p. 186) notes, the metaphor is probably unavoidable ‘for expository purposes’, as when we introduce beginning linguistics students to the concept of the morpheme. Yet, paradoxically, it is in the realm of morphology where the metaphor fails most conspicuously. To give just one example: *butcher*, like *writer*, appears to contain the agentive suffix *-er*. Yet there is no base verb (*to*) *butch* to which the morpheme attaches. *Butcher* cannot be exhaustively analyzed into its constituent building blocks, even though the word would appear to be morphologically complex.

framed in terms of the metaphor. I suggested the meaning of *all over* in *water all over the floor* could be computed from the covering sense of *over* in association with the quantifying sense of *all*, yielding the composite sense ‘total coverage’. Observe that for this account to go through, it is necessary to select just one sense of *over*, ignoring all the others. If, for example, we wanted to break down *over here* into its semantic building blocks, we should select a different sense of *over*, namely, the ‘end-point on a path’ sense. Postulating a range of distinct senses of a word therefore presents itself as a way of preserving the spirit of the building block metaphor, in face of a wide range of conventionalized uses of a word.

Strict application of the building block metaphor is liable to result in an explosion of polysemes. Consider the adjective *old* (Taylor, 1992). In examples such as *old man*, *old friend*, and *old student (of mine)*, *old* does not modify an associated noun in exactly the same way. An old man is a man who is advanced in years; an old friend is a person who has been a friend for a long time; an old student (of mine) is a person who used to be a student of mine but who no longer is my student. Proposing different senses of *old* allows the meanings of these Adj-N expressions to be built up from their constituent parts. The downside is that on the polysemy account of *old*, *old friend* ought to be three-ways ambiguous, with the interpretations ‘aged friend’, ‘friend of long standing’, and ‘former friend’. Yet if I introduce you to ‘an old friend’, only the second of these interpretations is likely to be in play.

At issue here, it would seem, is the manner in which a word of a given semantic type selects a specific reading of a word with which it is associated. The matter was addressed by Pustejovsky (1991), in his study of the ways in which words can mutually ‘coerce’ their readings. *Begin a novel* coerces a particular meaning of *novel*, namely, ‘novel-as-text’. Contemporaneously, this sense of *novel* triggers an enriched interpretation of *begin*, namely, ‘begin to read’. We can imagine other mutually coercing interpretations, as when talking of an author, a type setter, a translator, or a book-devouring insect ‘beginning a novel’. On the basis of these examples, we should not want to claim that *begin*, or *book*, are polysemous. Neither, according to Pustejovsky (‘Lexical shadowing and argument closure’, in R&L), do we need to posit two readings of *risk*, in the expressions *risk death* and *risk one’s life*.

Perhaps the major shortcoming of the building block metaphor is that it ignores the possibility that organizational principles may apply to the whole independently of how the parts are characterized. Consequently, the properties of the whole may go beyond, or may even be at variance with, the properties (however we wish to characterize them) of the parts. This is very evident with respect to phonological structure. Typically, *did you* would have the pronunciation [dɪ.dʒu], rather than the ‘compositional’ pronunciation [dɪd.ju:]. It is not just that the boundary segments of the building blocks [dɪd] and [ju:] have mutually influenced each other. Rather, the complex expression has been subject to re-organization in terms of syllable and foot structure. The component syllables of [dɪ.dʒu] do not match up with the syllables contributed by the component structures; moreover, the two syllables have been structured in terms of a strong-weak relation within a trochaic foot.

The interplay of word meanings (understood as the semantic units which words, in their status as building blocks, contribute to the whole) and the meanings of larger

expressions in which the words occur, has come to the fore in studies of constructions. Dowty (“‘The garden swarms with bees’ and the fallacy of ‘argument alternation’”, in R&L) argues that the kinds of verbs which are eligible to take locative subjects is determined by the semantics of the locative subject construction (for which Dowty offers a detailed and insightful analysis), it does not arise from, or entail, the polysemy of the participating verbs. Or consider Goldberg’s (1995, p. 29) often-cited example of a person ‘sneezing the napkin off the table’. *Sneeze* does not plausibly belong in the class of caused-motion verbs (*put*, *push*, *throw*, etc.). The caused-motion sense of *sneeze*—‘cause (the napkin) to go (to a place which is ‘off the table’) by sneezing (on it)’—is contributed by the syntactic construction [V NP PP] in which it occurs. The primacy of the construction over its parts is supported by the fact that in different instantiations of the construction the meanings of the parts are mapped in different ways onto the meaning of the construction (Mandelblit and Fauconnier, 2000). Thus, *sneeze* (in *sneeze the napkin off the table*) designates the causing action, whereas *trot* (in *trot the horse into the stable*) designates the caused activity. Appeal to constructions, then, may certainly reduce the need to postulate extensive polysemy at the level of words. On the other hand, polysemy (and all of its associated problems) is liable to re-emerge at the level of constructions. As argued by Goldberg (1995), the caused-motion construction itself has a number of distinct variants, each of which severely restricts the range of items which are eligible to occur in it.

3.3. *The conduit metaphor*

Lurking behind the building block metaphor and the semiotic model is the conduit metaphor of communication. The metaphor construes linguistic expressions as containers for semantic content; communication is a matter of sending the linguistic expressions, along a conduit, to a receiver, who then unpacks the containers and retrieves their content.

Reddy (1979) exemplified the metaphor in great detail and warned of its pernicious effects. For example, the metaphor downplays the role of the receiver in the interpretation of messages—what, after all, could be easier than taking a pre-packaged content out of a container? The metaphor also encourages us to associate words with discrete units of meaning. On this view, the task of the semanticist or the lexicographer is clear—it is to identify and to characterize these meaning units. We have seen, however, that the statement of word meanings is fraught with difficulties. Indeed, it may not even be possible, in principle, to state precisely how many different meanings a word has, let alone characterize the meanings in a way which accounts for their contribution to the meaning of a complex expression.

It is time, perhaps, to consider alternative approaches to the problem of polysemy. Perhaps we need to abandon the idea of words having a fixed number of determinate meanings, which they contribute to the complex expressions in which they occur. Some pointers to just such an alternative are contained in several papers in R&L, which I now address.

4. A usage-based approach

As mentioned, polysemy has been a major issue in natural language processing and in automatic understanding, data-mining, and translation systems. In their introductory essay, R&L relate how workers in natural language processing have tried to grapple with the reification of meaning, especially in relation to polysemy. The traditional approach has accepted that a word may have more than one meaning which it is able to contribute to the whole. Comprehension is a matter of selecting, from amongst the senses of a word, that sense which is pertinent to the context. Two aspects, therefore, are involved: (i) sense listing, and (ii) sense selection (or sense disambiguation). According to (i), the task is to list, for each word in the system's lexicon, the senses with which it is associated. According to (ii), the task is to devise algorithms which, given a particular use of a word, will select, from the various senses associated with a word, just that sense which is appropriate to the context.

The problems associated with (i) have already been mentioned. For a given word, it might not be at all apparent how many meanings it has, nor how these might be characterized. Moreover, given the lack of agreement on sense listings in the major dictionaries, it may be inadvisable to rely too heavily on decisions made by the lexicographers (as when using machine-readable versions of the dictionaries). Concerning (ii), i.e. sense selection, we can refer to a discussion of the problem which dates from the early years of natural language processing, Bar-Hillel (1960). Consider the sentence *The box is in the pen*. An understanding of this sentence requires that we select the appropriate sense of *pen*, namely, 'enclosure (typically for animals or for playing children)', rather than 'writing implement'. On the other hand, given the sentence *The pen is in the box*, we should want to select the writing-implement sense of *pen*.

These decisions are based on what we know, encyclopedically, about pens as enclosures and pens as writing implements, in particular, knowledge about the relative sizes of the two kinds of entities, and their ability to function as containers for other kinds of entities. This information is not likely to be included in standard dictionary definitions of the two senses of *pen*. To be sure, a programmer could include this information in the system's lexicon, and devise an algorithm which could decide, for any occurrence of *in the pen*, which of the two senses should be selected. The problem with this approach is not only that it requires the programmer to laboriously enter, for each word in the system's lexicon, all manner of encyclopedic knowledge associated with the word's different senses. Bar-Hillel's point was that the programmer will be unable to foresee all the possibly ambiguous contexts in which a word may occur. One never knows which bit of common-sense knowledge is going to be relevant to the next example of ambiguity that will turn up. Consequently, systems based on sense-listing and sense-selection will be appropriate only for tightly restricted domains of discourse, where the range of potentially ambiguous contexts can be reliably predicted in advance.

Consider, however, an alternative approach to the problem of the box and the pen. A text about pens ('writing implements') is not likely to involve reference to pens ('enclosures for animals or for playing children'), and vice versa. Moreover, the

one sense is likely to co-occur with words such as *ink*, *write*, and *paper*, whereas the other is likely to co-occur with words such as *children*, or the names of animals. The possibility thus arises that a word sense can be characterized in terms of a distinctive contextualization pattern, concerning the probability of the word in that sense occurring with other words, within a window of a given size (Schütze, ‘Disambiguation and connectionism’, in R&L). On this approach, words can be considered to be similar in meaning to the extent that their contextualization patterns are similar (Miller and Charles, 1991). Likewise, a word is polysemous to the extent that uses of the word cluster in different contextualization patterns. The question whether different uses of a word exemplify one or more senses hinges on the degree of tolerance that is allowed when different contextualization patterns are assessed for their similarity. A high tolerance factor will lump different contextualization patterns together, while a low tolerance factor will result in a proliferation of different senses. This, I think, is not an undesirable result; in fact, it is precisely the result which is needed in order to account for effects pertaining to the ‘micro-structure’ (Cruse, in R&L) of word meanings.

A proliferation of contextualization patterns (and therefore, also, of word senses) is compatible with the recent emphasis, in Cognitive Linguistics, on the ‘usage basis’ of linguistic knowledge (Barlow and Kemmer, 1999). Someone learning a language does not need to learn, and very likely does not learn, the maximally schematic meanings of the words in the language. A person needs to learn usage patterns for the words. The usage patterns are likely to be rather specific, having to do with particular combinations of words, appropriate to rather particular circumstances. One learns, for example, that it is possible to identify a place as either near or distant (in the horizontal plane) by means of the expressions *over here* or *over there*. One learns that it is possible to refer to the random results of an experiment by saying that the data are *all over the map*. To be sure, speakers abstract over usage events. If abstraction over usage events did not occur, speakers would have no basis for extending their linguistic behaviour beyond the verbatim repetition of already encountered utterances. The crucial question, it seems to me, concerns the level of abstraction of linguistic knowledge which sanctions the extension of a speaker’s linguistic repertoire. My hunch is that rather low-level abstractions, very many in number, and rich in contextual detail, may be more adequate for the purpose than a smaller number of more abstract, higher-level abstractions.

5. Concluding remarks

The two volumes which triggered this review article, [Ravin and Leacock \(2000\)](#) and [Cuyckens and Zawada \(2001\)](#), offer a valuable survey of contemporary approaches to polysemy, and will be essential reading to all students of the topic. As I have tried to show in this review, the seemingly straightforward concept of polysy (‘the association of two or more related senses with a single linguistic form’), once it is examined at all closely, raises all manner of conceptual and methodologi-

cal issues, many of which await resolution. We can be fairly confident that the last word on polysemy has not yet been spoken.

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